GOVERNMENT GENERAL DEGREE COLLEGE AT TEHATTA

Name – Aditi Haldar

Sub – ENVS

Sem – 1st (History Honours)

Roll – 14

Topic – Biological Hazards

(12)

09/03/2023

Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk

These organisms can affect human health, including infection, intoxication and even death. Infection when in the body, produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily heat. Spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only of Example of spore forming, clostridium botulinum and clostridum perfringens.

Toxins are produced whem toxin producing bacteria are present in high numbers. They survive normal cooking temperatures and temperatures higher than 80°c [176°F].

The risk of intoxication is prevented by controlling the growth of toxin producing baeteria. These to include: clostridium botulinum, Baeillus cereus, and staphyloecoceus aures.

Major biological hazards

- Baeteria ex: Salmonella spp. Entarohaemorrhagie to Esecheriichia coli, campylobaeter jejuni, yersinia to Baeills cereus, stophloecoeeus aureus. clostridium botulinom, clostridium perfringents. Vibrio wulnfic Vibrio parahaarmolyticus.

- Virus ex: Toxoplasma gondii, cryptosporidia. Giardia spp. Triehinella Spiralis, Taenia solim, Anisakis spp.

- Parasites ex: Toxoplasma gondil, cryptosporidia, Giardia Anisakis spp.

Sources

The major sources of biological contaminants in food are.

- animal guts: faecal contamination.

- Soil and water contaminated by non-treated manure
- cross contamination :
  - human contamination due to poor personal hygiene, faecal contamination, failure in infection control (illness not reported)
  - cross-contamination of food products spread from processing environment due to poor / improper sanitaiton.

Factors affecting the growth of microorganisms in foods

- The temperature values for microbial growth depend on the type of microorganism. For example, such [4°c or 39°F], while thermotrophe can grow at higher temperatures [44°c or 113°F).

- The pH of product acidily of growth of bacteria. Most of grow in a pH ronge between 5 and 9.

- The water Activity (a_w) refers to the water. The more Table 1 shows the impact of water activity on the bacteial spoilage.

aw of product	Bacterial Spoilage	Examples
> 0.90	Spoils easily	fresh vegetables, fresh meat, processed meat, milk, fish.
0.78-0.90	Suseeptible to spoilage	dry cheeses, flour, cakes, beans, cerals
> 0.78	little bacterial spoilage but mould may grow	Rolled oats, dried fruits, caramels, dehydrated foods.

Each of these factors is important for the control of microbial growth. It is the interaction control of micro organisms.

control and prevention

The most effectvee way to control biological hazards is by (GMP) and Hazard Analysis and critical of Point (HAccp) will help prevent biological hazards in yours facility.

GMPs ensure hazards associated with personnel of environment are controlled food production HACCP during food processing packing and storage.

Processing strategies to control biological hazards:

- effective thermal processing used as a kill step
- use of appropriate process controls:
  - storge temperatures (ex: cooler, freezer)
  - processing parameters (ex: temperature and time for cooking, water activty during dehydnation)
  - adequate cooling system.

effective cleaning and sanitizing procedures (ex: SSOPs)

use of foods technologies to prevent the growth of bacteria or other biological hazards.

- paekoging technologies to prevent the groth. of packaging modified atmosphere paekoging

- preservatives.

- proeessing teehnques (ex: dehydration).

GOVERNMENT GENERAL DEGREE COLLEGE AT TEHATTA

Name — Akash Biswas

Sub — ENVS

Sem — 1st (Banglie Honours)

Roll - 20

Topic — Biological Hazards

(11)

09/03/2023

Biological Hazards —

Biological Hazards are organisms, or substances Product by Organisms, or substances Product by organisms, that Pose a theat to human health. They are a major concern in food Procesing because they cause most food borne illness outbreaks.

Risk —

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria Produce toxice that affect the body.

Infection can be Prevented by Properly Processing and handling food Products. because Pathogens are easily destroyed by heat. However, Some bacteria that Produce Spores can Survive Cooking temperatures.

For example, steam Cooking sinificantly reduces non-spore-forming food borne Pathogens, but only inactivates spores. Examples of Spore forming bacteria meldue Bacillus Cereus, Costridium botulinum and Clostridium Perfrigens.

Toxins are Produced when toxin Producing bacteria are Present in high numbers. Bacteria must first grow in the food before Producing toxins. These toxins are very difficult to eliminate. They survive normal Cooking temperatures and when temperatures higher than 80°C (176°F).

The risk of intoxication is Prevented by Controling the growth of toxin Producing bacteria. These include: Clostridium botulinum, Bacillus Cereus. and Staphylococcus aureus.

Major biological hazards :

* Bacteria ex : Salmonella spp., Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphylococcus aureus Clostridium botulinum, Clostridiam Perfringens, vibrio vulnificus, vibrio Parahaemolyticus

* Virus ex : hepatitis A virus, Norwalk viruses, Rotavirus

* Parasites ex : Toxoplasma gondii, Cryptosporida Giardia spp., Trichinella Spiralis, Taenia solium Anisakis spp.

Sources :

The major sources of biological contaminats in food are:

- animal guts: faecal contamination
- Soil and water Contaminated by non-treated manure
- Cross contamination :
  - human Contamination due to Poor Personal hygiene, fuecal contamination, failure in infection Control (illness not reported)
  - Cross-Contamination of food Products spread from Processing environment due to Poor / improper Sanitation.

Factors affecting the growth of microorganisms in foods :

* The temparature :— values for microbial growth depend on the type of microorganism. For example, Such [4°c or 39°F], while thmotraghs can grow of higher temparature [44°c or 113°F].

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Each of these factors in imported for the Control of merobial growth. It is the interaction control of microorganisms.

Control and Prevention –

The most effectvee way to control biological hazards is by (GMP) and Hazard Analysis and Critical of Point (HACCP) will help Prevent biological hazards in yours facility.

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Processing strategies to control biological hazards:

- effective teremal Procesing used as a kill step
- Use of appropriate Process Controls:
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  - adequate Cooling System.

effective eleaning and Saritirng Procedures (ex: SSOPs)

- Use of foods technologies to Prevent the growth of bacteria or Other biological hazards.

– Packaging technologies to Prevement the groth of Packaging modified atmosphere Packaging

– Preservatives.

– Proessing tecnques (ex: dehydration).

UNIVERSITY OF KALYANI

TEHATTA GOVERNMENT COLLEGE



TEHATTA, NADIA

BIOLOGICAL HAZARDS

(13)

SUB : ENVS

09/03/2023

Submitted By : AMARJIT BISWAS

B.A Bengali Hons 1st Semester Exam,2023

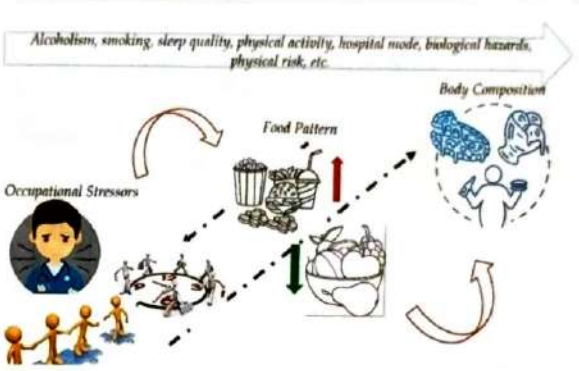
Registration No. :

Session : 2022-23

Biological Hazards

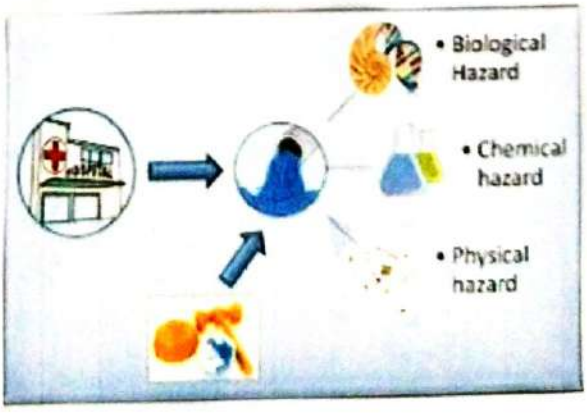
Biological Hazards are organisms, or substances ~~Product~~ produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk



These organisms affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.



For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore

forming bacteria include Bacillus cereus, clostridium botulinum and Clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°c (176°F).



The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. ~~Ttease~~ These include: Clostridium botulinum, Bacillus cereus, and Staphylococcus aureus.

Major biological hazards

- **Bacteria ex:** Salmonella SPP.. Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphylococcus aureus, Clostridium botulinum, Clostridium -



perfringens, Vibrio vulnificus, Vibrio paraha-emolyticus.

- **Virus ex:** hepatitis A virus, Norwalk viruses, Rotavirus.

- **Papasites ex:** Toxoplasma gondii, Cryptosporidia, Giardia spp, Trichinella spiralis, Taenia solium, Anisakis spp.



Sources

The major sources of biological contaminants in food are:

(i) **animal guts:** faecal contamination.

(ii) soil and water contaminated by # non-treated manure.

(iii) **Cross contamination:**

- human contamination due to poor personal hygiene, faceal contamination, failure in infection control (illness not reported)

- cross-contamination of food products spread from processing environment due to poor/improper sanitation.

Factors affecting the growth of microorganisms in foods

(i) The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F).



(ii) The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.

(iii) The water Activity (aw) refers to the water available in the product. The more water available the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

aw of product	Bacterial spoilage	Examples
>0.90	spoils easily	fresh vegetables, fresh meat, processed meat, milk, fish.
0.78-0.90	susceptible to spoilage	dry cheeses, flour, cakes, beans, cereals
<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods.

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

control and prevention

The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing Practices (GMPs) and Hazard Analysis and critical control Point (HACCP) will help Prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

Processing strategies to control biological hazards:

(i) effective thermal processing used as a kill step (ex: cooking, pasteurization)

(ii) use of appropriate process controls:
- storage temperatures (ex: cooler, freezer)
- processing parameters (ex: temperature and time for cooking, water activity during dehydration)
- adequate cooling system.

(iii) effective cleaning and sanitizing procedures (ex: SSOPs)

(iv) use of food technologies to prevent the growth of bacteria or other biological hazards:
- Packaging techniques (ex: use of vacuum Packaging, modified atmosphere Packaging)

- preservatives

- processing techniques (ex: dehydration)



TEHATTA GOVERNMENT GENERAL DEGREE COLLEGE

2023

Biological Hazards

Sub: ENVS.

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Sem- BA 1st (Bengali Honours)

Roll-27

Student ID- 1570003

13

09/03/2023

■ জৈবিক বিপদ: একটি জৈবিক বিপদ, বা জৈব বিপত্তি, বা জৈব পদার্থ যা জীবিত প্রানীর স্বাস্থ্যের জন্য হুমকি সৃষ্টি করে প্রাথমিকভাবে মানুষের। এটি একটি অনুজীব, ভাইরাস বা টক্সিনের একটি নমুনা অন্তর্ভুক্ত করতে পারে যা মানুষের স্বাস্থ্যের প্রতি বিরূপ প্রভাব ফেলতে পারে।

■ জৈবিক বিপদের প্রকারভেদ: কর্মক্ষেত্রের সবচেয়ে সাধারন বিপদগুলির মধ্যে একটি হলো জৈবিক বিপদ, যা কর্মীদের ক্ষতি এবং সংক্রামিত করার সম্ভাবনা রয়েছে।

যদিও বেশিরভাগ বায়োহাজার্ড গুলি প্রায়শই ছত্রাক ব্যাকটেরিয়া, ভাইরাস, পরজীবি থেকে আসে। জৈবিক বিপদের 4 টি প্রধান প্রকার গুলি হলো-

i) জৈবিক এজেন্ট: এই শ্রেনীবিভাগের মধ্যে রয়েছে ব্যাকটেরিয়া, ভাইরাস, পরজীবি এবং ছত্রাক (যেমন ইস্ট, এবং ছাঁচ) ইত্যাদি। এগুলি সাধারনত ক্ষতিকারক অনুজীব বলে বিবেচিত হয়। যখন কিছু প্রানী বা মানুষের জন্য COVID-19 ভাইরাসের মতো গুরুতর ঝুঁকি এবং রোগের কারন হতে পারে।

ii) বায়োটক্সিন: এগুলি জৈবিক উৎস সহ পদার্থের একটি গ্রুপকে বোঝায় যা মানুষের জন্য বিষাক্ত। প্রায়শই বায়োটক্সিন গাছপালা, ব্যাকটেরিয়া, পোকামাকড় বা কিছু প্রানী দ্বারা উৎপাদিত হয়। ক্রমাগত এক্স পোজারের ফলে সারা শরীরে প্রদাহজনক প্রতিক্রিয়া হতে পারে।

■ রক্ত এবং রক্তের পণ্য: সচিত্ত রক্তকে জৈবিক্য বিপদ হিসেবে বিবেচনা করা হয় না, তবুও যদি এটি দূষিত হয় বা এর উৎস কোনোভাবে সংক্রমিত হয় তবে তবে এটি সম্ভাব্য ঝুঁকি ঘটন হতে পারে। এছাড়াও, রক্তের পণ্য যেমন লোহিত রক্তকণিকা, শ্বেত রক্তকণিকা, প্লাজমা, টিস্যু এবং প্লেটলেটগুলিও যদি সঠিকভাবে পরিচালনা না করা হয় তবে তা বিপজ্জনক।

■ পরিবেশজাত নমুনা: মাটি, এগুলি উদ্ভিদ, মাটি বা জলকে বোঝায় সেগুলি সম্ভাব্যভাবে প্রথম দুটি ধরনের জৈবিক বিপদ ধারন করে। সেটি হলো— i) জৈবিক এজেন্ট ii) বায়োটক্সিন।

বিভিন্ন ধরনের জৈবিক বিপদের সম্ভাব্য ঝুঁকিগুলিকে সঠিকভাবে চিহ্নিত করতে পারিবেশ, সংস্থা, স্বাস্থ্য ও নিরাপত্তা পরিচালকদের এবং কর্মীদের সাহায্য করার জন্য জৈবিক এজেন্টদের শ্রেণীবিন্যাসের একটি সিস্টেম প্রতিষ্ঠিত হয়েছে। এছাড়াও, এই সিস্টেমটি ঝুঁকির মাত্রার ওপর ভিত্তি করে কার্যকর ব্যবস্থা বাস্তবায়নে একটি নির্দেশিকা হিসাবে ব্যবহৃত হয়।

বিশ্ব স্বাস্থ্য সংস্থার ল্যাবরেটরি বায়োসেফটি অনুযায়ী জৈবিক বিপদের 4 টি ঝুঁকি গ্রুপ নিম্ন বর্ণনা করা হলো—

■ জৈবিক এজেন্ট বা জীব যা সুস্থ মানুষ বা প্রাণীদের রোগের কারন হতে পারে না।

- প্যাথোজেন যেগুলি মানুষ বা প্রানীদের রোগের কারন হতে পারে তবে শ্রমিক, সম্প্রদায় বা পরিবেশের জন্য গুরুতর বিপদ হওয়ার সম্ভাবনা কম।

- প্যাথোজেনগুলি মানুষ বা প্রানীদের জন্য গুরুতর রোগ সৃষ্টি করে যা সাধারনত একজন সংক্রামিত ব্যাক্তির বিজ্ঞাপন থেকে হয়।

- মানুষ বা প্রানীদের মারাত্মক রোগ সৃষ্টিকারী প্যাথোজেন যা প্রত্যক্ষ বা পরোক্ষভাবে সংক্রমনযোগ্য এবং যার জন্য প্রতিরোধমূলক এবং চিকিৎসা ব্যাবস্থা উপলব্ধ নাও হতে পারে।

- জৈবিক স্বাস্থ্য বিপদঃ- জৈবিক স্বাস্থ্যের ঝুঁকির মধ্যে রয়েছে ব্যাকটেরিয়া, ভাইরাস, পরজীবি এবং ছাঁচ বা ছত্রাক। যখন তারা শ্বাস নেওয়া, খাওয়া বা ত্বকের সংস্পর্শে আসে তখন তারা মানুষের স্বাস্থ্যের জন্য হুমকি সৃষ্টি করতে পারে। এগুলি খাদ্য বিষক্রিয়া, টিটেনাস, শ্বাসযন্ত্রের সংক্রমন বা পরজীবি সংক্রমনের মতো অসুস্থতার কারন হতে পারে। আমরা খাদ্য, বায়ু বা জলের মাধ্যমে সংক্রামিত জৈবিক বিপদগুলি পর্যবেক্ষন ও নিয়ন্ত্রনের বিষয়ে দক্ষতা এবং সংস্থান সরবরাহ করি।

- ব্যাকটেরিয়া প্রাক্তন- সালমোনেলা এসপিপি, ভিজিন, অরিয়াস, ব্যাসিলাস সেরিয়াস, ক্লোসট্রিডিয়াম, ইত্যাদি

- ভাইরাস প্রাক্তন- হেপাটাইটিস এ ভাইরাস, নরওয়াক ভাইরাস, রোটাভাইরাস।

■ জৈবিক বিপদের কুপ্রভাব গুলি হলো-

এই জীবগুলি সংক্রমন, নেশা এবং এমনকি মৃত্যু সহ মানুষের স্বাস্থ্যকে প্রভাবিত করতে পারে। জীব যখন হোস্টকে আক্রমন করে এবং শরীরে সংখ্যাবৃদ্ধি করে তখন সংক্রমন ঘটে। সঠিকভাবে প্রক্রিয়াকরন এবং খাদ্য পন্য পরিচালনার মাধ্যমে সংক্রমন প্রতিরোধ করা যেতে পারে কারন প্যাথোজেনগুলি তাপ দ্বারা সহজেই ধ্বংস হয়ে যায়।

উদাহরনস্বরূপ, বাষ্প রান্না উল্লেখযোগ্যভাবে অ-স্পোর গঠনকারী খাদ্যবাহিত রোগজীবানুকে হ্রাস করে, কিন্তু শুধুমাত্র স্পোরগুলিকে নিষ্ক্রিয় করে। স্পোর গঠনকারী ব্যাকটেরিয়াগুলির উদাহরনগুলির মধ্যে রয়েছে ব্যাসিলাস সেরিয়াস, ক্লোস্ট্রিডিয়াম পারফ্রিনজেন।

টক্সিন উৎপন্ন হয় যখন টক্সিন উৎপাদনকারী ব্যাকটেরিয়া বেশি সংখ্যায় থাকে। বিষক্তে পদার্থ তৈরি করার আগে ব্যাকটেরিয়া অবশ্যই খাদ্যে বৃদ্ধি পাবে। এই টক্সিন নির্মূল করা খুব কঠিন। বিষ উৎপাদনকারী ব্যাকটেরিয়ার বৃদ্ধি নিয়ন্ত্রন করে নেশার ঝুঁকি রোধ করা হয়। এর মধ্যে রয়েছে- ব্যাসিলাস সেরিয়াস এবং স্ট্যাফিলোকক্কাস অরিয়াস।

■ খাদ্যে অনুজীবের দ্বারা প্রভাবিত উপাদান গুলি হলো-

অনুজীবের বৃদ্ধির জন্য তাপমাত্রার মান অনুজীবের প্রকারের উপর নির্ভর করে। সাইক্রোট্রফ যেমন লিস্টেরিয়া মনোসাইটোজিন হিমায়ন তাপমাত্রায় (4°C বা 39°F) বৃদ্ধি পায়। যখন থার্মোট্রফগুলি উচ্চ তাপমাত্রায় বৃদ্ধি পেতে পারে। একটি পন্যের pH পন্যটির অম্লতা বা ক্ষারত্বের সাথে সম্পর্কিত। পন্যের pH ব্যাকটেরিয়ার বৃদ্ধিকে প্রভাবিত করে।

■ নিয়ন্ত্রন এবং প্রতিরোধ:

জৈবিক বিপদের নিয়ন্ত্রনের সবচেয়ে কার্যকর উপায় হলো প্রতিরোধ, গুড ম্যানুফ্যাকচারিং প্র্যাকটিস এবং হ্যাজার্ড অ্যানালাইসিস অ্যান্ড ক্রিটিক্যাল কন্ট্রোল পয়েন্ট বাস্তবায়ন আপনার সুবিধার জৈবিক বিপদ প্রতিরোধ সাহায্যে করবে।

জিএমপি গুলি নিশ্চিত করে যে কর্মীদের এবং পরিবেশের সাথে সম্পর্কিত বিপদগুলি খাদ্য উৎপাদনের সময় নিয়ন্ত্রিত হয়। HACCP এমন বিপদগুলি নিয়ন্ত্রন করে যা উপাদান এবং প্যাকেজিং উপকরনগুলিতে উপস্থিত থাকতে পারে এবং এছাড়াও খাদ্য প্রক্রিয়াকরন, প্যাকেজিং এবং স্টোরেজের সময় ঘটে থাকে।

■ জৈবিক বিপদ সংক্রমনকারী কিছু ব্যাকটেরিয়া হলো-

i) ব্রুসেলোসিস- ব্রুসেলোসিস একটি ব্যাকটেরিয়া দ্বারা সৃষ্ট হয় এবং সংক্রামিত গবাদি পশু বা সোয়াইন পরিচালনার মাধ্যমে সংক্রমন হয়। শ্রমিকরা সংক্রামিত প্রানীর বায়ুবাহিত রক্ত বা টিস্যুতে শ্বাস নেওয়ার মাধ্যমে, সংক্রামিত পদার্থের সাথে হাত বা শরীরের অন্যান্য অংশে কাটার মাধ্যমে ব্যাকটেরিয়ার সংস্পর্শে আসতে পারে। ব্রুসেলোসিস-এর লক্ষণগুলির মধ্যে রয়েছে ক্রমাগত জ্বর, মাথা ব্যাথা, দুর্বলতা, জয়েন্ট ব্যাথা, ক্ষুধা হ্রাস, রোগের চিকিৎসার জন্য অ্যান্টিবায়োটিক ব্যবহার করা হয়।

ii) Psittacosis একটি ব্যাকটেরিয়াজনিত রোগ যা সংক্রামিত পোল্ট্রি দ্বারা বাহিত হয়। পোল্ট্রি শ্রমিকরা পোল্ট্রির রক্তের

সংক্রামক পেতে শ্বাস-প্রশ্বাসের মাধ্যমে উদ্ভাসিত হয়। এই ব্যাকটেরিয়াজনিত রোগ গুলির লক্ষণগুলি হলো- জ্বর, ঠান্ডা লাগা, মাথাব্যাথা, শরীরে ব্যাথা এবং কাশিসহ একধরনের নিউমোনিয়া। অন্যান্য লক্ষণগুলির মধ্যে রয়েছে অনিদ্রা, বমি বমি ভাব, ডায়রিয়া অন্তর্ভুক্ত থাকতে পারে।

iii) Erysipeloid হলো হাঁস-মুরগি এবং মাছের হ্যান্ড-লারদের মধ্যে দেখা যায় এমন একটি রোগ যেখানে ধারালো হাড় এবং পাখনার কাঁটা থেকে ঘন ঘন ক্ষত হয়। Erysipeloid একটি ব্যাকটেরিয়া সংক্রমন, এবং সংক্রমনের স্থানের চারপাশে লালাভাব, জ্বালা এবং জ্বলন সৃষ্টি হয়। ক্ষত বিরুদ্ধে সুরক্ষার জন্য পোল্ট্রি এবং মাছ ইত্যাদি কর্মীদের দ্বারা প্রতিরক্ষামূলক গ্লাভস পরতে হবে।

উপরে বর্নিত হাঁস-মুরগি, মাংস বা খাদ্যের জন্য শ্রমিকরা প্রতিদিন আরো বেশি বিপদ প্রকাশ করে। নতুন প্রযুক্তি, কোটা বা দ্রুত লাইনের গতির কারনে হোরি-জোনের উপর নতুন বিপদগুলি হ্রাস পায়। এবং পুরনো বিপদগুলি বাড়তে থাকে।

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TEHATTA GOVERMENT GENERAL DEGRE COLLEGE

Environement Studies Projeet On
Biological Hazards

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বর্তমানে সংবাদপত্র, টেলিভিশন এবং বিভিন্ন মহলে Hazard ও Disaster সম্পর্কে প্রায়ই জানা যায়। এ সম্পর্কে পরিবেশ বিজ্ঞানী, সমাজবিজ্ঞানী, ভূ-তত্ত্ববিদ এবং ভৌগোলিকেরা নানান সংজ্ঞা ও ব্যাখ্যা দিয়েছেন। তবে সবই প্রকৃতপক্ষে নয়। পরিবেশ বিজ্ঞানীরা Hazard-কে Natural hazard বলতেই বেশি আগ্রহী আবার এই বিষয়ে ভূ-তত্ত্ববিদ ও ভৌগোলিকদের মধ্যে সামান্য মতভেদ রয়েছে। ভূ-তত্ত্ববিদেরা Hazard আলোচনায় Natural Geological factors আর ভৌগোলিকেরা Anthropo-genic factors এর উপর বেশী গুরুত্ব আরোপ করেছেন।

প্রকৃতপক্ষে 'Hazard' এবং 'Disaster' এর মধ্যে বিষয়গত ও প্রয়োগগত ব্যবধান রয়েছে। ভৌগোলিকেরা Hazard-এর ব্যাখ্যা দিয়েছেন যে, এটি হল ভূমিরূপগত বা প্রাকৃতিক প্রক্রিয়া যার মধ্যে নানা প্রাকৃতিক ও ভূমিরূপগত উপাদান অন্তর্ভুক্ত এবং এটি প্রাকৃতিক ও মানুষ্যকৃত। তবে সাধারণভাবে বলা যায় এটি সর্বোচ্চ প্রাকৃতিক ও মানবিক প্রক্রিয়া যার সঙ্গে সময়স্থিতি যুক্ত থাকে না। ভূমিরূপবিদ Prof. Savindra Singh (2001) Hazard-এর সংজ্ঞা দিয়েছেন যে,

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'Hazards are generally taken to be the Processes (causal factor) and the responses (Results) of extreme events, both natural and anthropogenic, which cause an accident/Extreme events/for danger'.

Prof. S. R. Basu (2004), মতে 'Hazard' হল একটি ভূতাত্ত্বিক / ভূমিরূপগত পদ্ধতির আভ্যন্তরীন বা বাহ্যিক প্রকাশ যার মধ্যে নানান প্রাকৃতিক উপাদান ও প্রক্রিয়া অঙ্গাঙ্গিক ভাবে জড়িত। 'Hazard' -এর অর্থে ব্যাপকভাবে না হলেও অল্পবিস্তর ক্ষয়ক্ষতি যুক্ত থাকে, যদিও মনুষ্য জীবনকে ধ্বংস করতে পারে না। এটি একটি পরিস্থিতি বিশেষ তবে তা দুর্ঘটনা নয়।

পরিশেষে বলা যায় দুর্যোগ (Hazard) প্রাকৃতিক, মনুষ্যসৃষ্ট বা উভয় কারণেই হতে পারে এবং যার মধ্যে ভূ-তাত্ত্বিক ভূমিরূপগত এবং সংস্কৃতি উপাদান অন্তর্ভুক্ত। অল্প সময়ের জন্য হলেও মানুষের স্বাভাবিক জীবনযাত্রাকে বিঘ্নিত করে থাকে। নীচে Hazard -এর কিছু স্বাভাবিক বৈশিষ্ট্য তুলে ধরা হল -

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① এটি প্রাকৃতিক, ভূমিরূপগত, ভূতাত্ত্বিক এবং সাংস্কৃতিক উপাদানের সংযুক্ত ক্রিয়া।

② তা সাধারণত ক্ষুদ্র স্কেলে সংঘটিত হয়।

③ মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যাহত না করলেও অল্প বিস্তর জীবনযাত্রার গতিকে রুদ্ধ করে দেয়।

④ ক্ষয়ক্ষতির প্রভাব ব্যাপক মাত্রায় না থাকলেও সামাজিক, প্রাকৃতিক ও অর্থনৈতিক সম্পদের অল্প বিস্তর ক্ষতি হয়।

⑤ দুর্যোগ উপযুক্ত আধুনিক পরিকল্পনার মাধ্যমে নিয়ন্ত্রন করা যায়।

বাংলাদেশের দুর্যোগ প্রবনতা :-

বাংলাদেশের মানুষের জীবনে ঝড়, ঘূর্ণিঝড় জলোচ্ছ্বাস, খরা, বন্যা, নদীভাঙ্গন ইত্যাদি প্রাকৃতিক দুর্যোগ নিয়মিত ঘটনা। ভৌগলিকভাবেই পৃথিবীর অন্যতম প্রাকৃতিক দুর্যোগ প্রবন দেশ বাংলাদেশের এসব দুর্যোগ প্রায় প্রতি বছর মানব সম্পদসহ অবকাঠামোগত, অর্থনৈতিক ও প্রাকৃতিক সম্পদের বিপুল ক্ষতি সাধন করে। ভৌগলিক অবস্থানগত বাস্তবতাই এর প্রধান কারন। নদীবিধৌত বাংলাদেশের উত্তরে হিমালয় পর্বতমালা, দক্ষিনে বঙ্গোপসাগর।

P.T.O

দেশের পশ্চিমাঞ্চলের কিছু পার্বত্য অঞ্চলে ও তিব্বতীয় মালভূমি হতে উৎপন্ন সাত আন্তর্জাতিক নদী। তাই হিমালয়ের বরফগলা পানিতে যেমন বন্যা সৃষ্টি হয় তেমনি হিমবাহ হতে হয় অতিবৃষ্টি। আমাদের দেশের অবস্থান উষ্ণমণ্ডলীয় অঞ্চলে এবং দক্ষিণের বঙ্গোপসাগরের সমুদ্রপৃষ্ঠের উষ্ণতা (29° সে.)। ফলে সমুদ্রে ঘূর্ণিঝড়ের সৃষ্টি হয়। সাম্প্রতিককালে বৈশ্বিক উষ্ণতা বৃদ্ধি ও পরিবেশ বিপর্যয়ের কারণে এসব ঘূর্ণিঝড় মারাত্মক আকার ধারণ করেছে। অন্যদিকে নদীমাতৃক বাংলাদেশের প্রধান প্রধান ও সুদূর প্রসারী নদীগুলোর উৎস ভারত ও নেপাল। পার্শ্ববর্তী দেশের নদী শাসনের কারণে এদেশে বন্যা ও খরার মতো দুর্যোগের সম্মুখীন হতে হয়।

প্রাকৃতিক দুর্যোগ :-

প্রাকৃতিক সৃষ্ট আকস্মিক ও চরম প্রতিকূল পরিবেশগত অবস্থাকে প্রাকৃতিক দুর্যোগ বলা হয়। প্রাকৃতিক দুর্যোগ যে কোনো দেশেই মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যাহত, বিপর্যস্ত ও দুর্বিসহ করে তোলে। বিশ্বের সর্বত্রই প্রাকৃতিক দুর্যোগ কম-বেশি অর্থনৈতিক আঘাত আনে। প্রাকৃতিক আঘাতের মুখোমুখি দাঁড়িয়ে করণীয় প্রায় কিছুই থাকে না। তাই দুর্যোগ ব্যবস্থাপনা অত্যন্ত গুরুত্বপূর্ণ। দুর্যোগ ব্যবস্থাপনা বলতে বোঝায় এমন একটি সমন্বিত ব্যবস্থা যাতে দুর্যোগপূর্ব, দুর্যোগকালীন ও

P.T.O

দুর্যোগ পরবর্তী সময়ে বিভিন্ন পরিকল্পনা, সংগঠন, সমন্বয়, নিয়ন্ত্রনসহ, যথাযথ কার্যক্রম গ্রহন ও বাস্তবায়নের মাধ্যমে দুর্যোগের ক্ষয়ক্ষতি হ্রাস করা যায়।

দুর্যোগ ব্যবস্থাপনার উদ্দেশ্য :-

ক) দুর্যোগকালীন মানবজীবন, সম্পদ ও বন্য প্রানি এবং পরিবেশগত ক্ষতি হ্রাস করা।

খ) ক্ষতিগ্রস্থ মানুষের কাছে অগ্রাধিকার ভিত্তিতে দ্রুত পৌছানো।

গ) দুর্যোগ পরবর্তী উদ্ধার, পুর্নগঠন, পুনর্বাসন নিশ্চিত করা।

দুর্যোগ ব্যবস্থাপনা :-

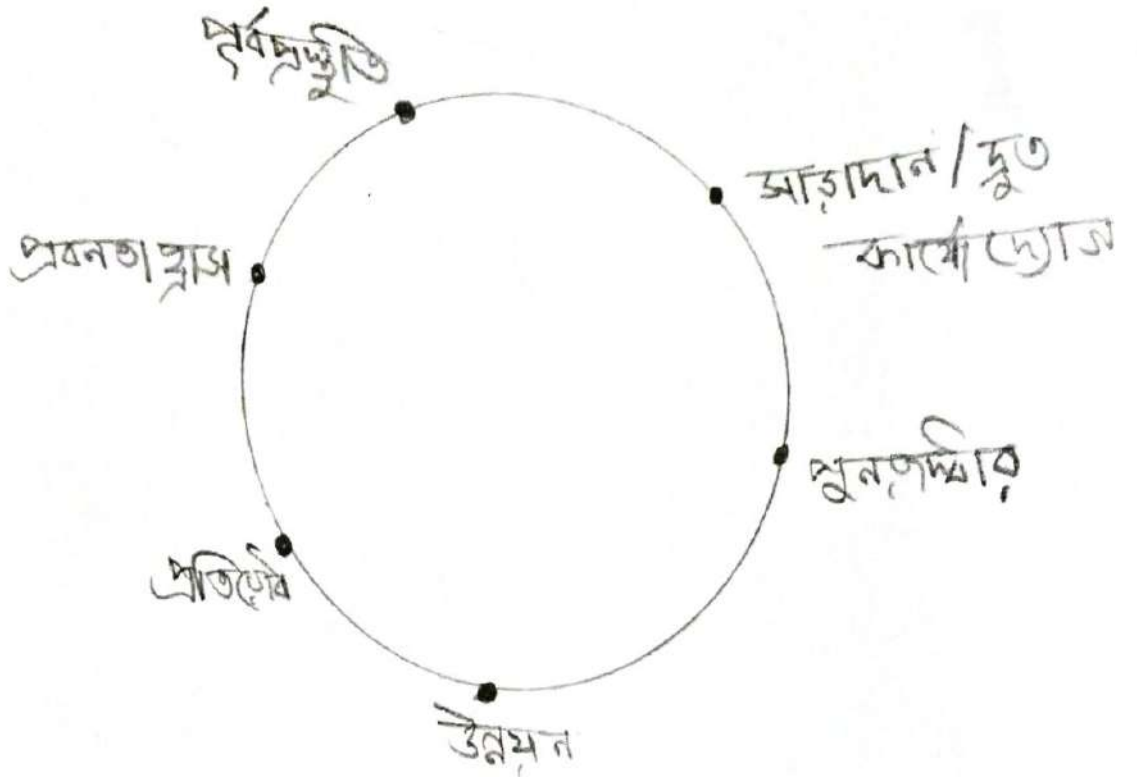
আগেই, বলা হয়েছে যে দুর্যোগ ব্যবস্থাপনা হল একটি সমন্বিত দুর্যোগ মোকাবেলা ব্যবস্থাপনা। দুর্যোগ ব্যবস্থাপনাকে তিনটি ধাপের একটি সমন্বিত ব্যবস্থাও বলা যেতে পারে। যথা :-

১) দুর্যোগপূর্ব প্রস্তুতি।
২) দুর্যোগকালীন তৎপরতা।
৩) দুর্যোগ পরবর্তী পুনরুদ্ধার।

অর্থাৎ, দুর্যোগের কার্যকরভাবে মোকাবেলায় ক্ষয়ক্ষতি হ্রাসের লক্ষ্যে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগপরবর্তী ধাপে গৃহীত পদক্ষেপ ও কার্যক্রমকেই এক কথায় দুর্যোগ ব্যবস্থাপনা বলে।

RTO

দুর্যোগ ব্যবস্থাপনা কার্যক্রমের উপাদানসমূহ কী কী উপায়ে কাজ করে তা একটি চক্রের সাহায্যে দেখানো হল নীচে।



দুর্যোগ ব্যবস্থাপনা কার্যক্রমে সুষ্ঠুভাবে সমন্বয় করার উদ্দেশ্যে সাংগঠনিকভাবে জাতীয় ও স্থানীয় পর্যায়ে বিভিন্ন কমিটি গঠন করা হয়েছে।

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TEHATTA, NADIA, 741160

Name : Anisha Mondal.

1st Year 1st Semester

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Date of Submisson : 01.03.2023

Session : 2022-23

(14)

09/03/2023

ENVS

Project



Biological Hazards

Introduction :

A biological hazard, or biohazard, is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a microorganism, virus or toxin that can adversely affect human health. A biohazard could also be a substance harmful to other living beings.

The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substances will know to take precations. The biohazard symbol was developed in 1966 by Charles Baldwin, an environmental-health engineer working for the Dow Chemical Company on the containment products.

It is used in the labeling of biological materials that carry a significant health risk, including viral samples and used hypodermic needles.

ANSI Z535/OSHA/ISO regulation :-

Biohazards Safety issues are identified with specified labels, Signs and paragraphs established by the American National Standards Institute (ANSI). Today ANSI Z535 Standards for biohazards are used world wide and should always be used appropriately within ANSI Z535 Hazards Communications (HazCom) Signage, labeling and paragraphs. The goal is to help workers rapidly identify the sereority of a biohazard from a distance and through colour are design standardization.

Biological hazard Symbol design :

- A red on white or white coloured background is used behind a black biohazard Symbol when integrated with a DANGER Sign label or paragraph.



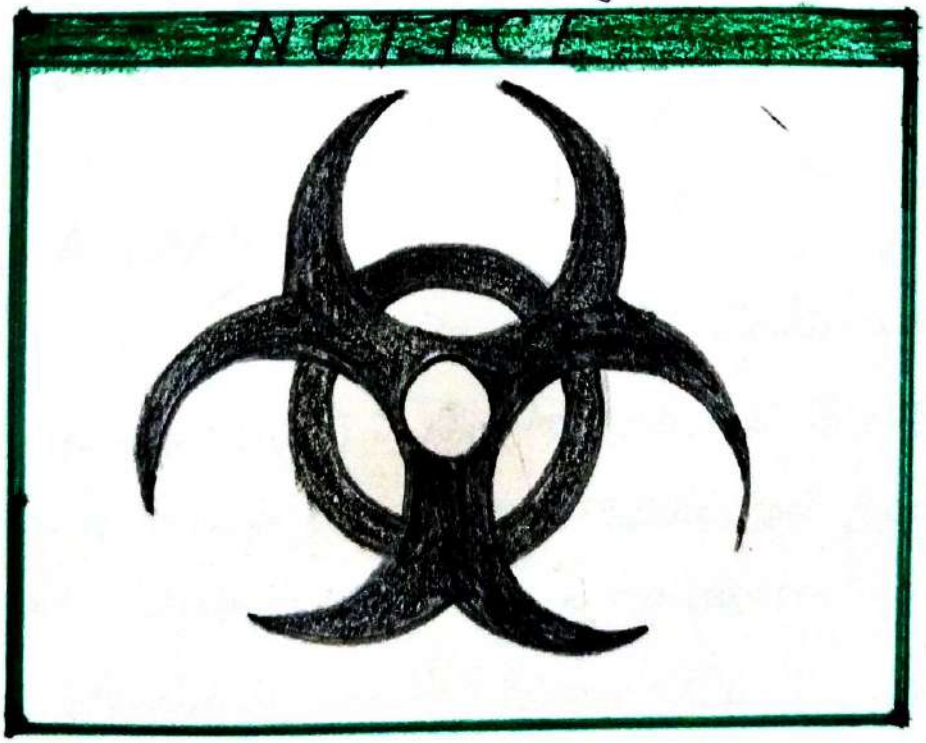
- An orange on black or white - coloured background is used behind a black biohazard Symbol when integrated with a WARNING Sign, label or paragraph.



- A yellow on black or white - coloured background is used behind a black biohazard Symbol when integrated with a CAUTION Sign, label or paragraph.



- A green on white or white-coloured background is used behind a black biohazard symbol when integrated with a NOTICE Sign, label or paragraph.



DANGER is used to identify a biohazard that will cause death. WARNING is used to identify a biohazard that may cause death. CAUTION is used to identify a biohazard that will cause injury, but not death. NOTICE is used to identify a noninjury biohazard message.

UN / ISO classification

Biohazardous agents are classification for transportation by UN number.

- Category A, UN2814 – Infections substance, affecting humans: An infections substance in a form capable of causing permanent disability or life-threatening or fatal disease in other wise healthy humans or animals when exposure to it occors.

- Category A, UN2900 – infectious substance affecting animals (only): An infectious substance that is not a form generally capable of causing permanent disability or life-threatening or fetal disease in otherwise healthy humans and animals

when exposure to themselves occurs.

- Category B, UN 3373 –

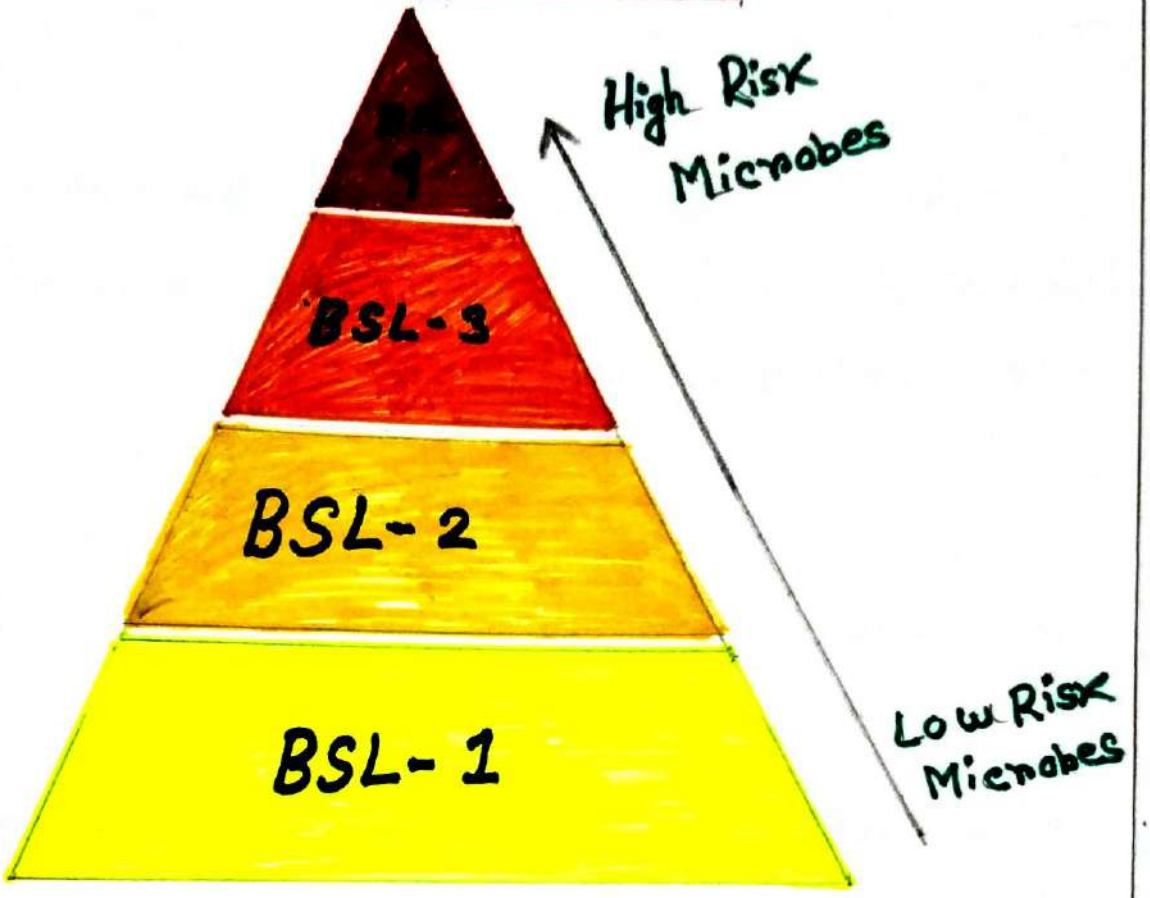
Biological Substance transported for diagnostic or investigative purpose.

- Regulated Medical Waste, UN 3291 – waste or reusable meterial derived from medical treatment of an animal or human or from biomedical research, which includes the production and testing.

Levels of biohazard

The united Staxes Centers of Disease Control and Prevention (CDC) categorize various diseases in levels of biohazard, Level 1 being minimum risk and Level 4 being extreme risk. Labaratories and other facilities are categorized as BSL 1-4 or as P1 through P4 for Short (Pathogen or Protection Level).

Biohazard Safety Levels



- Anthropogenic hazard – Hazard caused by human action or inaction.
- Biocontainment – Physical containment of Pathogenic organisms or agents in microbiology laboratories.
- Biological agent – Pathogen that can be weaponized.

- Biosafety level - Level of the biocontainment precautions required to isolate dangerous biological agents.
- Chemical hazard - Non-biological substance that has the potential to cause harm to life or health.
- Hazard - Situation or object that can cause damage or harm.

- Health hazard - Situation or object that can cause damage or harm.
- Interplanetary contamination - Biological contamination of a planetary body by a space probe or spacecraft.

- List of laboratory biosecurity incidents.
- Mechanical hazard - Hazard with a mechanical energy source.
- Occupational hazard - Hazard experienced in the workplace.
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- Planetary protection - Guiding principle of a space mission.
- Public health - Promoting health through organized effort and informed choices of society and individuals.

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09/03/2023

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I convey my deep sense of gratitude to ~~Sir~~ mam Susmita Chaudhary for suggesting the way I may find suitable for the development of my project and has valuable guidance has been a constant help and encouragement in the preparation of this manuscript. I owe to him in every sense for providing me with the facilities through out the course of the investigating. I am grateful to all my friends in the class and my groupe whome I represent for perpect. giving an active support in this

Ankan Biswas

Date:- 01/02/2023 Signature of the Student

Biological Hazards

Biological hazards are organisms, or substance produced by organisms, that, pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk

These organisms can affect human health, including infection, intoxication and even death, infection occurse when organisms invade the host and multiply in the body. Intoxication occurs when bacteria product toxins that affect the body.

Infection can be prevented by properly processing and handing food products because pathogens are easily destroyed by heat. However, some bacteria that product spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-froming food borne pathogens, but only inactivates spores.

Examples of spore forming bacteria include Bacillus cereus, clostridium botulinum and clostridium perfringens.

Toxins are producted when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food befor producing toxins. These toxins are very difficult to eliminate they survive normal cooking temperatures and even temperature higher than 80°C (176°F)

Major biological hazards

- Bacteria ex: Salmonella spp, Enterohaemorrhagic Escherichia coli, compylobacter iejuni, yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphococcus aureus, clostridium botulinum, clostridium perfringens, Vibrio vulnificus Vibrio ~~Non~~ vulnificus, vibro parahaemolyticus,
- Virus ex: hepalitis A virus, Norwalk, viruses, Rotavirus
- parasites ex: Toxoplasma gondii, cryptosporidia, Giardia spp, Trichinella spiralis, Teania Solium, Anisakis spp.

Sources

The major sources of biological contaminants in food are:

- animal guts: faecal contamination
- Soil and water contaminated by non-treated manure
- Cross contamination
  - human contamination due to poor personal hygiene, faecal contamination, failure in infection control (illness not reported)
  - cross-contamination of food products spread from processing environment due to poor/ improper Sanitation.

Factors affecting the growth of microorganisms in foods

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as refrigeration temperature (9°C or 39°F) while thermotrophs can grow at higher temperatures (45°C or 113°F).

- The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. most bacteria grow in a pH range between 5 and 9

- The water Activity (a_w) refers to the water available in the product. The more water available, the better bactaria will grow. Table I Shows the impact of water activity on bacterial Spoilage.

aw of product	Bacterial Spoilage	Examples
>0.90	Spoils easily	fresh vegatables, fresh meat, processed meats milk, fish
0.78-0.90	Susceptible to Spoilage	dry cheeses, flours, cakes, beans, cereals
<0.78	little bacterial Spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of micro organisms.

Control and prevention

the most effective way to control biological hazards is by prevention. The imple mentation of Good manufactering practices (GMPs) and Hazard Analysis and Critical control point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personal and environment are controlled during food producting. HACCP controls hazards that may be present in ingredients and packaging and storage.

processing Strategies to control biological hazards.

- effective thermal to control biological processing used as a kill step (ex: cooking pasteurization)
- used of appropriate process controls.

- Storage temperatures (ex: cooler, freezer)
- processing parameters (ex: temperatures and time for cooking, water activity during dehydration)
- adequate cooling system

- effective cleaning and sanaitizing procedures (ex: SSOPs)
- use of food technologies to prevent the growth of bacteria or other biological hazards:
  - packaging techniques (ex: use of vacuum packing, modified atmosphere packaging)
  - preservatives
  - processing techniques (ex: dehydration)



TEHATTA GOVERNMENT COLLEGE

(12)

ENVS PROJECT

Sy 09/03/2023

NAME :- ANKAN MONDAL

SUBJECT:- ENVS

COURSE :- B.A.HONS(ENGLISH)

SEM :- 1ST SEMESTER

YEAR:-2022-2023

ENVS



Project Topic

Biological Hazards

INTRODUCTION

A biological hazard, or bio hazard, is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a microorganism, virus or toxin that can adversely affect human health. A biohazard could also be a substance harmful to other living beings.

The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substances will know to take precautions. The biohazard symbol was ~~deko~~ developed in 1966 by charles Baldwin, an environmental-health engineer working for the Dow Chemical company on the containment Products.

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Biological hazard's symbol design :→

- A red on white coloured background is used behind a black biohazard symbol when integreated ~~whe~~ with a 'DANGER' sign. Label ore paragraph.



- An orange on black ore white-coloured background is used behind a black biohazard symbol when integreated with a 'WARNING' sign, table ore paragraph.



- A yellow on black or white - coloured background is used behind a black bio-hazard symbol when integrated with a 'CAUTION' sign label or paragraph.



- A green on white or white coloured background is used behind a black bio hazard symbol when integrated with a 'NOTICE' sign or paragraph.



'DANGER' is used to identify a biohazard that will cause death. 'WARNING' is used to identify a biohazard that may cause death. 'CAUTION' is used to identify a biohazard that will cause injury, but not death. 'NOTICE' is used to identify a noninjury biohazard message.

OSHA requires the use of proper ANSI HAZCOM where appliable in American workplaces, state and local governments also use these standards as codes and laws with in their own jurisdictions. Proper use of ANSI Z535 signs, labels and paragraphs are written into many of OSHA standards for Hazcom and created to integrate with ISO symbols.

Reference ANSI Z535 for a complete description on how to use 'DANGER', 'WARNING', 'CAUTION', 'NOTICE' signs, lables, paragraphs.

* UN/ISO Classification:-

Biohazards agents are classification for transportation by UN number.

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❋ BIOSAFETY LEVEL:→

The united states centers for Disease control and prevention (CDC) categorise, various diseases in levels of biohazard, Level 1 being minimum risk and level 4 being extreme risk. Laboratories and other facilities are categorized as BSL 1-4 or as P1 through P4 for short (Pathogen or Protection Level).

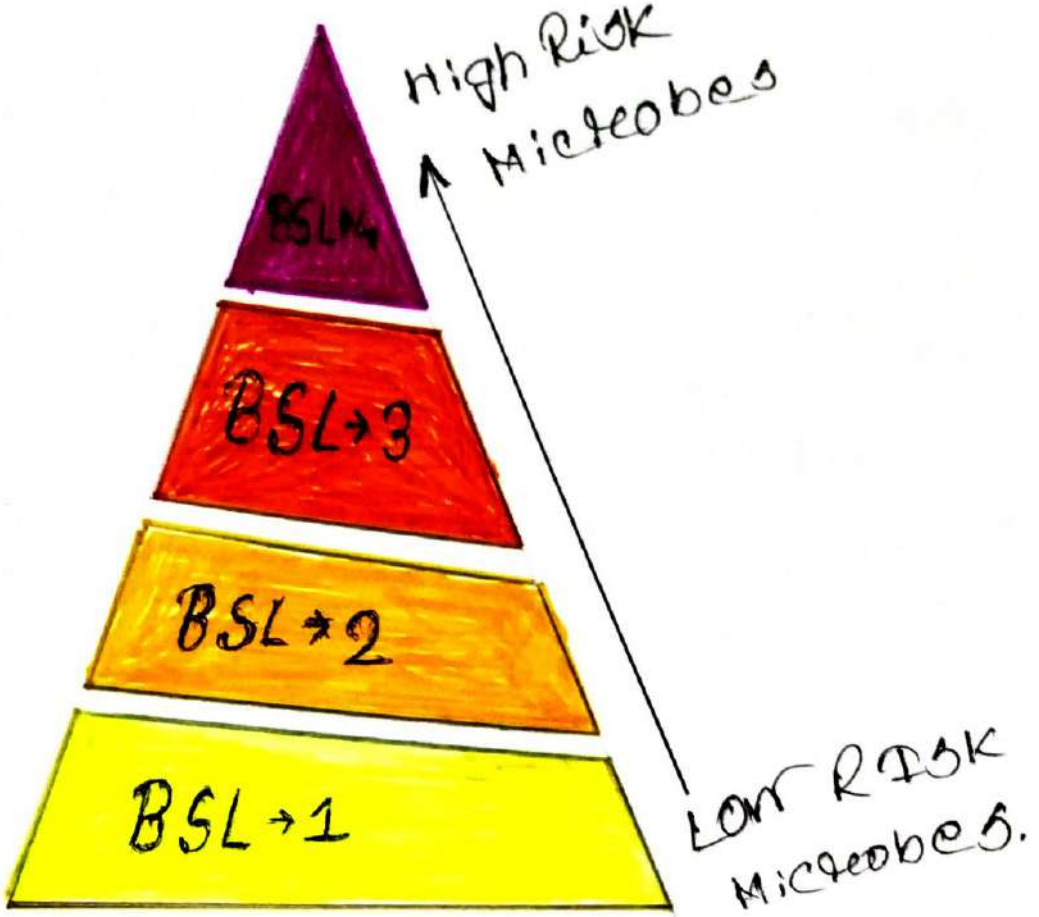
• Biohazard level 1:→ Bacteria and viruses including Bacillus subtilis, canine hepatitis, Escherichia coli and varicella (chicken pox) as well as some cell cultures and non-infectious bacteria. At this level Precautions against the biohazard materials in question are minimal, most likely involving gloves and some sort of facial protection.

• **Biohazard level 2 :→** Bacteria and viruses that cause only mild disease to humans or are difficult to contract via aerosol in a lab setting, such as hepatitis A, B, C some influenza A stains, Human respiratory syncytial virus, Lyme disease, dengue fever and HIV. Routine diagonstic work with clinical specimens can be done safely at Biosafety level 2, using Biosafety level 2 practices and procedures Research work can be done in a BSL-2 (P2) facility using BSL-3 practice and procedures.

• **Biohazard level 3 :→** Bacteria and viruses that can cause severe to fatal disease in humans but for which vaccines or other treatments exist, such as anthrax, west nile virus, venezuelen, equine encephalitis ~~SARSCOV-2~~ SARS COV-2, Rift valley fevers, Rocky mountain spotted fever, Yellow fever and malaria.

• Biohazard level 4:→ viruses that cause severe to fatal diseases in humans, and for which vaccines or other treatments are not available, such as Bolivian hemorrhagic fever, Lassa fever virus. Population is no longer routinely vaccinated. When dealing with biological hazards at this level, the use of a positive pressure personal suit with a segregated. air supply is mandatory. The entrance and exit of a level 4 biolab will contain multiple showers a vacuum room, autonomous detection system and other safety precaution designed to destroy all traces of the biohazard. multiple air locks. are employed and are electronically secured to prevent doors from both opening at the same time. There are no bacteria classified at this level.

■ Biohazard Safety Levels :→



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- Public health:→ Promoting health through organized efforts and informed choices of society and individuals.

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my EVS teacher "Miss. Susmita Chowdhury" for their able guidance and support in completing my Project.

I would also like to extend my gratitude ~~to the~~ to my friend for helping me to complete this project.

DATE :-

~~25/0~~

01/03/2023

Ankan Mondal

(B.A) English. Hons

TEHATTA GOVERNMENT COLLEGE



TEHATTA * NADIA

UNIVERSITY OF KALYANI

BA HONS 1st SEMESTER EXAMINATION - 2022-2023

B.A HONS
1st SEMESTER
DIPARTMENT – PHILOSOPHY HONS
SUB : ENVIRONMRNTL STUDIES
(BIOLOGICAL HAZARD)

NAME - APURBA PRAMANIK

(11)

College Roll No - .....

10/03/2023

SESSION : 2022-2023

☐ Biological Hazards:

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

☐ Risk: These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisams invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores. can survive cooking tem peratures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, clostridium botulinum and clostridium perfringens.

- Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher then 80°C.

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include: Clostridium botulinum, Bacillus cereus, and Staphylococcus aureus.

- ☐ Major biological hazards:

- Bacteria ex: Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botulinum, Clostridium perfringens, vibrio vulnificus, Vibrio parahaemolyticus.

- Virus; ex: Hepatitis A virus, Norwalk viruses, Rotavirus.
- Parasites ex: Toxoplasma gondii, Cryptosporidia, Giardia spp, Trichinella spiralis, Taenia solium, Anisakis spp.

Sources:

The major sources of biological contaminants in food are:-

- animal guts: faecal contamination.
- Soil and water contaminated by ~~not~~ non-treated manure.
- cross contamination:
  - human contamination due to poor personal hygine, faecal contamination, failure in infection control (illness not reported)
  - cross-contamination of food products spread from processing environment due to poor/improper sanitation.

Factors affecting the growth of microorganisms in foods:

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as listeria monocytogenes grow at refrigeration temperature (4°c or 39°F), while thermotrophs can grow at higher temperatures (45°c or 113°F).
- The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. most bacteria grow in a pH range between 5 and 9.

❑ control and prevention:

The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing practices (GMPs) and Hazard Analysis and critical control point (HACCP) will help prevent biological hazards in your facility.

- Processing Strategies to control biological hazards:
  - effective thermal processing used as a kill step (ex: cooking, pasteurization)
  - Use of appropriate process controls.
  - effective cleaning and sanitizing procedures (ex: SSOPs)
  - Use of food technologies to prevent the growth of bateria or other biological hazards.

TEHATTA GOVERNMENT COLLEGE

Name : Archita Biswas.
Subject : Environmental Studies
~~First~~ semester English department

(11)

09/03/2023

Food Safety Program

Biological Hazards:

Biological Hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are major concern in food processing because they cause most food borne illness outbreak

Risk:

These organisms can affect human helth, including infection, intoxication and even death. Infection occurs when organisms invade that host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processi and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatu res.

For example, steam cooking significantly reduce non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, Clostridium botulinum and Clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers.

Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C (176°F).

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Major biological hazards:

- Bacteria: Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botulinum, Clostridium perfringens, Vibrio vulnificus, Vibrio parahaemolyticus
- Virus ex: Hepatitis A virus, Norwalk viruses Rotavirus.
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Sources:

The major sources of biological contaminants in food are:

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- The PH of a product is related to the acidity or alkalinity of the product. The PH of products affects the growth of bacteria. Most bacteria grow in a PH range between 5 and 9.
- The water Activity (a_w) refers to the water available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

Each of theses factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of micro-organisms.

control and Prevention:

The most effective way to control biological Hazards is by prevention. The implemention of Good Manufacturing Practices (GMPs) and Hazard Analysis and Critical control Point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food Production. HACCP controls hazards that may be Present in ingredients and packaging material and also those that occur during food.

Processing strategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking, pasteurization)
- use of appropriate process controls:
  - storage temperatures (ex: temperature and time for cooking, water activity during dehydration)
  - adequate cooling system.
- effective cleaning and sanitizing procedures (ex: SSOPs)
- use of food technologies to prevent the growth of bacteria or other biological hazards:
  - Packaging techniques (ex: use of vacuum packaging, modified almosphere packaging)
  - Preservatives
  - Processing techniques (ex: dehydration)

Acknowledgement

I convey my deep sense of gratitude to mam Susmita Choudhary for suggesting the way. I may find situable for the development of my project and her valuable guidance has been a constant help and encouragement is the preparation of the manuscript ower to him in every sense for Providing owe to him in every sense for providing course of the investigating. I am greateful to all my friends in the class and my group whome I represent for giving an active support in the repect.

Date: 01/03/2023

Archita Biswas

Signature of the student

TEHATTA GOVERNMENT COLLEGE

SUB :- Evns,

BIOLOGICAI HAZARD



NAME :- ARPAN PRAMANIK

STUDENT ID :- 1570075

COUSE :- B.A (1 Year Degree) PHILOSOPHY HONS

SESSION :- 2023-2024

(12)

09/03/2023

• Introduction

A biological hazard. or biohazard is a bialogical substance that Poses a threat to the health of living organisms. Primary humans. This could include a simple of a micro organism. virus or toxin that can adversely affect human health. A biohazard could also be a substance harmful to other living being.

The term and its associated symbol are generally used as a warning, so that those Potentially ~~its~~ exposed to the substances will know to take. Precaution. The biohazard symbol was developen in 1966 by Charles. Baldwin, an environmental- health engineer working for the Dow Chemical. Company on the containment Products.

It is used in the labeing of biological materials that carry a

P.T.O

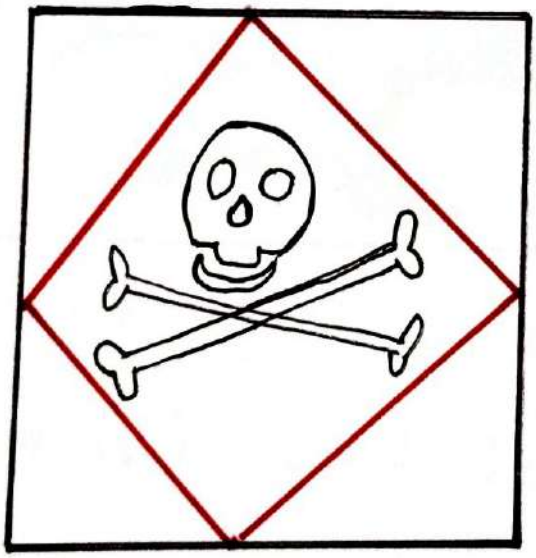
~~Signi~~ Significant health risk including viral samples and used hy podermic needles.

ANSI Z535/OSHA/ISO regulation %

Biohazardous Safety issus are identified with Speeified labels, Signs and Paragraps established by the American National Standards Institute (ANSI). Today ANSI Z535 standards for biohazard are used worldwide and should always be used appropriately withim ANSI Z535 Hardous Communications (Hazcom) signage, labeling and Paragraphs. The goal is to help workers rapidly identify the severit of a biohazard from a distance and throughh colour are desing standardization.

■ Biological hazard's Symbol design :-

- A red on white or white coloured background is used behind a black bio hazard symbol when integated with a 'DANGER' Sign, Label or Paragraph.



- An orange on black or white - coloured background is used behind a black biohazard symbol ~~with~~ when integrated with a 'WARNING' table or Paragraph.



- A yellow on black or white - coloured background, is used behind a black biohazard symbol when integrated with a 'CAUTION' sign, label or Paragraph.

P.T.O



- A green on white coloured background is used behind a black bioharard symbol when integrated with a 'NOTICE' sign lable on Paragraph.



'DANGER' is used to identify a biohazard that will cause death. 'WARNING' is used to identify a biohazard that may cause death. 'CAUTION' is used to identify a biohazard that will cause injury, but not death. 'NOTICE' is used to identify a non-injury biohazard message.

OSHA requires the use of Proper ANSI Hazcom where applicable in American workplaces, these state and local governments also use these standerds as codes and laws within their own inrisdiction. Prooper use of ANSI Z535 signs, lables and Pragnaphs are written in to many of OSHA's Standards for Hazcom and crafted to integrate with ISO Symbol.

GENERAL DEGREE COLLEGE, TEHATTA

SEASON : 2022-23

NAME : ARPITA SARKAR

SUB : ENVS

DEPARTMENT : ENGLISH

(11)

22/03/2023

-:TOPIC:-

BIOLOGICAL HAZARD

Topic :- Biological hazard

Biological hazard :- Biological hazards are organic substances that present a threat to the health of people and other living organisms.

Risk :- These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Example of Spore forming bacteria include Bacillus cereus, Clostridium botulinum and clostridium perfringens.

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• Cross contamination:
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- Bacteria ex:— Salmonella spp. Entero-haemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botulinum, Clostridium perfringens, Vibrio vulnificus, Vibrio parahaemolyticus,

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GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

Processing strategies to control biological hazards:

- effecting thermal processing used as a kill step (ex:- cooking, pasteurization)
- Use of appropiate process controls:

- Storage temperatures (ex: Cooler, Freezer)

- processing parameters (ex: temperature and time of cooking, water activity during dehydration)

- adequate cooling system

• effective cleaning and sanitizing procedure (ex: SSOPs)

• use of food technologies to prevent the growth of bacteria or others biological hazards:

- packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)

- preservatives

- processing techniques (ex: dehydration)

TEHATTA GOVERNMENT COLLEGE

SUB :- Evns,

BIOLOGICAI HAZARD



NAME :- **ASIF SHAIKH**

STDUNT ID :- **1570096**

COUSE :- **B.A (1 Year Degree) POLITICAL SCIENCE HONS**

SESSION :- **2023-2024**

(12)

By 09/03/2023

Introduction

A biological hazard, an bio-hazard, is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a micro organism, virus or toxin that can adversely affect human health. A biohazard could also be a substance harmful to other living beings.

The term and its associated symbol are generally used as a warning, so that are those potentially used exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by Charles Baldwin, an environmental-health engineer working for the Dow chemical company on the containment products.

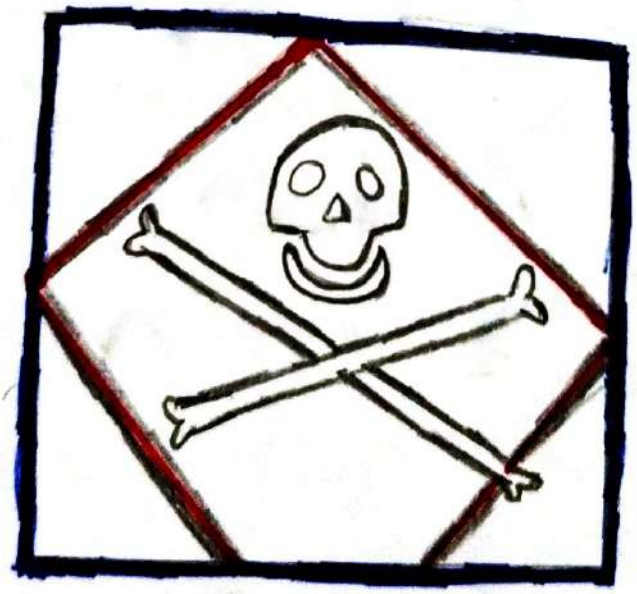
It is used in the labeling of biological materials that carry a significant health risk including viral samples and used hypodermic needles.

—: ANSI Z535/OSHA/ISO regulation :—

Bihazardous safely issues are identified with specified labels, sings and paragraphs established by the American National Standards Institute (ANSI). Today, ANSI Z535 standards for biohazards are used world wide and should always be used appropriately within ANSI Z535 Harordous communications. The goal is to help workers repidly identify the severity of a biohazard from a distance and through colour are design standardi zation.

■ Biological hazards symbol design :—

- A red on white or white coloured background is used behinde a black bio hazard symbol when integrated with a "DANGER" sign. Label or paragraph.



- An orange on black on white - coloured background is used behind a black biohazard symbol when integrated with a "WARNING" eign. Jable on Paragraph.



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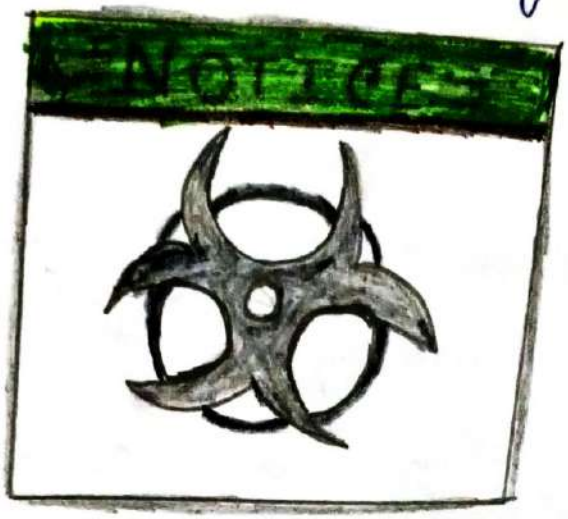

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OSHA requires the use of proper ANSI Hazcom where appliable in American workplaces. state and local governments also use these standends as codes and laws within their own jurisdictions. Proper use of ANSI Z535 Signs. labels and paragnaphs are written into many of OSHA's standards for Hazcom and crafted to integrate with ISO Symbols

- An Refernce. ANSI Z535 for a complete description on how to use "DANGER" "WARNING" "CAUTION" "NOTICE" Sings, labels, Paragraphs.

UN/ISO classification :—

Biohazards agents are classification for transportation by UN number.

- Categaray A. UN 2814— Infectious substance affecting humans: An infectious substance in a form capable of causing permanent disability or life: threatening an fatal disease in other wise healthy humans an animals when exposure to it occurs.
- Category A. UN 2900— Infectious substance affecting animals (only): An infactious substance that is not a form generally capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans and exposure. to themselves occurs.
- Category B. UN 3373— Biological substance to transported for diagnostic or investigative purposes.

ENVS



(13)

By 09/03/2023

Project Topic

Biological Hazards

Student Data
Name → Ayan Mandal
Class → BA. Eng (Hons).
Sem → 1st Sem
Sub → Envs (project)
College → T. G. C
Year → 2023-2024

Introduction

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Biohazardous safety issues are identified with specified labels, signs and paragraphs established by the American National Standards Institute **(ANSI)**. Today ANSI Z535 standards for biohazards are used appropriately within ANSI.

Z535 hazardous communication (Hazcom) signage, labeling and paragraphs. The goal is to help workers rapidly identify the severity of a biohazard from a distance and through colours are design standardization.

Biological hazard symbol design :

- An orange on black or white-coloured back ground is used behind a black bio-hazard symbol when integrated with of a 'WARNING' sign table or paragraph.



- A yellow on black or white coloured background is used behind a black bio hazard symbol when integrated with a 'CAUTION' sign table or paragraph.



- A green on white or white coloured background is used behind a black bio hazard symbol when integrated with a 'NOTICE' sign table or paragraph.



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- **Category B. UN 3373** – Biological substance transported for diagnostic or investigative purposes.

- **Regulated Medical waste. UN 3291** – waste or reusable material derived from medical treatment of an animal, or human or from biomedical research, which includes the production and testing.

Biohazard safety levels :-



- **Anthropogenic Hazard** -
  Hazard caused by human action or inaction
- **Biocontentment** -
  physical containment of pathogenic organisms or agents in microbiology (laboratories).
- **Biological agent** -
  pathogen that can be weaponised.
- **Biosafety levels** -
  Level of the biocontainment precautions required to isolate dangerous biological agents.
- **Chemical Hazard** -
  Non biological substance that has the potential to cause harmful to life or health.
- **Hazard** -
  situation or object that can cause damage or harm.
- **Interplatary contimination** -
  Biological contimination of a plantary body by space probe or spacecraft.

List of laboratory biosecurity incidents :-

- **Mechanical Hard -**
  Hazard with a mechanical energy source.
- **Occupationed Hazard -**
  Hazard experinced in the work-place.
- **physical Hazard -**
  Hazard due to a physical agent.
- **planetary protection -**
  Guilding Principle of a space mission.
- **psychosocial Hazard -**
  Occupationed Hazard to one's psychosocial well being.
- **public health -**
  promoting health through organised efforts and informed choices of society and individuals.

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my Envs teacher "**Susmita Chowdhury**" for their able guidance and support in this project process.

I would like to sincerely thank my family and friends for their endless support and encouragement throughtout the project.

Date:- 01/03/2023

Ayan Mandal

Teacher Signature

Student Signature

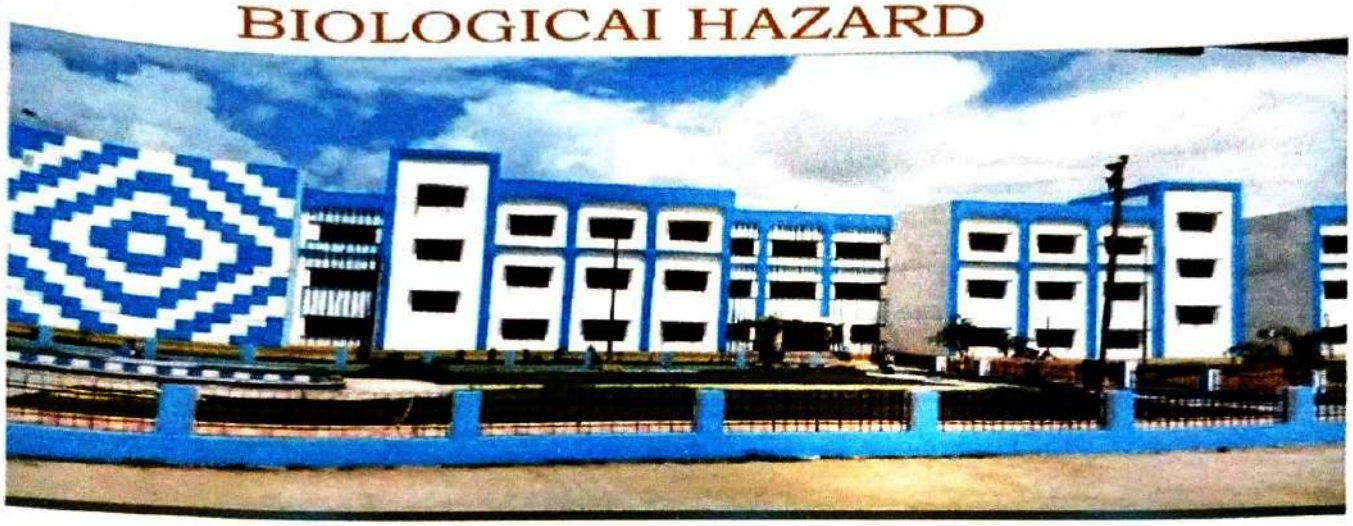




TEHATTA GOVERNMENT COLLEGE

SUB :- Evns,

BIOLOGICAI HAZARD



NAME :- **BANTI DEBNATH**

ROLL NO :- **20**

COUSE :- **B.A (1 Year Degree) HISTORY HONS**

SESSION :- **2023-2024**

(13)

09/03/2023

ANSI Z535/OSHA/ISO regulations:-

Biohazardous safety issues are identified with specified labels, signs and paragraphs established by the American national Standards Institute (ANSI). Today ANSI Z535 Standards for biohazards are used worldwide and should always be used appropriately within ANSI Z535 Hazardous communications (Hazcom) signage, labeling and paragraphs. The goal is to help workers rapidly identify the severity of a biohazard from a distance and through colour and design standardization.

- **Biological hazards symbol design:-**

  - A red on white or white coloured background is used being a black biohazard symbol when integrated with a 'DANGER' sign label or paragraph

Introduction

A biological hazard, or biohazard is a biological substance that poses a threat to human health of living organisms primarily humans. This could include a sample of a micro organism virus or toxin that can adversely affect human ~~health~~ health. A biohazard could also be a substance harmful to other living being.

The term and its associated symbol are generally used as a warning, so that are those potentially exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by Charles Baldwin, an environmental-health engineer working for the Dow Chemical Company on the containment products.

It is used in the labeling of biological materials that carry a significant health risk including viral samples and used hypodermic needles.



- An orange on ~~black~~ black or white coloured background is used behind a black biohazard ~~sym~~ symbol when integrated with a 'WARNING' table or paragraph.



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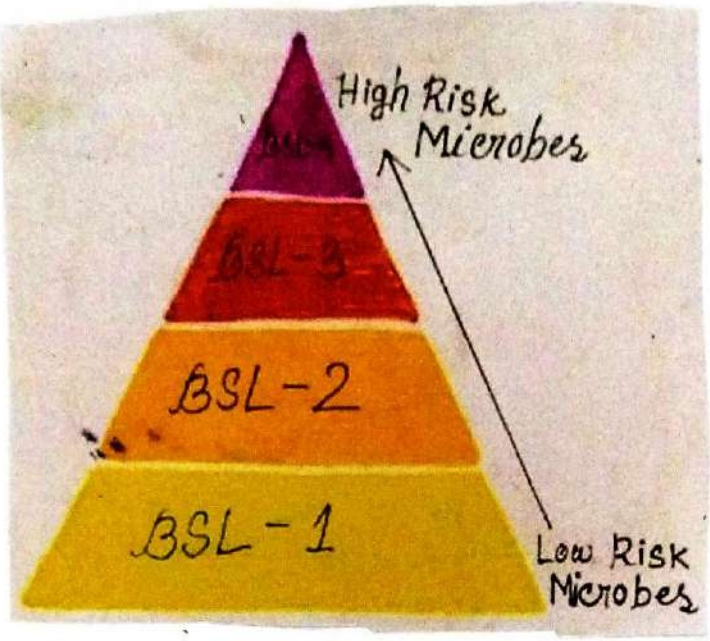
Biohazard Safety Levels



- Anthropogenic hazard – Hazard caused by human action or inaction.
- Biocontainment - physical containment of pathogenic organisms or agents in microbiology.
- Biological agent - pathogen that can be weaponed.
- Hazard - Situation or object that can cause damage or harm.
- Biosafety level – Level of the biocontainment precautions required to isolate dangerous biological agents.

- A green or white or white coloured background is used behind a black bio-hazard symbol when integrated with a 'NOTICE' signable or paragraph.



'DANGER' is used to identify a biohazard that will cause death. 'WARNING' is wes to identify a biohazard that may cause death. 'CAUTION' is used to identify a biohazard that will cause injury but not death. 'NOTICE' is used to identify a non-injury biohazard message.

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UNIVERSITY OF KALYANI

TEHATTA GOVERNMENT COLLEGE



TEHATTA, NADIA

BIOLOGICAL HAZARDS

SUB : ENVS

(12)

Submitted By : BARSHA HALDER

B.A Bengali Hons 1st Semester Exam,2023

Registration No. :

College Roll : 18

09/03/2023

Session : 2022-23

BIOLOGICAL HAZARDS

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health they are a major concern in food processing because they cause most food borne illness outbreaks.

RISK

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invads the host and multiply in the body. Intoxication occurs when bacteria produce toxins that effect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Example of spore forming bacteria include Bacillus cereus. Clostridum botulinum and Clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C (176°F) the risk of intoxication is prevented by controlling the growth of toxin producing bacteria. these include: clostridium botulinum Bacillus cereus, and staphylococcus aureus.

Major biological hazards

- Bacteria ex : Salmonella spp. Enterohaemorrhagic Escheri-chia coli, campylobacter jejuni, yersinia enterocolitica listeria monocytogenes, Bacillus anthracis, Bacillus cereus. staphlococcus aureus. clostridium batulinum. clostridium perfringens, Vibrio vulnificus, Vibrio parahaemolyticus
- virus ex: Hepatitis A virus, Norwalk viruses Rotavirus.
- parasites ex : Toxoplasma gandii, Cryptosporidia, Giandia spp., Trichinella spiralis, Taenia Solium., Anisakis spp.

Sources

The major Sources of biological Contamiants in food are.

- Animal guts : faccal contamination
- Soil and water contaminated by non-treated manure.
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Factors affecting the growth of microorganisms in foods

- The temperature values for microbial growth depend on the type of microorganism. for example, psychrotrophs such as listeria monocytogence grow at refrigeration temperature (4°C or 39°F), while thermotro-

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- The water Activity (a_w) refers to the water available in the product. The more water available the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

aw of product	Bacterial Spoilage	Examples
>0.90	Spoils easily	fresh vegetables fresh meat processed meat, milk, fish.
0.78-0.90	Susceptible to spoilage	dry cheese, flour, cakes, beans, cereals.
<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels. dehydrated foods.

Each of these factors is important for the control of the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

Control and prevention

The most effective way to control biological hazards is by prevention. The implementation of Good manufacturing practic-es (Gmps) and Hazard Analysis and Critial Control point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production.

HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

processing strategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking, pasteurization)

- use of appropriate process controls:
  - storage temperatures (ex: cooler, freezer)
  - procesing parmeters (ex: temperature and time for cooking, water activity during dehydration)
  - adequate cooling system.
- effective cleaning and sanitizing procedures (ex: SSOP)
- use of food technologies to prevent the growth of bacteria or other biological hazards:
  - packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)
  - preservatives
  - processing techniques (ex: dehydration)



EVS

Project

(14)

2022-23

09/03/2023

TEHATTA GOVERNMENT COLLEGE

Tehatta, Nadia

2022

Name: Bidisha Mondal

1st year 1st semester

Department of English

Date of submission: 1.3.2023





Biological hazard

Introduction :

A biological hazard, or biohazard, is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a microorganism, virus or toxin that can adversely affect human health. A biohazard could also be a substance harmful to other living beings.

The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by Charles Baldwin, an environmental-health engineer working for the Dow Chemical Company on the containment products.

It is used in the labeling of biological materials that carry a significant health risk, including viral samples and used hypodermic needles.

ANSI Z535/OSHA/ISO regulation :-

Biohazardous safety issues are identified with specified labels, signs and paragraphs established by the American National Standards Institute (ANSI). Today, ANSI Z535 standards for biohazards are used worldwide and should always be used appropriately within ANSI Z535 Hazardous Communications (HazCom) signage, labeling and paragraphs. The goal is to help workers rapidly identify the severity of a biohazard from a distance and through colour are design standardization.

Biological hazard symbol design :

- A red on white or white coloured background is used behind a black biohazard symbol when integrated with a DANGER sign, label or paragraph



- An orange on black or white-coloured background is used behind a black biohazard symbol when integrated with a WARNING sign, label or paragraph.



- A yellow on black or white-coloured background is used behind a black biohazard symbol when integrated with a CAUTION sign, label or paragraph.



- A green on white or white-coloured background is used behind a black biohazard symbol when integrated with a NOTICE sign, lable or paragraph.



DANGER is used to identify a biohazard that will cause death. WARNING is used to identify a biohazard that may cause death. CAUTION is used to identify a biohazard that will cause injury, but not death. NOTICE is used to identify a noninjury biohazard message.

OSHA requires the use of proper ANSI HazCom where applicable in American work-places. States and local governments also use these standards as codes and laws within their own jurisdictions. Proper use of ANSI Z535 signs, labels and paragraphs are written into many of OSHA's standards for HazCom and crafted to integrate with ISO symbols.

Reference ANSI Z535 for a complete description on how to use DANGER, WARNING, CAUTION and NOTICE signs, lables or paragraphs.

UN/ISO Classification

Biohazardous agents are classification for transportation by a UN number.

- Category A, UN 2814 — Infectious substance, affecting humans: An infectious substance in a form capable of causing permanent disability or life-threatening or fatal disease in other wise healthy humans or animals when exposure to it occurs.
- Category A, UN 2900 — infectious substance affecting animals (only): An infectious substane that is not a form generally capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans and animals when exposure to themselves occurs.
- Category B, UN 3373 - Biological substance transported for diagnostic or investigative purposes.

- Regulated Medical Waste, UN 3291 – Waste or reusable meterial derived from medical treatment of an animal or human or from biome-dical research, which includes the production and testing.

BIOSAFETY LEVEL :

The United states Centers for Disease Control and Prevention (CDC) catagorize various diseases in Levels of biohazard, Level 1 being minimum risk and Level 4 being extreme risk. Laboratories and other facilities are categorized as BSL 1-4 or as P1 through P4 for short (Pathogen or Protection Level).

- Biohazard Level 1 : Bacteria and viruses including Bacillus subtilis, canine hepatitis, Escherichia coli, and varicella (chickenpox), as well as some cell cultures and non-infectious bacteria. At this level precautions against the biohazardous materials in question are minimal, most likely involving gloves and some sort of facial protection.

- Biohazard Level 2 : Bacteria and viruses that cause only mild disease to humans, or are difficult to contract via aerosol in a lab setting, such as hepatitis A, B and C, some influenza A strains, Human respiratory syncytial virus, Lyme disease, salmonella, mumps, measles, scrapie, dengue fever and HIV. Routine diagonstic work with clinical

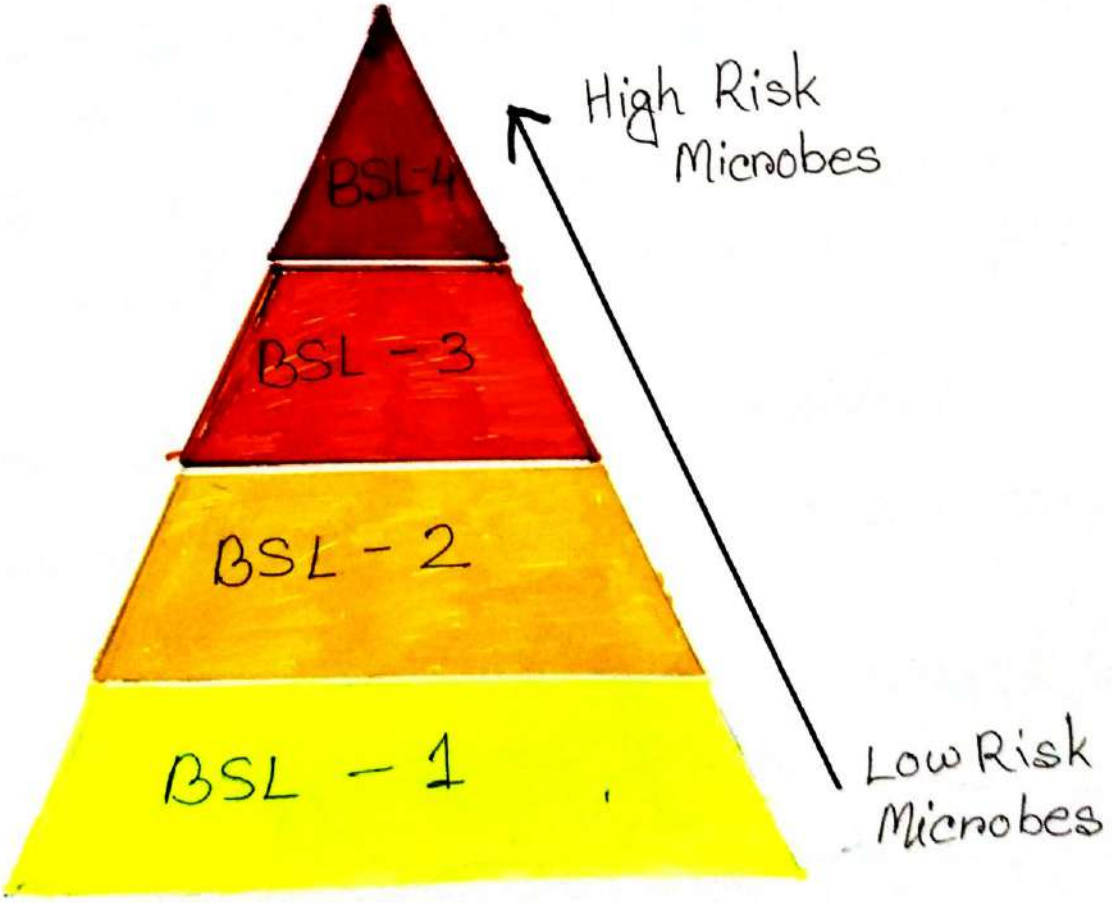
specimens can be done safely at Biosafety Level 2, using Biosafety Lavel 2 practices and procedures. Research work can be done in a BSL-2(P2) facility, using BSL-3 practices and procedures.

- Biohazard Level 3 : Bacteria and viruses that can cause severe to fatel disease in humans, but for which vaccines or other treatments exist, such as anthrax, West Nile virus, Venezuelan equine encephalitis, SARS coronavirus, MERS coronavirus, SARS-coV-2, Influenza A H5N1, hantaviruses, tuberculosis, typhus, Rift Valley fever, Rocky Mountain spotted fever, yellow fever, and malaria.

- Biohazard Level 4 : Viruses that cause severe to fatal disease in humans, and for which vaccines or other treatments are not available, such as Bolivian hemorrhagic fever, Marburg virus, Ebola virus, Lassa fever virus, Crimean-Cango hemorrhagic fever, and other hemorrhagic diseases, as well as Nipah virus. Variola virus (smallpox) is an agent that is worked with at BSL-4 despite the existence of a vaccine, as it has been eradicated and thus the general population is no longer routinely vaccinated. When dealing with biological hazards at this level, the use of a positive pressure personnel suit with a segregated air supply is mandatory. The entrance and exit of a Level 4 biolab will contain multiple showers, a vaccum room, an ultraviolet light room, autonomous detection system, and other safety precaution

designed to destroy all traces of the biohazard. Multiple airlocks are employed and are electronically secured to prevent doors from both opening at the same time. All air and water service going to and coming from a Biosafety Level 4 (P4) lab will undergo similar decontamination procedures to eliminate the possibility of an accidental release. Currently there are no bacteria classified at this level.

Biohazard Safety Levels



- Anthropogenic hazard – Hazard caused by human action or inaction.
- Biocontainment – Physical containment of pathogenic organisms or agents in microbiology laboratories.
- Biological agent – Pathogen that can be weaponized.
- Biosafety level – Level of the biocontainment precautions required to isolate dangerous biological agents.
- Chemical hazard – Non-biological substance that has the potential to cause harm to life or health.
- Hazard – Situation or object that can cause damage or harm.
- Interplanetary contamination – Biological contamination of a planetary body by a space probe or spacecraft.
- List of Laboratory biosecurity incidents
- Mechanical Hazard – Hazard with a mechanical energy source
- Occupational Hazard – Hazard experienced in the workplace
- Physical hazard – Hazard due to a physical agent
- Planetary protection – Guiding principle of a

space mission

- Psychosocial hazard — Occupational hazard to one's psychological well-being
- Public health — Promoting health through organized efforts and informed choices of society and of individuals.

TEHATTA GOVT. COLLEGE

ENVS

NAME DEBJIT SAHA

SEM 1st SEM

CLASS B.A. HONS (ENGLISH)

12

By
09/03/2023

ENVS



Project Topic

Biological Hazards

Introduction -

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⑩ Mechanical Hazard — Hazard with a mechanical energy source.

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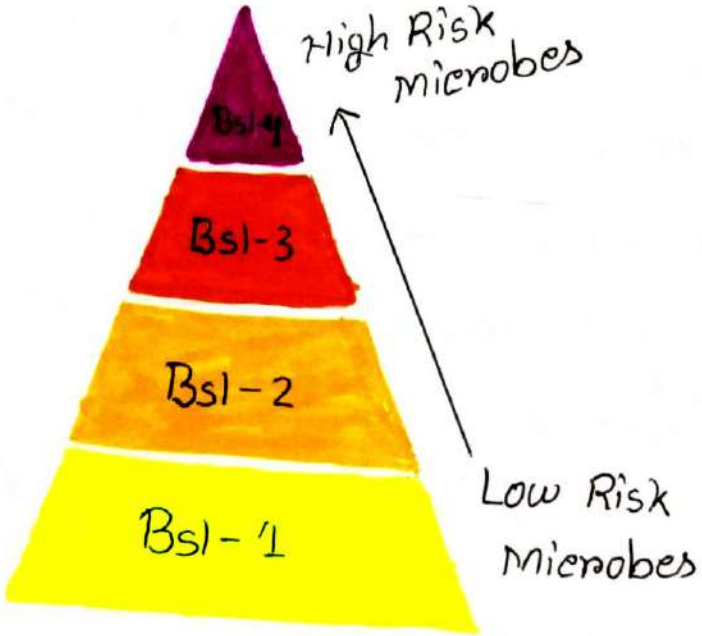
Biohazard Safety Levels –



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ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my teacher Mrs Susmita chowdhury as well as our Principal Mr. Sibsankar Pal who gave me the golden opportunity to do this wonderful project on the topic Biological Hazards.

Secondly, I would aslo like to thank my Parents and friends who helped me a lot in finalizing this project within the limited time frame.

Lastly, I like to thank all my supporters who have motivated me to fulfill their Project before the timeline.

ASSIGNMENT

Academic Year.
2022-2023

TEHATTA GOVERMENT GENERAL DEGREE COLLEGE

Environement Studies Project on
Biological Hazards

Submitted by

Name Dipika Biswas
Course B.A Philosophy Honours (1st sem)

Submitted to
Sushmita Chowdhury
Assistant Prof. in Chemistry
Govt. General Degree Collage, Tehatta

Date of Submission

(13)
09/03/2023

Professor Sign

Biological Hazards

Biological hazards are argnisms or sublences produced by argani-sms that pose a threal to human heath. They are a major concern in food processing beacouse they cause most food borne illness outbeoks.

Risk

These organisms con offect human health includuing infection intaxication and even death Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs. when bacteria praduce toxins that offect the body.

Infection can be prevented by property processing and han dilling food product beause pathagens are easily destroyed by that. Howsver. some bacteria that product spares can Survive Cooking tempeatues.

For example, steam cooking significantly reduses non-spore forming food barne pathogens but only inactivates spores. Examp les of spare forming bacteria and Clostridium perfringens.

The risk of intaxication is prevented by cantrolling the growth of toxin producing bacteria. these include. Clasidium batulln un, Bacillas cerus, and Staphyiococcus aureus.

Major biological hazards

- Bactoria ex Salmonella spp, Enterohoemorrhogic

Escherichia call, Compyfobacter jejuni. Yersinia enterocotitica listeria monocytogens Bacillus anthratticus, Bacillus cereus Staphlococcus aurevs clostridum botulinum, clastridum perfringens. Clostridum botulinum, Clastridum vibrio vulnficus, vibrio parahaemolyticuse

- Virus ex hepatis A virus Narwalk viruse Rotavirus.
- Parasites ex. Toxopplasma gondil. Cryphosparidio Glandia spp. Trichinella spiralis Taenia solum Anisakis spp.

Sources.

the major Soures of biological contaminats in food are —

- animal guts foecal contamination.
- soil and water contaminated by non-freated manure.
- cross contamination
  - human conbazamination due to poor personal hygiene faecal contamination, failure in infection control
  - cross-contamination at food products spreed from processing envicronment due to poor / improper sonliation.

Factors affecting the growth of microorgnisms in foods

- the temperature values for microbial growth depend on the type of microorgansim for example, psychrotrophs such as listeria monocytogenes grow at refrigerotion temperature while thermatrophys can grow of higher temperatures.

o The PH of a product related to the acidity on alkollinity of the product. The pH of product offects the growth of bacteria grow in a pH range between 5 and 9.

Control and prevention

The most effective way to control Biological hazards is by prevention. The implementation of Good Manufeturing Praetices (GMPs) and Hazard Analysis and Critical Control Point (HAECP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personal and environment are controlled during food production HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food proeessing. packaging and storge.

Prossing Strategies to control biological hazards

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- use of appropriate proeess controls:
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  - adequose colling system
- o effective cleaning and sonitizing proeedures [Lex SSOPs)
- o use of food hechnologies fa prevent the growth of

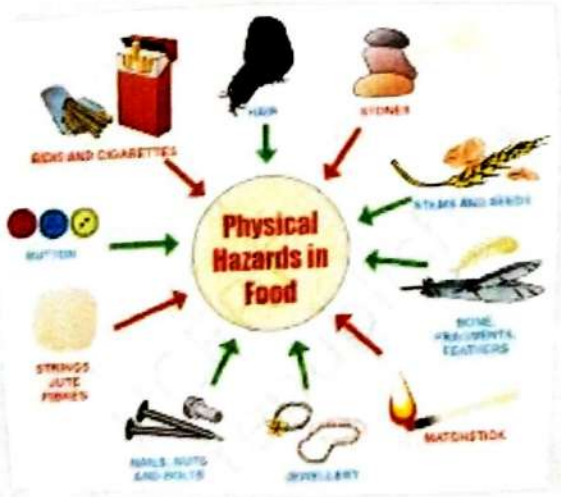
baeleria or other biological hazards
- Packaging techniques [lex use of vacum paekaging modifiled atmosphere packaging]
- preservatives
- processing teehiques [ex dehydehydration]

Prevention of Biologieal Hazards

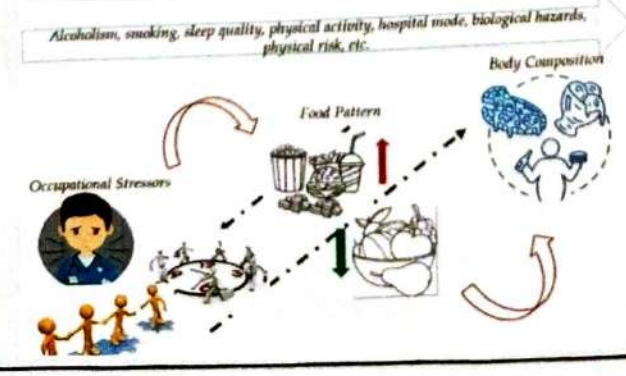
The primary check to biologial Hazards should be exercised at the level of entry or exit of any animal from the fram and also monitoring the ree-entry of a previously helathy animal. A newly introudueed animal shoud be eheeked thoroughly for the presence of infeetion and its vaccination Status. The animal Should be tested for diseases prevent in the previously inhabited area and kept separate for the appropriate quarantine period. The entry of personal should be restnieted and no new person from unknown area or endemia area be allowed to enter the fanm premises. Entry of vehieles should also be restnieted with a sepnate area of disembnking. Semen, vaccine and other biologieal products shoud be properly sereened so as not to introduee an infeetion to a fanm.

Besides adpting measunes for preventing the entry of infeetions, a propnen heath management program shoud be institued so as

as to maintain animals should be regularly screened for the early detection of disease Newbron livestok shoud be administered colostrum to boost their immune system proper vactination and dewonming should be done and a record maintained for each animals and also lead to Production loss due to stress. Sick animals Shoud be isloated from the flock, so as to lemited disease at its intial stage. Ease of any disease outbreak raceination shoud be penformed in adjoining frams on surrounding area to prevent spread of disease. In the event of highly infe.etious of disease. In the event of higly infectious diseases liked H5N1 arian influenza mass culling shoud be done prevent spread.







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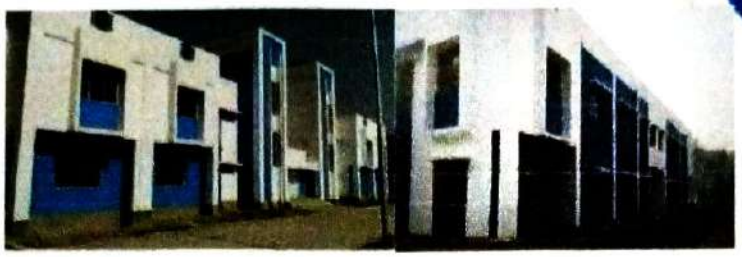

TEHATTA -741160 ,NADIA

SUBJECT-ENVS

HISTORY HONOURS

(14)

09/03/2023

NAME :-DISHA GUIN

SEMESTER -1st

SESSION-2022-23

ROLL NO-

Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk :-

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, clostridium botulinum and clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C [176°F].

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include : Clostridium botulinum, Bacillus cereus and Staphylococcus aureus.

Major biological Hazards :-

- Bacteria ex : Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botulinum, Clostridium perfringens, Vibrio vulnificus, Vibrio parahaemolyticus.
- ~~Virus~~ Virus ex : hepatitis A virus, Norwalk viruses Rotavirus.
- Parasites ex : Toxoplasma gondii, Cryptosporidia, Giardia spp, Trichinella spinalis, Taenia solium, Anisakis spp.

Sources :-

The major sources of biological contaminants in food are :

- animal guts : faecal contamination.
- soil and water contaminated by non-treated manure,
- cross contamination :

— human contamination due to poor personal hygiene, feacal contamination, failure in infection control (illness not reported)

— cross-contamination of food products spread from processing environment due to poor/ improper sanitation.

Factors affecting the growth of microorganisms in foods :-

- The temperature values for microbial growth depend on the type of microorganism: For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F)
- The pH of a product is related to the acidity or alkalinity of the product. The pH

of products effects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.

- The Water Activity (a_w) refers to the water available in the product. The more water available, the better bacteria will grow. Table I shows the impact of water activity on bacterial spoilage.

a_w of product	Bacterial Spoilage	Examples
> 0.90	Spoils easily	fresh vegetables, fresh meat, processed meat, milk, fish.
0.78 - 0.90	Susceptible to spoilage	dry cheeses, flour cakes, beans, cereals.
<0.78	little bacterial spoilage but mould may grow.	rolled oats, dried fruits, caramels, dehydrated foods.

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth of control of microorganisms.

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The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing practices (GMPs) and Hazard Analysis and Critical Control point (HACCP) will help prevent biological hazards in your facility.

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- effective thermal processing used as a kill step (ex : cooking , pasteurization)
- use of appropriate process controls :
  - storage temperatures (ex : cooler , freezer)
  - processing parameters (ex : temperature and time for cooking, water activity during dehydration)
  - adequate cooling system.

- effective cleaning and sanitizing procedures (ex: SSOPs)

- use of food technologies to prevent the growth of bacteria or other biological hazards:

— Packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)

— Preservatives.

— Processing techniques (ex: dehydration)

Goverement General Degreee College. Tehatta

Name - Easha Sarkar
Sub - ENVS
Department - Bengali
Yeare - 1st Semester - 1st
Date of Submission - 01/03/2023

(13)

By 09/03/2023



Biological Hazard

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The term and its associated symbol are generally used as a warning, so that those patentially exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by charles Baldwin, an environmental-health engineer working for the Dow Chemical Company on the containment products.

It was in the labelling of biological materials that carry a significant health risk, including viral samples and used hypodermic needles.

In unicode, the biohazard symbol is U+2623.

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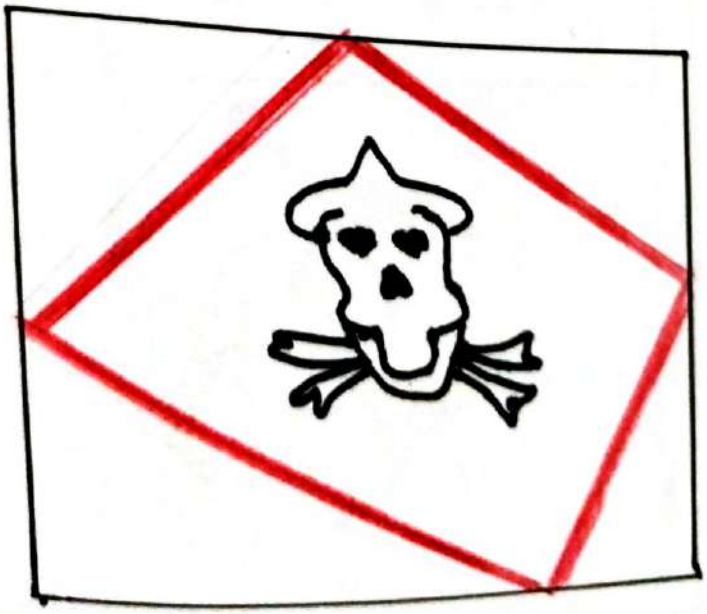

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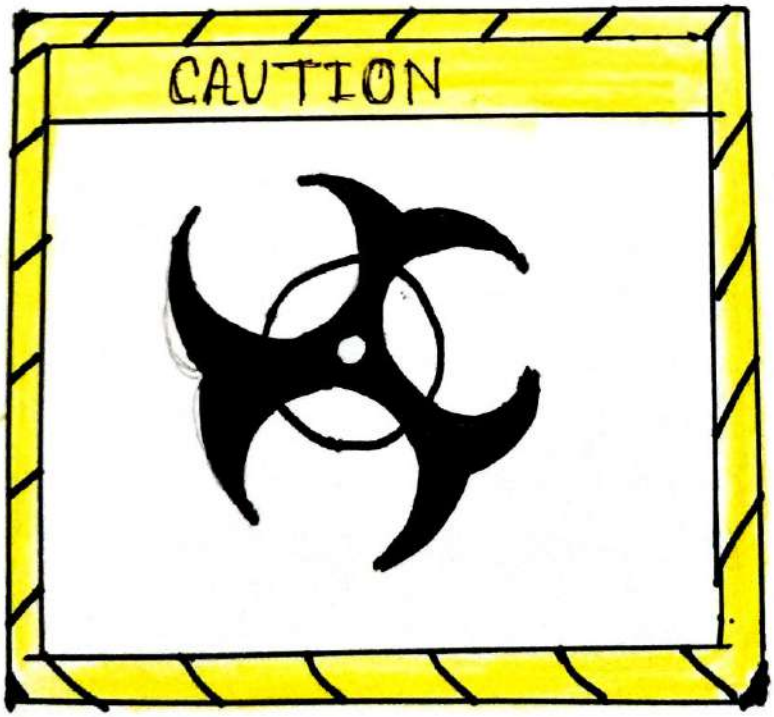

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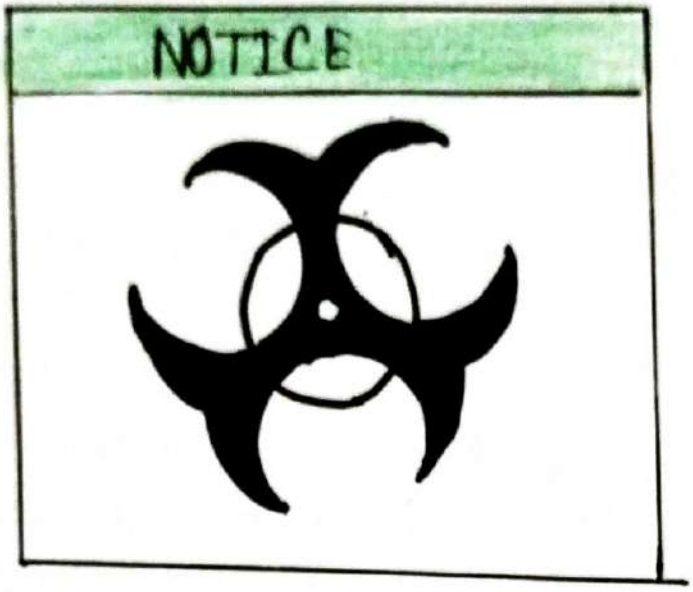

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*Reference ANSI Z535 for a complete description on how to use DANGER, WARNING, CAUTION and NOTICE signs, lables, paragraph.

UN /ISO Classification:

Biohazardous agents are classified for transporting by on numbers :-

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Levels of Biohazard:

Biosafety Level:

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Biohazard Level 2:

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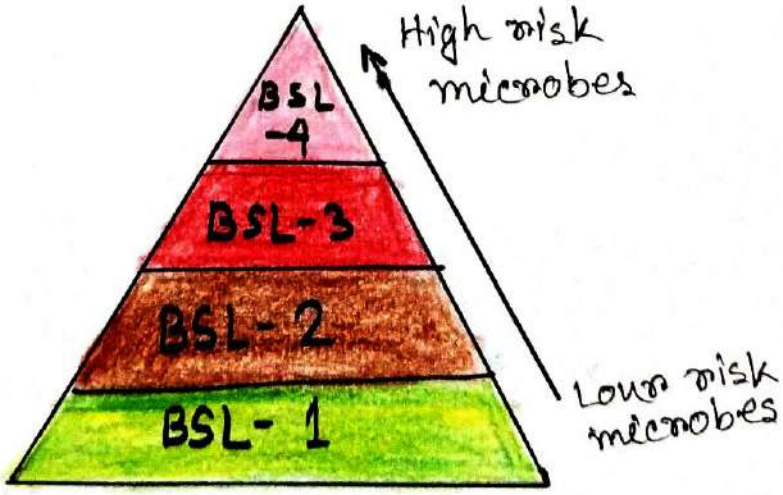
* Biohazard Level 3 :

Bacteria and viruses that can cause severe to fatal disease in humans, but for which vaccines or other treatments exist, such as anthrax, west nile virus, venezuelan equine encephalities, SARS coronavirus. Rocky, mountain spotted fever and yellow fever and malaria.

* Biohazard Level 4 :

Viruses that cause severe to fatal disease in humans and for which vaccines or other threatments are not avilable, such as Bolivian hemorrhagic fever. When dealing with Biological hazards at this level, the use of a positive pressure personnel suit with a segregated air supply is mandatory. The entrance and exit of a level four biolab will contain multiple showers, a vacuum room, autonomous detection system, and other safety precautions.

Biohazard Safety Levels :



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* Physical hazard : Hazard due to a physical agent.

* Planetary protection : Guiding principle of a space mission.

* Psychosocial hazard : Occupational hazard to one's psychosocial well-being.

* Public health : Promoting health through organized efforts and informed choices of society and individuals.



TEHATTA GOVERNMENT COLLEGE

TEHATTA , NADIA ,741160

PROJECT WORK IN ENVIRONMENTAL STUDIES CLASSROOM

ON

BIOLOGICAL HAZARDS

TEHATTA GOVERNMENT COLLEGE

(13)

BY

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FAWJAL KABIR KHADIM

1ST YEAR 1ST SEMESTER

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Introduction

Biological hazards are major source of Risk that may Result in emergencies and disasters. They Cause Significant Loss of Life, affect many thousand of People, have the Potential for major economic losses through of livestock and crops, and may Cause damage and Loss to the natural heritage. including to endangered fauna and flora.

The management of risks due to biological hazards a national and Community Priority. It has been recoginzed as Part of the Sendai framework and is globlly addressed under the International Helth Regulations (IHR)

Biological Hazards

Biological hazards are of organic or conveyed by biological vectors. Including pathogenic microorganism, toxins and bioactive substances. Examples are bacteria, virus or parasite, as well as venomous wildlife and example insects, poisonous plants and mosquitoes conveying disease-causing agents.

1. These hazards also pose to animals, including livestock, and to plants. hazards are usally the result of natural occurrence, but can also result from deliberate or accidental release.

- The Ebola virus outbreak in west Africa in 2014-2016, the largest epidemic of its kind of date in the population of Guinea, Liberia and Sierra Leone.

- The ongoing outbreak of Zika virus infection in the Americas and the Pacific region, associated with Congenital and other neurological disorders.

- Global significant in diarrheal disease incidence. following recurrent floods in most African countries or significant increase following the 2004 Tsunami in Indonesia and thailand.

- Outbreaks of yellow fever in Angola, Democratic Republic of Congo and Uganda in 2016.

- Outbreaks of middle East Respiratory Syndrome-Coronavirus (MERS CoV) an Emerging disease identified in 2012.

UN/ISO Classification:-

Biohazards agents are classification for trans portation by UN number.

- Category A UN-2814 -
Infection Substance affecting humans, an infectious substance in a form capable of causing or total disease. In other wise healthy human or an animals when exposure to it occurs.

- Category A UN-2900
Infectious Substance affecting animals (only). An infectious substance. that is not a form generally capable of causing permanent disability or life-threatening or total disease in otherwise healthy humans and exposure.

- Category B UN-3373 Biological Substance transported for diagnostic or investigative.

Biosafety level :-

- **Level 1 :-**
The United States Centers for disease Control and Prevention (CDC) categorise various diseases in levels of biohazard Level - 1 being minimum risk and level 4 being risk.

- **Level - 2 :-**
Bacteria and viruses that can cause severe to fatal disease in human but for which vaccine or other treatment exist, such as another. west nile, virus equine.

- **Level - 3**
Bacteria and viruses that cause only mild disease to human or one difficult to contract via aerosol in a Lab setting.

- **Level - 4**
viruses that cause severe to fatal disease in humans, and for which, vaccine or other treatment are not.

ANSI Z535/OSHA/ISO Regulation:-

Biohazardus Safety issues are identified with specified labels, signs and established by American National Standards institute today ANSI-Z535 Standards for biozards are used world wide and should always be used appropriately within-ANSI Z535.

- **Biological Hozard's Symbol design:-**

- A red on white or white on coloured back-ground is used behind a black biohazed symbol when integrated with a 'Danger' sign, label or paragraph.



- An orange on black or white - clouded background is used behind a black biohazard symbol when integrated with a 'warning' lable or paragraph



- A yellow on black or white - clouded background is used behind a black biohazed symbol when integrated with a 'caution' sign paragraph.



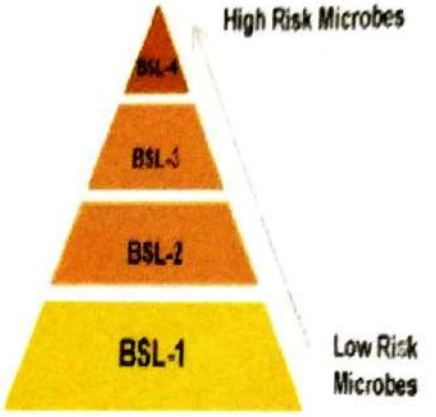
- A green on white or white coloured background is used behind a black biohazard symbol when integrated with a 'Notice' sign label or polygon.



Danger is used to identify a biohazard that will cause death. Warning is used to identify a biohazard that may cause death. Caution is used to identify a biohazard that will cause injury, but not death. 'Notice' is used to identify a non-injury biohazard message.

OSHA requires the use of PPE per ANSI HazCom where applicable in American.

Biohazard Safety levels



- Anthropogenic hazard :- Hazard caused by human action or intion.

- Bio Containment :- Physical containment of pathogenic organisms or agents in microbiology laboratories)

- Biosafety Level :- Pathogen that can be cultured.

- Biosafety level :-
level of the bio containment precautions required to isolate dangerous biological agents.

GOVERNMENT GENERAL DEGREE COLLGE

TEHATTA

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বর্তমানে সংবাদপত্র, টেলিভিশন এবং বিভিন্ন মহলে Hazard ও Disaster সম্পর্কে প্রায়ই শোনা যায়। এই পরিবেশ বিষয়ক বিজ্ঞানী, সমাজবিজ্ঞানী, ভূ-তত্ত্ববিদ এবং ভৌগলিকেরা নানান সংজ্ঞা ও ব্যাখ্যা দিয়েছেন। তবে সবাই একমত নন। পরিবেশ বিজ্ঞানীরা Hazard-কে Natural hazard বলতেই বেশি আগ্রহী আবার এই বিষয়ে ভূ-তত্ত্ববিদ ও ভৌগলিকদের মধ্যে সামান্য মতভেদ রয়েছে। ভূ-তত্ত্ববিদরা Hazard আলোচনায় Natural Geological factors আর ভৌগলিকেরা Anthropogenic factors-এর উপর বেশী গুরুত্ব আরোপ করেছেন।

প্রকৃত পক্ষে 'Hazard' এবং 'Disaster'-এর মধ্যে বিষয়গত ও প্রয়োগগত ব্যবধান রয়েছে। ভৌগলিকেরা Hazard-এর ব্যাখ্যা দিয়েছেন যে, এটি হল ভূমিরূপগত বা প্রাকৃতিক প্রক্রিয়া যার মধ্যে নানা প্রাকৃতিক ও ভূমিরূপগত উপাদান অন্তর্ভুক্ত এবং এটি প্রাকৃতিক ও মনুষ্যকৃত। তবে সাধারন ভাবে বলা যায় এটি সর্বোচ্চ প্রাকৃতিক ও মানবিক প্রক্রিয়া যার সঙ্গে ক্ষয়ক্ষতি যুক্ত থাকে না। ভূমিরূপবিদ Prof. Sovindra Singh (2001) Hazard-এর সংজ্ঞা দিয়েছেন যে, 'Hazard are generally taken to be the processes (causae factor) and the respones (Results) of extreme exents, both natural and anthropogeric, which cause an accidentl extreme events or danger'.

Prof. S. R. Basu (2004), মতে 'Hazard' হল একটি ভূতাত্ত্বিক, ভূমিরূপগত পদ্ধতির আভ্যন্তরীন বা বাহ্যিক প্রকাশ যার মধ্যে নানান প্রাকৃতিক উপাদান ও প্রক্রিয়া আঙ্গাঙ্গিক ভাবে জড়িত। Hazard-এর সঙ্গে ব্যাপকভাবে না হলেও অল্পবিস্তর ক্ষয়ক্ষতি যুক্ত থাকে, যদিও মনুষ্য জনজীবন-কে স্তব্ধ করতে পারে না। এটি একটি পরিস্থিতি বিশেষ তবে তা চূড়ান্ত ঘটনা (extreme events) নয়।

পরিশেষে বলা যায় দুর্যোগ (Hazard) প্রাকৃতিক, মনুষ্যসৃষ্ট বা উভয় কারণেই হতে পারে এবং যার মধ্যে ভৌগলিক, পরিবেশগত এবং সাংস্কৃতিক উপাদান অন্তর্ভুক্ত। অল্প সময়ের জন্য হলেও মানুষের স্বাভাবিক জীবনযাত্রাকে বিঘ্নিত করে থাকে। নিম্নে Hazard-এর কিছু স্বাভাবিক বৈশিষ্ট্য তুলে ধরা হল —

① এটি প্রাকৃতিক, পরিবেশগত, প্রযুক্তিক এবং সাংস্কৃতিক উপাদানের সংযুক্ত ক্রিয়া।
② তা সাধারণত খুব কম ক্ষেত্রে সংঘটিত হয়।
③ সমাজের স্বাভাবিক জীবনযাত্রাকে ব্যাহত না করলেও অল্প কিছুর জীবনযাত্রার গতিকে রুদ্ধ করে দেয়।
④ ক্ষয়ক্ষতির প্রভাব ব্যাপক মাত্রায় না থাকলেও আপাতদৃষ্টিতে, প্রাকৃতিক ও অর্থনৈতিক সম্পদের অল্প কিছুর ক্ষতি হয়।
⑤ দুর্যোগ উপযুক্ত আধুনিক পরিকল্পনার মাধ্যমে নিয়ন্ত্রন করা যায়।

বাংলাদেশের দুর্যোগ প্রবণতা :-

বাংলাদেশের মানুষের জীবনে ঝড়, ঘূর্ণিঝড় জলোচ্ছ্বাস, খরা বন্যা, নদীভাঙন ইত্যাদি প্রাকৃতিক দুর্যোগ নিয়মিত ঘটনা। ভৌগলিকভাবেই পৃথিবীর অন্যতম প্রাকৃতিক দুর্যোগ প্রবণ দেশ, বাংলাদেশের এসব দুর্যোগ প্রায় প্রতি বছর মানব সম্পদ অবকাঠামোগত, অর্থনৈতিক ও প্রাকৃতিক সম্পদের বিপুল ক্ষতি সাধন করে। ভৌগলিক অবস্থানগত বাস্তবতাই এর প্রধান কারণ। নদীবিধৌত বাংলাদেশের উত্তরে হিমালয় পর্বতমালা, দক্ষিণে বঙ্গোপসাগর। এদেশের দক্ষিণাঞ্চলেও কিন্তু পার্বত্য অঞ্চল ও বিস্তীর্ণ জল তল ভূমি ভূড়ে রয়েছে সাত স্বাভাবিক নদী; তাই হিমালয়ের বরফ গলা পানিতে যেমন বন্যা সৃষ্টি হয় তেমনি হিমবাহ হতে হয় অতিবৃষ্টি। আমাদের দেশের অবস্থান উষ্ণমন্ডলীয় অঞ্চলে এবং দক্ষিণের বঙ্গোপসাগরের সমুদ্রপৃষ্ঠের উষ্ণতা 27 ডিগ্রী কেন্দ্রিক উষ্ণতা বৃদ্ধি ও পরিবেশ বিপর্যয়ের কারণে এসব ঘূর্ণিঝড় মারাত্মক আকার ধারন করেছে, অন্যদিকে নদীমাতৃক বাংলাদেশের প্রধান প্রধান ও গুরুত্ব পূর্ণ নদীগুলোর উৎস ভারত ও নেপাল। পার্শ্ববর্তী দেশের নদী শাসনের কারণে এদেশে বন্যা ও খরার মত দুর্যোগের সম্মুখীন হতে হয়; প্রচুর অতিবর্ষনে বন্যা ও নদীভাঙন প্রায় নিয়মিত ঘটনা। অন্যান্য ভৌগলিক অবস্থান, জলবায়ু, ভূমির গঠন, নদীমাতৃক ভূমি রূপ; সমুদ্রের অবস্থান ইত্যাদি কারণে সৃষ্টি ঝড়, বন্যা, খরা

নদীভাঙ্গন অবস্থান, জলবায়ু, ভূমির গঠন, নদীমাতৃক ভূমিরূপ, সমুদ্রের অবস্থান ইত্যাদি কারণে সৃষ্টি ঝড়, দুর্যোগের সাথে বসবাস করে আমাদের জীবনধারণা।

প্রাকৃতিক দুর্যোগ :—

প্রাকৃতিক ভাবে সৃষ্ট আকস্মিক ও রেশ প্রতিকূল পরিবেশগত অবস্থাকে প্রাকৃতিক দুর্যোগ বলা হয়। প্রাকৃতিক দুর্যোগ যে কোনো দেশেই মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যাহত, বিপর্যস্ত ও দুর্বিসহ করে তোলে। বিশ্বের সর্বত্রই প্রাকৃতিক দুর্যোগ কম-বেশি আঘাত হানে। প্রাকৃতিক তান্ডবের মুখোমুখি দাঁড়িয়ে করনীয় প্রায় কিছুই থাকে না। তাই দুর্যোগ ব্যবস্থাপনা অত্যন্ত গুরুত্বপূর্ন। দুর্যোগ ব্যবস্থাপনা বলতে বোঝায় এমন একটি সমন্বিত ব্যবস্থা যাতে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগের ক্ষয়ক্ষতি হ্রাস করা যায়। আমাদের দেশের মানুষ বিশ্বের অনেক দেশের তুলনায় প্রাকৃতিক দুর্যোগ মোকাবিলা করে বেশি অত্যন্ত। যেমন ঝড়, বন্যা, খরা, জলোচ্ছ্বাস ইত্যাদি দুর্যোগে এদেশের মানুষ চিরায়তভাবেই সংগ্রাম করে বেঁচে থাকার চেষ্টা করে। নিয়মতান্ত্রিক ও বৈজ্ঞানিকভাবে, শৃংখলার সাথে দুর্যোগ মোকাবেলা করা স্বাভাবিকভাবেই অধিক কার্যকরী হয়। যেমন - বাংলাদেশের দক্ষিণা ঞ্চলে সমুদ্র থাকায় সমুদ্র সৃষ্ট ঘূর্ণিঝড়, জলোচ্ছ্বাস বারবার দক্ষিণা ঞ্চলে আঘাত হানে। এতে মানবসম্পদসহ বহু ক্ষয়ক্ষতি সাধিত হয়। এসব ক্ষতি হ্রাস করতে ও বিপর্যয় কাটাতে প্রয়োজন সমন্বিত দুর্যোগ ব্যবস্থাপনা।

দুর্যোগ ব্যবস্থাপনার প্রধান উদ্দেশ্য :—

ক) দুর্যোগকালীন মানবজীবন, গবাদি ও বন্য প্রানি এবং পরিবেশগত ক্ষতি হ্রাস করা।

খ) ক্ষতিগ্রস্থ মানুষের কাছে অগ্রাধিকারভিত্তিতে দ্রুত ত্রানসামগ্রী পৌঁছানো।

গ) দুর্যোগ পরবর্তী উদ্ধার, পুনর্গঠন ও পুনর্বাসন নিশ্চিত করা।

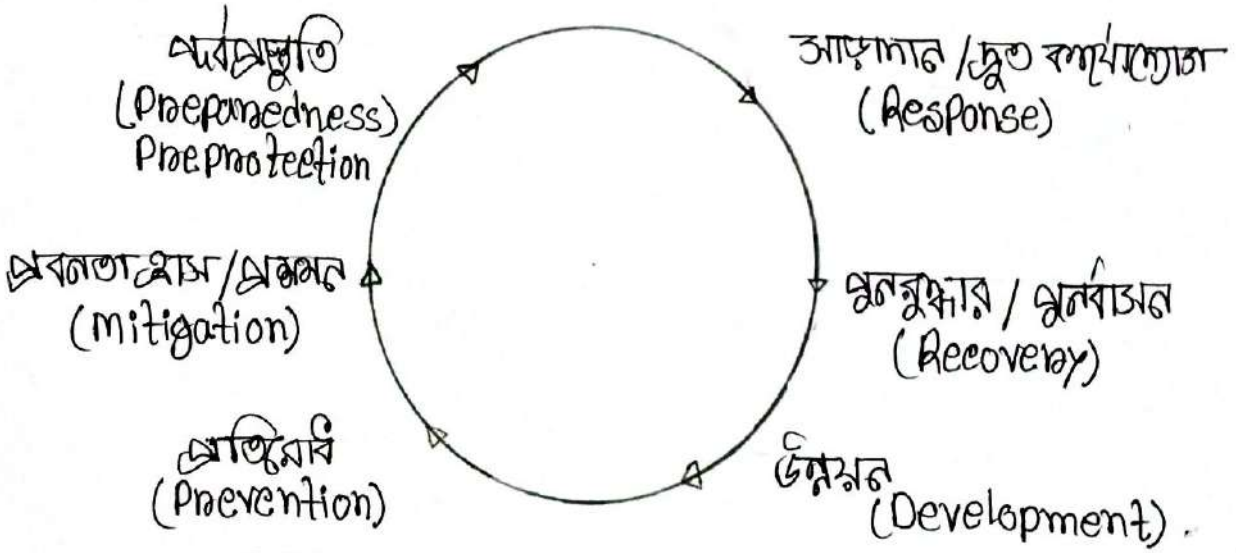
উপরোক্ত উদ্দেশ্যসমূহ বিবেচনায় রেখেই দুর্যোগ ব্যবস্থাপনা কার্য ক্রম পরিকল্পনা ও পরিচালনা করা হয়।

দুর্যোগব্যবস্থাপনা :—

আগেই বলা হয়েছে যে, দুর্যোগ ব্যবস্থাপনা হল একটি সমন্বিত দুর্যোগ মোকাবেলা ব্যবস্থাপনা। দুর্যোগ ব্যবস্থাপনাকে তিনটি স্তরের বা ধাপের একটি সমন্বিত ব্যবস্থাও বলা যেতে পারে। যথা:

১। দুর্যোগপূর্ব প্রস্তুতি
২। দুর্যোগকালীন প্রস্তুতি
৩। দুর্যোগ পরবর্তী পুনরুদ্ধার

অর্থাৎ, দুর্যোগের ভয়াবহতা মোকাবেলায় ক্ষয়ক্ষতি হ্রাসের লক্ষ্যে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগপরবর্তী স্তর গুলিও থাকবেন ও কার্যক্রমকেই এক কথায় দুর্যোগ ব্যবস্থাপনা বলে।
দুর্যোগ ব্যবস্থাপনা কার্যক্রমের ডিসাস্টারসম্বন্ধ কী কী উপায়ে কাজ করে তা নীচে একটি চক্রের সাহায্যে দেখানো হল —



চিত্র ১০.১ : দুর্যোগ ব্যবস্থাপনা চক্র

দুর্যোগ ব্যবস্থাপনা কার্যক্রম সুষ্ঠুভাবে সম্পন্ন করার উদ্দেশ্যে সরকারিভাবে জাতীয় ও স্থানীয় পর্যায়ে বিভিন্ন কমিটি গঠন করা হয়েছে। কমিটিগুলো প্রাকৃতিক দুর্যোগ সংক্রান্ত বিভিন্ন সংগঠনের কার্যক্রম সম্পন্ন করার সাথে সাথে দুর্যোগের বিভিন্ন পর্যায়ে সক্রিয় অংশ গ্রহণ করে থাকে। আসুন, এবার আমরা এসব কমিটিগুলোর কয়েকটির নামের সাথে পরিচিত হই।

TEHATTA GOVERNMENT COLLEGE



TEHATTA * NADIA

UNIVERSITY OF KALYANI

BA HONS 1st SEMESTER EXAMINATION - 2022-2023

B.A HONS
1st SEMESTER
DIPARTMENT – HISTORY HONS
SUB : ENVIRONMRNTL STUDIES

NAME - JAYANTI MONDAL

College Roll No - 19 (12)

SESSION : 2022-2023

09/03/2023

Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

□ Risk :-

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, clostridium botulinum and clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate.

P.T.O ⟶

They survive normal cooking temperatures and even temperatures higher than 80°c (176°F).

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include: clostridium botulinum, Bacillus cereus, and staphylococcus aureus.

Major biological hazards ⟶

- Bacteria ex: Salmonella spp., Enterohaemorrhagic Escherichia coli, campylobacter jejuni, yersinia enterocalitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, staphlococcus aureus, clostridium botulinum, clostridum perfringens, vibrio vulnificus, vibrio parahaemolyticus.

- virus: hepatitis A virus, Norwalk viruses, Rota-virus.

- parasites: Texoplasma gondii, cryptosporidia, Giardia spp., Trichinella spiralis, Taenia solium, Anisakis spp.

Sources ⟶

The major sources of biological contaminats in food are:

- animal guts: faecal contamination.
- Soil and water contaminated by non-treated manure
- cross contamination:
  - human contamination due to poor personal hygiene, faecal contamination, failure in infection control (illness not reported)
  - cross-contamination of food products spread from processing environment due to poor/ improper sanitation

□ Factors affecting the growth of microorganisms in foods ——→

- The temperature values for microbial growth depend on the type of microorganisms. For example, psychotrophs such as listeria monocytogenes grow at refrigeration temperature (4°c or 39°F), while thermotrophs can grow at higher temperatures (45°c or 113°F).

- The pH of a product is related to the acidity or alkalinity the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.

- The Water Activity (aw) refers to the water available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

aw of Product	Bacterial Spoilage	Examples
> 0.90	spoils easily	fresh vegetables, fresh meat, processed meat, milk, fish
0.78.0.90	susceptible to spoilage	dry cheeses, flour cakes, beans, cereals
< 0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels dehydrated foods

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

☐ Control and prevention ⟶

The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing practices (GMPs) and Hazards Analysis and critical control point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

Processing strategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking, pasteurization)
- use of appropriate process controls:
  - storage temperatures (ex: cooler, freezer)
  - processing parameters (ex: temperature and time for cooking, water activity during dehydration)
  - adequate cooling system
- effective cleaning and sanitizing procedures (ex: SSOPs)

P.T.O ⟶

- Use of food technologies to prevent the growth of bacteria or other biological hazards:
  - packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)
  - preservatives
  - processing techniques (ex: dehydration)

TEHATTA GOVERNMENT COLLEGE

University of Kalayani

Name - Jayeta Modak.

Sub - Environmental Science

Hours - Bengali

Session - 2022 - 2023

(13)

09/03/2023

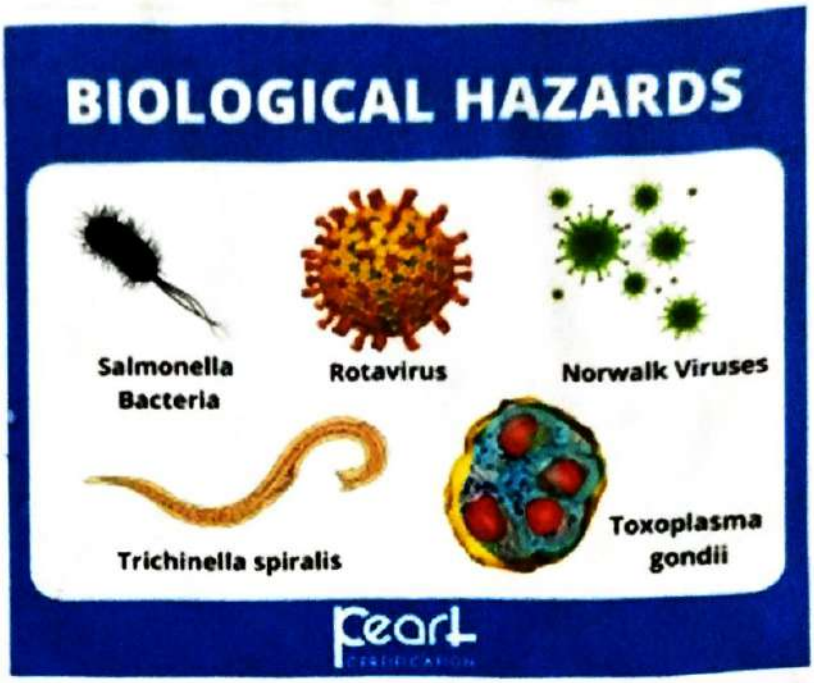
BIOLOGICAL HAZARD

A Biological Hazard or Bio Hazard, is a biological substance that poses a threat to the health of living organizims, premarely humans. This could include a sample of a micro-organism, visus or toxin that can adversely affect human health. A bio hazard could also be a substance harmful to other living beings.



The term and its associated symbol are generally used as to the substances will no to take precaudions. The bio-hards symbol was developed in 1966 by chorls Baldwin, an envionmental health-engineer working for the dow chemical company on the containment products.

Biological health hazards included different kind of Bacteria, Viruses, Parasites and moulds or fungi. They can pose a threat to human health when they are in held, eaten or coming contact with skin. They can cause illness such as food poisoning, tetanuse, respiratory infections or parasite infection.



There are many ways where biological hazards do harm to as-

(1) In hospital industry when biological waste are not properly disposed, then they can spread various diseases through fangus, bacteria and virus.

(2) Biological wastage of markets also can harm people when they are not properly disposed.

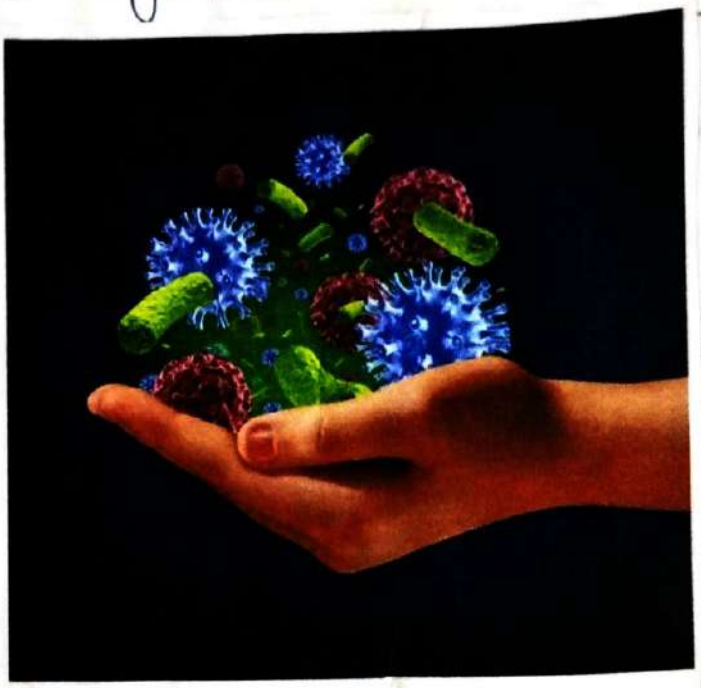
(3) Contegious disease like Corona or Covid Padients. and their belongings are not properly handled. The dusease can spread rapidly. This is the best

example of bio-hazard.

④ There are many fungus goes on food and affects on human beings.

⑤ There are many disease like chalera caused by bacteria which are found in our environment, are also bio-hazard.

The United States Centers for Disease Control and Prevention (CDC) categorizes various diseases in levels of biohazard, Level 1 being minimum risk and Level 4 being extreme risk. Laboratories and others facilities are categorized as BSL (Biosafety Level) 1-4 or as P1 through P4 for short (Pathogen or Protection Level).



Biohazard Level 1: Bacteria and Viruses inding Bacillus Subtilis, Canine hepatitis, Escherichia Coli,

and Varicella (chicken Pox), as well as some cell cultures and non-infectious bacteria, At this level precautions against the biohazardous materials in question are minimal, most likely involving gloves and some sort of facial protection.

Biohazard Level 2: Bacteria and viruses that cause only mild disease to humans, or are difficult to contract via aerosal in a lab setting, such as hepatitis A, B, and C, Some influenza A strains, Human respiratory syncytial virus, Lyme disease, Salmonella, mumps, measles, Scrapie, dengue fever, and HIV.



Routine diagnostic work with clinical specimens can be done safely at Biosafety Level 2, using Biosafety Level 2 practices and procedures. Research work (including co-cultivation, virus replication studies, or manipulations involving concentrated virus) can be done in a BSL-2 (P2) facility, using BSL-3 practices and

Procedures.

Biohazard Level 3: Bacteria and viruses that can cause severe to fatal disease in humans, but for which vaccines or other treatments exist, such as anthrax, West Nile virus, Venezuelan equine encephalitis, SARS coronavirus, MERS coronavirus, SARS-COV-2, Influenza A H5N1, hantaviruses, tuberculosis, typhus, Rift Valley fever, Rocky Mountain spotted fever, Yellow fever, and malaria.

Biohazard Level 4: Viruses that cause severe to fatal disease in humans, and for which vaccines or other treatments are not available, such as Bolivian hemorrhagic fever, Marburg virus, Ebola virus, Lassa fever virus, Crimean-Congo hemorrhagic fever, and other hemorrhagic diseases, as well as Nipah virus.[3] Variola virus (smallpox) is an agent that is worked with at BSL-4 despite the existence of a vaccine, as it has been eradicated and thus the general

Population is no loger routinely vaccinated. When dealing with biological hazards at this level, the use of a positive pressure personal suit with a segregated air supply is mandatory. The enthance and exit of a level Four biolab will contain mutiple showers, a vacuum room, an ulthaviolet light room, autonomous detection system, and other safety precautions designed to destroy all traces of the bio-hazard. Multiple airlocks are employed and are electronically secured to prevent doors from both opening at the same time. All air and water service going to and coming from a Biosafety level 4 (P4) lab will undergo similar decontamination procedures to eliminate the possibility of an accidental release. Currently there are no bacteria classified at this level.

Ultimately we can say properly disposal and labeling biological hazard item can keep us safe from various unwated disease so we must educated all of as so that all can be safe.

TEHATTA GOVERNMENT COLLEGE

Tehatta, Nadia

NAME :- KHUSHI BISWAS
SUB :- EVS
DEPARTMENT :- BENGALI
1st year 1st semester
DATE OF SUBMISSION :- 01/03/23

(14)

By
09/03/2023

EVS PROJECT

2022-2023



Biological hazard

Introduction :—

A Biological hazard, or biohazard is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a microorganism, virus or toxin that can adversely affect human health. A biohazard could also be a substance harmful to other living beings.

The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by Charles Baldwin, an environmental-health engineer working for the Dow chemical company on the containment products.

It used in the labelling of biological materials that carry a significant health risk, including viral samples and used hypodermic needles.

In unicode, the biohazard symbol is U+2623.

ASNI Z535 / OSHA / ISO regulation :-

Biohazardous safety issues are identified with specified lables, signs, and paragraphs established by the American national standards Institute (ANSI). Today ANSI Z535 standards for biohazards are used worldwide and should always be used appropriately within ANSI Z353 Hazardous communications (HazCom) signage, labeling and paragraphs. The goal is to help workers rapidly identify the senverity of a biohazard from a distance and through colour and design standardization.

Biological hazard symbol design :-

* A red on white on white-coloured background is used behind a black biohazard symbol when integrated whit DANGER sign, lable or paragraph.



* An orange on black on white coloured background is used behind a black biohazard symbol when integrated with a WARNING sign, lable or paragraph.



* A yellow on black on white-coloured background is used behind a black biohazard symbol when integrated with a CAUTION sign, lable or paragraph.



* A green on white-colored background is used behind a black biohazard symbol when integrated with a NOTICE sign, lable or paragraph.



DANGER is used to identify a biohazard that will cause death. WARNING is used to identify a biohazard that may cause death. CAUTION is used to identify a biohazard that will cause injury, but not death. NOTICE is used to identify a noninjury biohazard message (e.g. hygiene, cleanup or general lab policies).

OSHA requries the use of proper ANSI Hazcom where applicable in Americal workplaces. States and local governments also use these standards as codes and laws within their own jurisdications. Proper use of ANSI Z535 signs, lables and paragraphs are written into many of OSHA's standards for Hazcom and crafted to integrate with ISO symbols.

* Reference ANSI Z535 for a complete description on how to use DANGER, WARNING, CAUTION and NOTICE Signs, labels, paragraphs.

UN/ISO classification :-

Biohazardous agents are classified for transporting by UN number:-

* Category A, UN 2814 :- Infectious substance, affecting humans: An infections substance in a form capable of causing permanent disability or life-threading or fatal disease in otherwise healthy humans or animals when exposure to it occurs.

* category A, UN 2900 :- Infectious substance, affecting animals (only): An infections substance that is not in a form generally capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans and animals when exposure to themselves occurs.

* Category B, UN 3373:- Biological substance transported for diagonostic of investigative purposes.

* Regulated Medical waste, UN 3291 :- Waste or reusable material derived from medical ~~reusable mate~~ treatment of an animal or human or from biomedical research, which includes the production and testing.

Levels of Biohazard :-

Biosafety level :-

The United States Centers for Disease control and prevention (CDC) categorizes various diseases in levels of biohazard, Level 1 being minimum risk and level 4 being extreme risk. laboratories and other facilities are categorized as BSL (Biosafety Level) 1-4 or as P1 through P4 for short (Pathogen or protection Level).

* Biohazard Level 1 : Bacteria and viruses including Bacillus subtills, canine hepatitis, Escherichia coli, and varicella (chickenpox), as well as some cell cultures and non-infectious bacteria. At this level precautions against the biohazardous materials in question are minimal, most likely involving gloves and some sort of facial protection.

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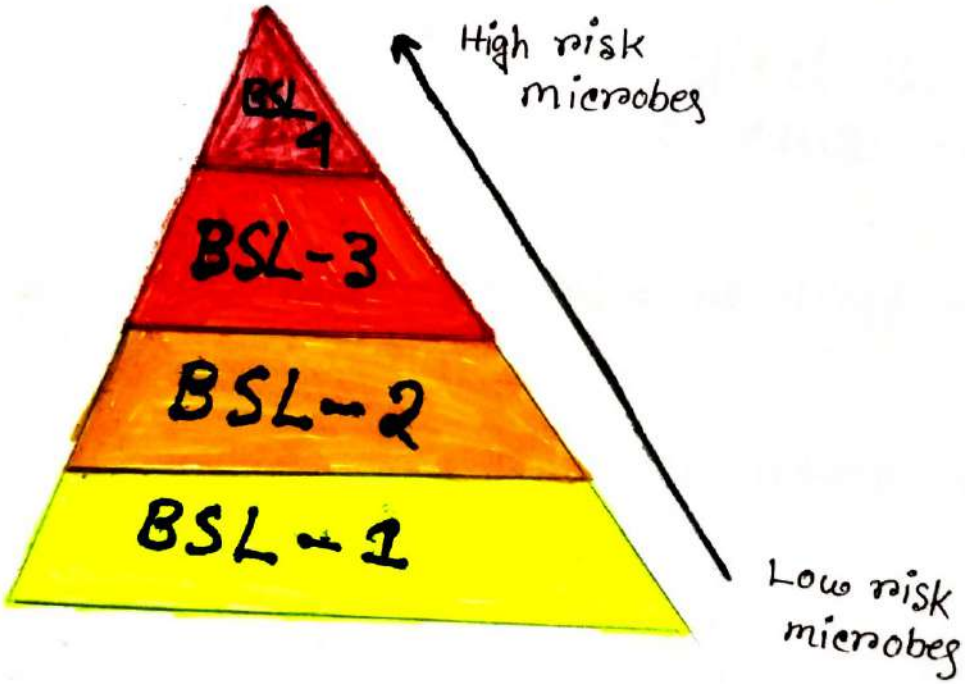
Biohazard Safety Levels :—



* Anthropogenic hazard :- Hazard caused by human action or Inaction.

* Biocontainment :- physical containment of pathogenic organisms or agents in microbiology laboratories.

* Biological agent :- Pathogen that can be weaponized.

* Biosafety Level :- Level of the biocontainment precautions required to isolate dangerous biological agents.

* Chemical hazard :- Non-biological substance that has the potential to cause harm to life or health.

* Hazard :- Situation or object that can cause damage or harm.

* Health hazard :- Situation or object that can cause damage or harm.

* Interplanetary contamination :- Biological contamination of a planetary body by a space probe of spacecraft.

List of laboratory biosecurity incidents

* mechanical hazard :- Hazard with a mechanical energy source.

* occupational hazard :- Hazard experienced in the workplace.
* physical hazard :- Hazard due to a physical agent.
* planetary protection :- Guiding principle of a space mission.
* psychosocial hazard :- occupational hazard on one's psychological well-being.
* public health :- Promoting health through organized efforts and informed choices of society and individuals.

GOVERNMET GENRAL DEGREE COLLEGE TEHATTA

2023

Biological Hazards

Sub: ENVS

(14)

By 09/03/2023

Name: KOYEL DAS

Sem: 1st (BA BENGALI HONOURS)

ROLL: 33

Student ID: 1570009

Biological Hazards:

Biological Hazards are organisms, or substances produced by organisms, that pose a threat to human health They are a major concern in food processing because they cause most food borne illness outbreks.



Risk: These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiplyin the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens, but only in are easily destroyed by heat. However, some bacteria that proudce spores can survive cooking temperatres.

For example, steam cooking significanly reduces non-spore-forming food borne pathogens,

but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, clostridium botulinum and clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must fist grow in the food before prodcing toxins. They survive normal cooking tempeartures and even temperatures higher than 80°C (176F°)

The nick of intoxication is prevented by controlling the growth of toxin producing bacteria. These inclade; clostridium botulinum, Bacillus cereus, and staphylococcus aureus.

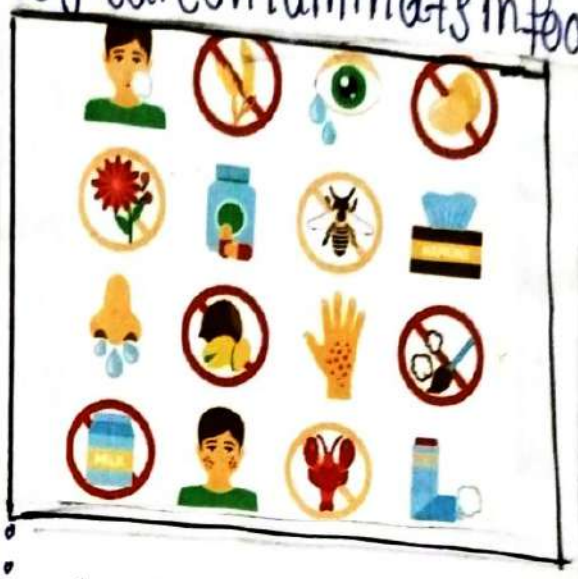
Major biological Hazards:

- ☐ Bacteria: ex salmonella spp, Enterohaemorrhagic Escherichia, compylobacter jejuni, yersinia enterocolitica, listermonocytogenes, Bacillus anthracis, Bacillus cereus, staphlococcus aureus, clostridiam bothulinum, clostridium perfringens, vibrio vulnificus, vibrioparahaemolyticus.
- ☐ virus exhepatits A virus, Norwalk viruses, Rotavirus.

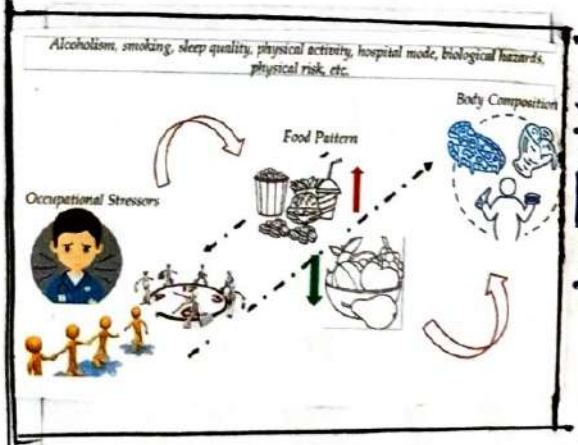
Parasites ex: Toxoplasma gondii crytospor idia Giardia spp, Trichinella spiralis, Taenia solium Anisakis spp.

Sources:

The major sources of biological contaminats in food are:



- animal guts: foceal contarmination.
- soil and water contaminated by non-treated manure.
- cross contamination:
  - human contamination due to poor personal hygiene, faecl contamination, faliure in infection control (illeness not reported)



- cross contamintion of food products spread from proessing environment due to poor / imporper sanitation

Factors affecting the growth of microorganisms in foods:

- The temperature values for microbial growth depend on the type of microorganism.

For example, psychrotrophs such as listeria monocytorgenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F)

- The pH of product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. most bacteria grow in a pH range between 5 and 9.
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Each of these factors is important for the control of microbial growth. It is the interaction among these facetors that determines the growth or control of micro-organisms

Control and prevention:

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processing strategies to control biological hazards:



- effective thermal processing used as kill up step (ex cooking, pasteurization)
- use of appropriate process controls:
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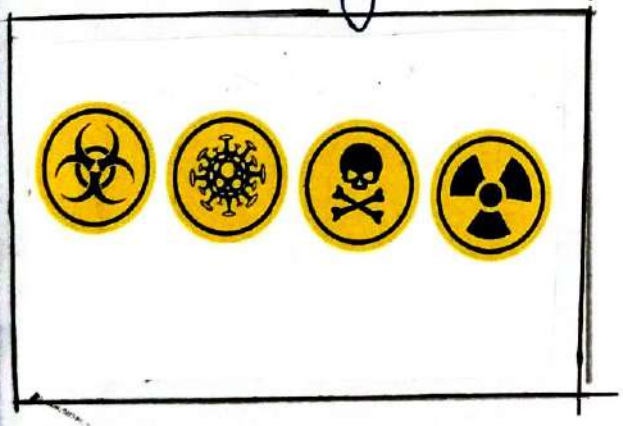
  - processing parameters (ex temperature and time for cooking, water activity during dehydration)

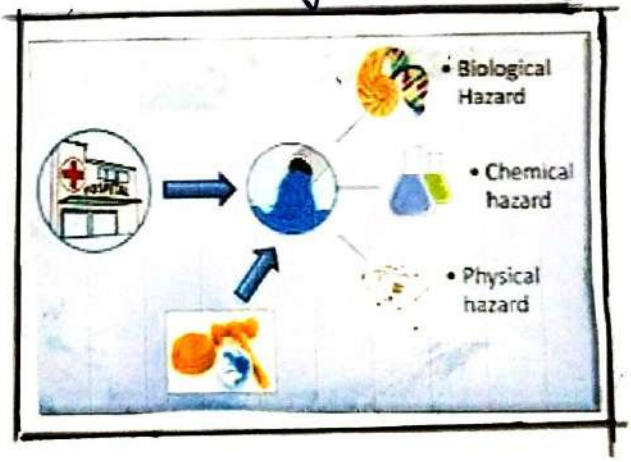
- adequatue cooling system

- effective cleaning and sanitizing procedurees (ex-SSOPs)

- use of food technologies to prevent the growth of bacteria or other biological Hazards:

  - pack aging techniques (ex: use of vacuum) pack aging, modified atmosphere packing)
  - preservaties
  - processing techniques (ex: dehyd ration)





ASSIGNMENT

TEHATTA GOVERMENT COLLEGE

Academic Year - 2022-23

Environmental Studies Project on

Biological Hazards

Submitted by

Name: Koyel Kar

Course: B.A Philosophy Honours

Registration No:

Submitted to

(13)

Susmita Chowdhury
Assistant Prof. in Chemistry
Govt. General Degree College, Tehatta

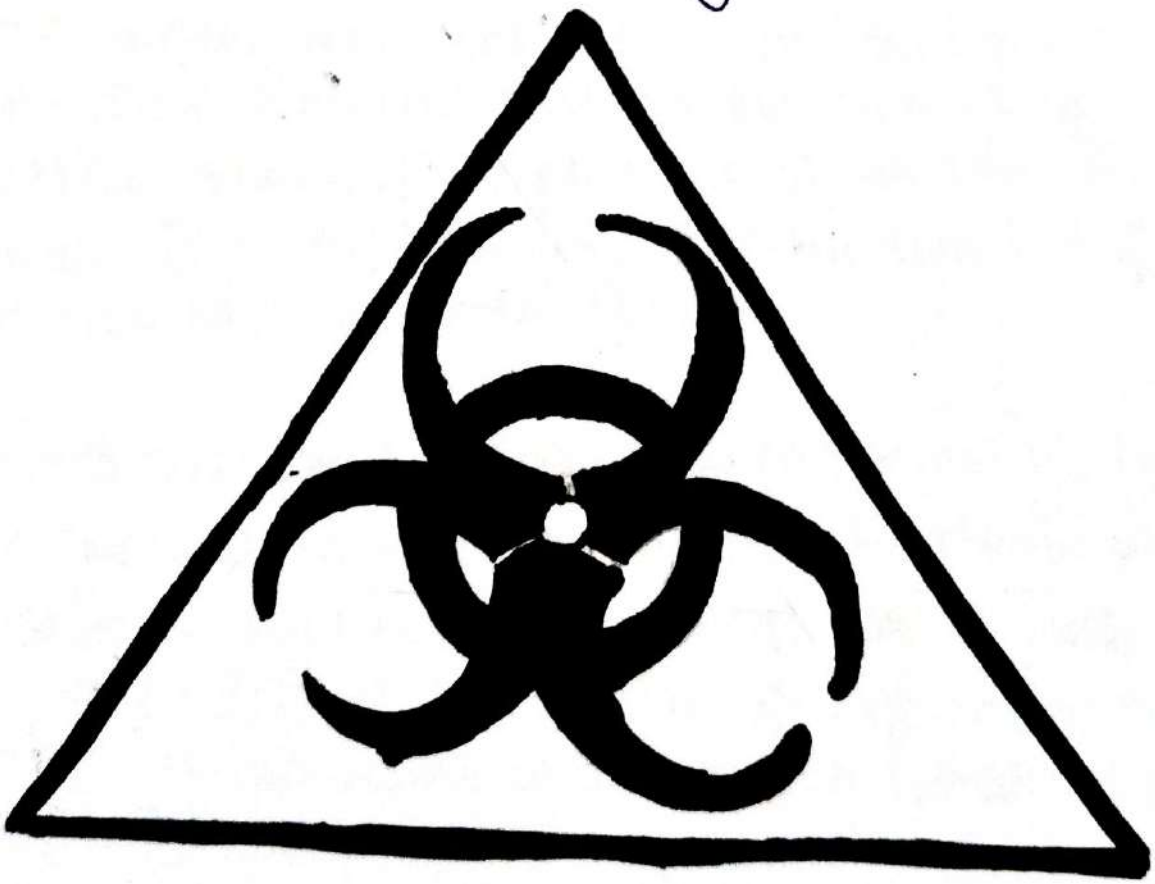
09/03/2023

Date of Submission: 01/03/2023

Professor Sign

INTRODUCTION

Biological hazards, also known as biohazards, refer to biological substances that pose a threat to the health of living organism, especially that of humans. These hazards can be encountered anywhere in the environment, including home, school or work. The biohazard symbol was developed in 1966 by Charles Baldwin, an environmental health engineer.



Risk:

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because Pathogens are easily destroyed by heart. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactive spores. Examples of spore forming bacteria include Bacillus cereus, Clostridium botulinum and clostridium Perfringens.

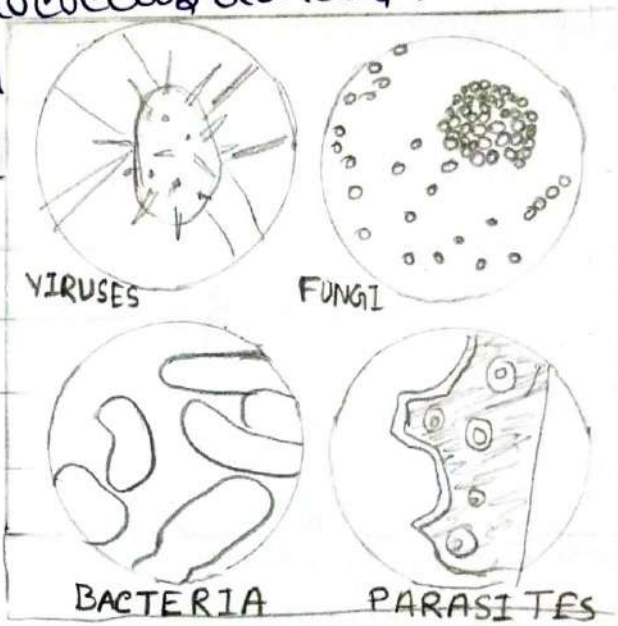
Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive natural cooking temperatures and even temperatures higher than 80°C [176°F]

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These includ' staphylococcus aureus.

Major biological hazards

- Bacteria ex:

Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthra-cis, Bacillus cereus, Staphylococcus aureus, Clostridium botulinum, Clostridium perfringens, Vibrio vulnificus, Vibrio Parahaemolyticus.



- Virus ex:

Hepatitis A Virus, Norwalk Viruses, Rotaviruses.

- Parasites:

Toxoplasma gondii, Cryptosporidia, Giardia spp, Trichinella spiralis, Taenia solium, Anisakis spp.

Sources

The major sources of biological contaminants in food are:

- animal guts: faecal contamination
- Soil and water contaminated by non-treated manure.

- Cross contamination:

- human contamination due to poor personal hygine, faecal contamination, failure in infection control (illness not reported).

- cross-contamination of food products spread from processing due to poor/improper sanitation

Factors affecting the growth of microorganisms in foods

The temperature values for microbial growth depend on the type of microorganism. For example psychrotrophs such as Listeria monocytogenes grow at refrigation temperature [4°C or 39°F], while thermotrophs can grow at higher temperatures [45°C or 113°F]

The pH of a product is related to the acidity or alkainity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.

The water activity (aw) refers to the water available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water

activity on bacterial spoilage.

aw of product	Bacterial spoilage	Examples
>0.90	Spoils easily	fresh vegetables, fresh meat, Processed meat, milk, fish
0.78-0.90	Susceptible to spoilage	dry cheeses, flour, cakes, beans, cereals
<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods.

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

Control and prevention

The most effective way to control biological hazards is by prevention. The implementation of Good manufacturing Practices (GMPs) and Hazard Analysis and Critical Control Point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production. HACP controls hazards that may be present in

ingredients and packaging materials and also those that occur during food processing, Packaging and storage.

Processing strategies to control biological hazards:

- effective thermal processing used as a kill step [Ex: Cooking, Pasteurization]
- Use of appropriate process controls:

- Storage temperatures (ex: Cooler, Freezer)

- Processing parameters [Ex: temperature and time for cooking, Water activity during dehydration]

- adequate cooling system.

- effective cleaning and sanitizing procedures [Ex: SSOPs]

Use of food technologies to prevent the growth of bacteria or other biological hazards:

- Packaging techniques [Ex: Use of vacuum packaging, atmosphere packaging]

- Preservatives.
- Processing techniques [Ex: dehydration].

— x —

TEHATTA GIENAREL DEGREE COLLEGE

Sub : Envs
Biological Hazards

Name : Labani Halder
Department : Bengali Honours (Sem-1)
Reg. No. :

(12)

09/03/2023

SESSION : 2023

Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect that body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inacting spores. Examples of spore, forming bacteria include Bacillus cereus, clostridium botulinum and Clstridium perfringens.

Toxins are produced when toxin producing bacteria are persent in high nmubers. Bacteria must first

grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C (176°F)

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include: Clostridium bothulinm, Bacillus cereus, and Staphylococcus aureus.

Major biological hazards

- Bacteria :

Salmonella spp. Enterohaemorrhagic Escherichia coli, Campylobacter iejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus, B aureus, Clostraeis botulinum, Clostridium perfrigens, vibria vulnificus, Vibria parahaemolyticus

- Virus :

are a group of pathogens that consist mostly of nucleic acids and that lack cellular structure Viruses are totally dependent on their hosts for replication. Examples are common cold, influenza, measles, SARS, Hantavirous, and rabies Roturirous, hepatitis A Virus, Norwalk viruses.

• Parasites :
Toxoplasma gondi, Cryptosporidia, Giardia spp, Trichinella Spiroadis, Taenia Solium Anisakis spp.

Sources

The major sources of biolpgical contaminants in food are:

- animal guts: faecal contamination
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- Cross contamination:

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- The temperature values for microbical growth depent on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (95°C or 113°F)

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GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packagig materials and also those that occur during food processing, packagig and storage.

Processing Strategies to control biological hazard:

- effective thermal processing used as a kill step (ex: cooking, pasteurization)
- use of appropriate process controls:

- storage temperatures (ex: cooler, freezer)

- Processing parmeters (ex: temperature and time for cooking, water activity during dehydration)

- adequate cooling system.

TEHATTA GOVERNMENT COLLEGE

SUB:- EVMS, BIOLOGICAL HAZARD



NAME :- LABANI MONDAL

ROLL :- 06

COUSE :- B.A (1 Year Degree) History Hons

SESSION :- 2023-2024

(11)

09/03/2023

Biological Hazards

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The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include. Clostridium botulinum, Bacillus cereus, and staphylococcus aureus.

Major biological hazards

- Bacteria ex:- Salmonella spp, Enterohemorrha-gic Escherichia coli, campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes Bacillus anthracis, Bacillus cereus, staphloco ccus aureus, Clostridium botulinum,

clostridium perfringens, vibrio vulnificus vibrio parahaemalyticus.

- virus ex:- hepatitis A virus, Norwalk viruses Rotavirus

- Parasits ex:- Toxoplasma gondii, cryptosporidia, Giardia spp, Trichinella spiralis, Taenia Sodium, Anisakis spp.

Sources

The major sources of biological contamin ts in food are.

- animal guts: faecal contamination
- Soil and water contamination by non-treat ted manure.
- cross contaminated:
  - human contaminated due to poor per sonal hygiene, faecal contamination, fail ure in infection control (illness not reported)

Cross-contamination of food products spread from processing environment due to poor/improper Sanitation.

Factors affecting the growth of microorganisms in foods

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F)
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Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

Control and Prevention

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GMPs ensure hazards associated with personnel and environment are controlled during food

Production. HACCP controls hazards that may by present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

Processing strategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking, pasteurization)
- Use of appropriat process controls:
  - Storage temperature (ex: cooler, freezer)
  - processing parameters (ex: temperature and time for cooking, water activity during dehydration)
  - adequate cooling system
- effective cleaning and sanitizing procedures (ex: SSOPs)

For information on the food safety program contact the CVO food safety knowledge centre.
For technical information, call 204-795-7968 or 204-795-8418 in winnipeg, or e-mail foodsafety@gov.mb.ca.

For general information, control your local GO Centre.

GOVERNMENT GENERAL DEGREE COLLAGE

TEHATTA



Project

NAME – Lisa Halder

CLASS – BA Honurs

SEM – 1

SUBJECT – Environmental Studies (ENVS)

(14)

By 09/03/2023

Biological Hazards

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Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must, but only inactivates spores. Examples first grow in the food before producing toxins are very difficult eliminats. They Survive normal cooking temperatures and clostridum Perfringens. Semperatures higher than 80c (176 °F)

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Major Biological hazards

Bactaria ex:- Salmonella spp, Enteroboemorrhagic Escherichia call, campyfobacter jejuni, Yersinia enterpocalitica botullinum, clostridum Perfringens, vibrio vulnificus vibrio, Parahaemolytieus.

Virus ex:- hepathitis A virus, Norwalk virus, Norwalk viruses, Rotavirus.

Parasites ex: Toxoplasma gondli, cryptosparidia, Giardia spp, Trichinella spiralis, Taenia Sallum, Anisakis spp.

Sources:-

The major sources of biological contaminants in food are:

- animal guts : faecal contamination
- soil and water contaminated by non-treated manure
- cross contamination: human contamination due to poor personal hygienes, faecal contanmination, failure in infection control

  cross-contamin of food products spread from products spread from processing environment due to poor / improper sanitation.

Factors affecting the growth of microorganisms in foods

- The temperature values for microbial growth depend on the type of microorganism. For example, psychotrophs such as listeria manocytogenes grow at refrigeration temperature (9°C or 39°F), while thermotra can grow at higher temperatures (95°C or 113°F).

- The PH of a product is related no the acidity or alkalinisty of the product. The PH of products affects the growth of bacteria, most bacteria grow in a PH range between 5 and 9

- The water activity low refers to the water available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

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GMPs ensure hazards associated with Personael and environment are controlled during food production, HACCP controls hazards that may be present in ingredients and packaging and storage.

Processing strategies to control biological hazards:-

- effective thermal processing used as a kill step ex cooking. Passteurization

- use of food technologies to prevent the growth of bacteria or other biological hazards:
  - Packaging techniques [ex: use of vacuum Packaging. modified atmosphere packaging).
  - Preservatives.
  - Processing techniques [ex: dehydration]
- use of apporpriate Process controls:
  - Storage temperatures (ex: cooler, freezer)
  - Processing Parameters [ex: temperature and time for cooking, water activity during dehydration)
    - adequase cooling system.
- use of food appropriate Process controls:

TEHATTA GOVERNMENT COLLEGE

TEHATTA , NADIA

UNIVERSITY OF KALYANI

NAME :- MAFUJA KHATUN

REG. NO. :-

ROLL NO :-

SUBJECT :- EVS

TOPIC :- BIOLOGICAL HAZARD

SESSION :- 2022 - 2023

(11)

09/03/2023

BENGALI DEPARTMENT

Biological hazards, also known as biohazards, refer to biological substances that pose a threat to the health of living organisms, primarily that of humans.

Biological hazards, also known as biohazards. This can include medical waste or samples of a microorganism, viruses, or toxins that can affect human health. Symbolized by a striking medallion of curving, curlicue scepts, the sinister nature of the biohazard is evoked by the sharp and pointed nature of the otherwise round symbol.

The chapters presented in this volume are reflective not of such vector-based biohazards, but of the greater and more widespread or more generalized threats caused by the diversity of insect plagues and swarms, blooms of posionous algaee, direct animal threats, degradation of land, deforestation, desentification, ecological impacts of climate change, and even strikes upon the Earth by comets and asteroids that would so devastate life if they were large enough.

P.T.O

The possible disruptions of the biological communities of the planet upon which humanity depends absolutely for the continuation on future economies. knowing more about the nature economies, the nature of such generalized biohazards is an obrious need in the community of expents conceerned about hazards, risks, and disasters.

Many volumes are written about the various point-source vectors of disease, contagion, and pandemics because of the insidious nature of that group of medical hazards. Less concern is generally exhibited with the diverse biologic hazards discussed in this volume, probably because of the more diffuse nature of many of those hazards discussed, and their seemingly lower impact to life, limb, or infrastructure. Nevertheless, many of these varieties of biological hazard can also do considerable damage, even to the loss of life, so greater attention needs to be paid to expositions of their many varieties. This volume, by no means exhaustive of all the possibilities of such biohazard, still addresses numerous such problems and quite diverse area of hazard occurrence.

P.T.O

prevention of Biological Hazards the primary check to biological hazard should be exercised at the level of entry or exit of any animal from the farm and also monitoring the re-entry of a previously healthy animal. A newly introduced animal should be checked thoroughly for the presence of infection and its vaccination status. The animal should be tested for diseases prevalent in the previously inhabited area and kept separate for the appropriate quarantine period. The Entry of vehicles should also be restricted with a separate area of disembarking. Semen, vaccine, and other biological products should be properly screened so as not to in introduce an infection to a farm.

Besides adopting measures for preventing the entry of infections, a proper health management program should be institute so as to maintain animals in good health condition. Animals should be regularly screened for the early detection of disease. Newborn livestock should be administered colostrum to boost their immune system.

proper vaccination and deworming should be done and a record maintained for each animal. Insect population should be kept in check as they may transmit disease to animals and also lead to production loss due to stress. Sick animals should be isolated from the flock, so as to limit the disease at its initial stage. In case of any disease outbreak vaccination should be performed in adjoining farm or surrounding area to prevent spread of disease. In the event of highly infectious disease like H5N1 avian influenza, mass culling should be done to prevent spread.

Risk and control Measures Although a variety of foodborne biological hazards are associated with poultry and eggs, Compylobacter and salmonella are the major pathogens implicated in foodborne diseases. In the EU, it is estimated that 44-68% of human foodborne case of salmonellosis are attributable to broilen and turkey meat. In contrast, 20-30% of human foodborne campylobacteriosis cases are attributable to handing, prepration, and consupion of broiler and turkey meat (or, 60-80%), when cross-contamination pathways occurring in the kitchen.

TEHATTA GOVERNMENT COLLEGE



UNIVERSITY OF KALYANI

TEHATTA ,NADIA

SUBJECT- Environmental Science

(Bioligical Hazard)

DEPARTMENT- BENGALI HONOURS 1ST SEMESTER

NAME- MANIK GHOSH

SESSION- 2022-2023

(12)

09/03/2023

বর্তমানে সংবাদপত্র, টেলিভিশন এবং বিভিন্ন জায়গায় Hazard ও Disaster সম্পর্কে আমরা শোনা যায়। এ সম্পর্কে পরিবেশ বিজ্ঞানী, সমাজবিজ্ঞানী, ভূ-তত্ত্ববিদ এবং ভৌগোলিকরা নানান সংজ্ঞা ও ব্যাখ্যা দিয়েছেন। তবে সবাই একমত নন। পরিবেশ বিজ্ঞানীরা Hazard-কে Natural Hazard বলতেই বেশি আগ্রহী আবার এই বিষয়ে ভূ-তত্ত্ববিদ ও ভৌগোলিকদের মধ্যে সামান্য মতভেদ রয়েছে। ভূ-তত্ত্ববিদরা Hazard আলোচনায় Natural Geological factors আর ভৌগোলিকরা Anthropogenic factors-এর উপর বেশী গুরুত্ব আরোপ করেছেন।

প্রকৃত পক্ষে 'Hazard' এবং Disaster'-এর মধ্যে বিষয়গত ও প্রায়োগিক ব্যবধান রয়েছে। ভৌগোলিকরা Hazard এর ব্যাখ্যা দিয়েছেন যে, এটি হল ভূমিরূপগত বা প্রাকৃতিক প্রক্রিয়া যার মধ্যে নানা প্রাকৃতিক ও ভূমিরূপ উপাদান অন্তর্ভুক্ত এবং এটি প্রাকৃতিক ও মনুষ্যকৃত। তবে সাধারণভাবে বলা যায় এটি সর্বোচ্চ প্রাকৃতিক ও মানবিক প্রক্রিয়া যার সাথে সমস্তি যুক্ত থাকে না। ভূমিরূপবিদ Prof. Savindra Singh (2001) Hazard-এর সংজ্ঞা দিয়েছেন যে, "Hazards are generally taken to be the processes (causal factor) and the responses (Results) of extreme events, both natural and anthropo-genic, which cause an accident / extreme events / or danger.

Prof. S. R. Basu (2004), মতে 'Hazard' হল একটি ভূতাত্ত্বিক / ভূমিরূপজাত পদ্ধতির আভ্যন্তরীন বা বাহ্যিক প্রকাশ যার মধ্যে নানান প্রাকৃতিক উপাদান ও প্রক্রিয়া অন্তর্ভুক্তভাবে জড়িত। Hazard-এর সাথে ব্যাপকভাবে না হলেও অল্পবিস্তর সময়সূচি যুক্ত থাকে, যদিও মনুষ্য জীবনকে ধ্বংস করতে পারে না। এটি একটি পরিস্থিতি বিশেষ এবং তা চূড়ান্ত ঘটনা (extreme events) নয়।'

পরিশেষে বলা যায় দুর্যোগ (Hazard) প্রাকৃতিক মনুষ্যসৃষ্ট বা উভয় কারণেই হতে পারে এবং যার মধ্যে ভূ-তাত্ত্বিক ভূমিরূপজাত এবং আপেক্ষিক উপাদান অন্তর্ভুক্ত। অল্প সময়ের জন্য হলেও মানুষের স্বাভাবিক জীবনযাত্রাকে বিঘ্নিত করে থাকে। নীম্ন Hazard-এর কিছু স্বাভাবিক (বৈশিষ্ট্য) তুলে ধরা হল —

① এটি প্রাকৃতিক, ভূমিরূপজাত, ভূতাত্ত্বিক এবং আপেক্ষিক উপাদানের সংযুক্ত ক্রিয়া।

② তা সাধারণত স্বল্প কালে সংঘটিত হয়।

③ মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যাহত না করলেও অল্প কিছুর জীবনযাত্রার গতিকে রুদ্ধ করে দেয়।

④ ক্ষয়ক্ষতির প্রভাব ব্যাপক মাত্রায় না থাকলেও সামাজিক, প্রাকৃতিক ও অর্থনৈতিক সম্পদের অল্প বিস্তার ক্ষতি হয়।

⑤ দুর্যোগ উপযুক্ত আধুনিক পরিকল্পনার মাধ্যমে নিয়ন্ত্রন করা যায়।

□ বাংলাদেশের দুর্যোগ প্রবনতা

বাংলাদেশের মানুষের জীবনে কত, ঘূর্ণিঝড় জলোচ্ছ্বাস, খরা বন্যা, নদীভাঙ্গন ইত্যাদি প্রাকৃতিক দুর্যোগ নিয়মিত ঘটনা। ভৌগলিক ভাবেই পৃথিবীর অন্যতম প্রাকৃতিক দুর্যোগপ্রবন দেশ বাংলাদেশের এসব দুর্যোগ প্রায় প্রতি বছর মানব সম্পদসহ অবকাঠামো গত, অর্থনৈতিক ও প্রাকৃতিক সম্পদের বিপুল ক্ষতি সাধন করে। ভৌগলিক অবস্থানগত বাস্তবতাই এর প্রধান কারন। নদীবিধৌত বাংলাদেশের উত্তরে হিমালয় পর্বতমালা, দক্ষিনে বঙ্গোপসাগর। এদেশের পশ্চিমাঞ্চলের কিছু পার্বত্য অঞ্চল ও কিছুটা সমতলভূমি ছাড়া রয়েছে সাত শতাধিক নদী। তাই হিমালয়ের বরফগলা পানিত যেমন বন্যা সৃষ্টি হয় তেমনি হিমবাহ হত হয় অতিবৃষ্টি।

আমাদের দেশের অবস্থান উষ্ণমণ্ডলীয় অঞ্চলে এবং দক্ষিনের বঙ্গোপসাগরের সমুদ্রপৃষ্ঠের উষ্ণতা 27 ডিগ্রী সেলসিয়াস (27° সে.) ফলে সমুদ্রে ঘূর্ণিঝড়ের সৃষ্টি হয়। সাম্প্রতিককালে বৈশ্বিক উষ্ণতা বৃদ্ধি ও পরিবেশ বিপর্যয়ের কারনে প্রায়ই ঘূর্ণিঝড় মারাত্মক আকার ধারন করছে। অন্যদিকে নদীমাতৃক বাংলাদেশের প্রধান প্রধান ও সুবৃহৎ নদীগুলোর উৎস ভারত ও নেপাল পার্শ্ববর্তী দেশের নদী শাসনের কারনে এদেশে বন্যা ও খরার মত দুর্যোগের সম্মুখীন হতে হয়। তাছাড়া অতিবর্ষন বন্যা ও নদী ভাঙ্গন প্রায় নিয়মিত ঘটনা। অর্থাৎ ভৌগলিক অবস্থান, জলবায়ু, ভূমির গঠন, নদীমাতৃক ভূমিরূপ, সমুদ্রের অবস্থান ইত্যাদি কারনে সৃষ্ট ঝড়, বন্যা, খরা, নদীভাঙ্গন, জলোচ্ছ্বাস ইত্যাদি দুর্যোগের সাথে বসবাস করেই আমাদের জীবনধারন করতে হয়।

□ প্রাকৃতিক দুর্যোগ :—

প্রাকৃতিকভাবে সৃষ্ট আকস্মিক ও চরম প্রতিকূল পরিবেশগত অবস্থাকে প্রাকৃতিক দুর্যোগ বলা হয়। প্রাকৃতিক দুর্যোগ যে কোনো দেশেই মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যহত, বিপর্যস্ত ও হুমকির মুখে ফেলে। বিশ্বের সর্বত্রই প্রাকৃতিক

দুর্যোগ কম-বেশি আঘাত হানে। প্রাকৃতিক প্রভাবের মুখোমুখি দাঁড়িয়ে করণীয় প্রায় কিছুই থাকে না। তাই দুর্যোগ ব্যবস্থাপনা অত্যন্ত গুরুত্বপূর্ণ। দুর্যোগ ব্যবস্থাপনা বলতে বোঝায় এমন একটি সমন্বিত ব্যবস্থা যাতে দুর্যোগ পূর্ব, দুর্যোগকালীন ও দুর্যোগ পরবর্তী সময়ে বিভিন্ন পরিকল্পনা সংগঠন, সমন্বয়, নিয়ন্ত্রণসহ যাবতীয় কার্যক্রম গ্রহণ ও বাস্তবায়নের মাধ্যমে দুর্যোগের সম্ভাব্য ক্ষয়ক্ষতি হ্রাস করা যায়। আমাদের দেশের মানুষ বিশ্বের অনেক দেশের তুলনায় প্রাকৃতিক দুর্যোগ মোকাবেলা করে বেশি অভ্যস্ত যেমন ঝড়, বন্যা, খরা, ভূমিধ্বস ইত্যাদি দুর্যোগ এদেশের মানুষ চিরাচরিত ভাবেই সংগ্রাম করে বেঁচে থাকার চেষ্টা করে। নিয়মতান্ত্রিক ও বৈজ্ঞানিকভাবে, শৃঙ্খলার সাথে দুর্যোগ মোকাবেলা করা স্বাভাবিকভাবেই অধিক কার্যকরী হয়। যেমন — বাংলাদেশের দক্ষিণাঞ্চল সমুদ্র থাকায় সমুদ্র সৃষ্ট ঘূর্ণিঝড়, জলোচ্ছ্বাস বারবার দক্ষিণাঞ্চল আঘাত হানে। এতে মানবসম্পদসহ বহু ক্ষয়ক্ষতি সাধিত হয়। এসব ক্ষতি হ্রাস করতে ও বিপর্যয় কাটাতে প্রয়োজন সমন্বিত দুর্যোগ ব্যবস্থাপনা

□ দুর্যোগ ব্যবস্থাপনার প্রধান উদ্দেশ্য

ক) দুর্যোগকালীন মানবজীবন, সম্পদ ও বন্যপ্রাণী তথা পরিবেশগত ক্ষতি হ্রাস করা।

খ) ক্ষতিগ্রস্থ মানুষের কাছে অত্যাবশ্যকভিত্তিতে দ্রুত ত্রাণসামগ্রী পৌঁছানো।

গ) দুর্যোগ পরবর্তী উদ্ধার, দ্রুত গঠন ও পুনর্বাসন নিশ্চিত করা।

উপরোক্ত উদ্দেশ্যসমূহ বিবেচনায় রেখেই দুর্যোগ ব্যবস্থাপনা কর্মসূচি পরিকল্পনা ও পরিচালনা করা হয়।

□ দুর্যোগ ব্যবস্থাপনা :—

আগেই বলা হয়েছে যে, দুর্যোগ ব্যবস্থাপনা হল একটি সমন্বিত দুর্যোগ মোকাবেলা ব্যবস্থাপনা। দুর্যোগ ব্যবস্থাপনাকে তিনটি ভাগে বা ধাপে একটি সমন্বিত ব্যবস্থাও বলা যেতে পারে।

যথা :

১। দুর্যোগপূর্ব প্রস্তুতি
২। দুর্যোগকালীন সতর্কতা
৩। দুর্যোগ পরবর্তী পুনরুদ্ধার

অর্থাৎ দুর্যোগের ক্ষয়ক্ষতি মোকাবেলায় সম্মিলিত প্রয়াস তথা দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগপরবর্তী ধাপ গৃহিত পদক্ষেপ ও কর্মকাণ্ডই এক কথায় দুর্যোগ ব্যবস্থাপনা বলে।

Thatta government college (T.G.C)

Name – Mahebub Hasan Mandal

Subject - Environmental Science

1st year 1st Semester

Department of English

Date of Submission: _____

(11)

22/03/2023

Biological Hazards

Biological hazards are organisms, or substance Produced by organisms, that pose a threat ## to human health. They are a major concern in food Processing because they cause most food born illness outbreaks.

Risk

These organisms can affect human health including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria Produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, Some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore - Forming food borne pathogens, but only ~~mas~~ inactivates spores. Examples of spore forming bactivates spores. include Bacillus cereus, Clostridium botulinum and clostridium and Clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. They survive normal cooking temperature and even temperature higher than 80°C (176°F)

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria.

Major biological hazards

- Bacteria ex: Salmonella spp. Enterhaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Clostridium botulinum, Clostridium perfringens, Vibrio vulnificus, Vibrio parahaemolyticus
- Virus ex: hepatitis A virus, Norwalk viruses, Rotaviruses
- Parasites ex: Toxoplasma gondi, Cryptosporidia, Giardia spp, Trichinella spiralis, Taenia Solium, Anisakis spp.

Sources

The major sources of biological contaminants in food are:

- animal guts: faecal contamination

- Soil and water contaminated by non-treated manure.
- Cross contamination:

– human contamination due to poor personal hygiene, faecal contamination, failure in infection control (illness not reported)

– Cross Cross-Contamination of food products spread from processing environment due to poor/ improper sanitation.

Factors affecting the growth of microorganisms in foods.

- The temperature values for microbial growth depend on the type of microorganism. For exemple, psychrotrophs such as Listeria monocyto-genes grow at refrigeration temperature (4°C or 39°F) while thermotrophs can grow at higher temperature (45°C or 113°F)
- The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria.
- The water Activity (aw) refers to the water available in the product. The more water available the better bacteria will grow.

aw of product	Bacterial Spoilage	Examples
>0.90	Spoils easily	fresh vegetables fresh meat, processed meat, milk fish
0.78-0.90	Susceptible to spoilage	dry cheeses, flour cakes beans. cereals
<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels dehydrated foods

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of micro organisms.

Control and prevention

The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing practices (GMPs) and Hazard Analysis and critical control point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazard associated with personnel and environment are controlled during food production

Processing strategies to control biological hazards:

- effective thermal processing packaging and used as a kill step (ex: cooking, pasteurization)
- Use of appropriate process controls:
  - Storage temperatures (ex: cooler freezer)
  - processing parameters (ex: temperature and time for cooking, water activity during dehydration)
- Use of food technologies to prevent the growth of bacteria or other biological hazards:
  - packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)
  - preservatives
  - processing techniques (ex: dehydration)

TEHATTA GOVERNMENT COLLEGE



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UNIVERSITY OF KALYANI

BA HONS 1st SEMESTER EXAMINATION : 20200-2023

B.A HONS

1st SEMESTER

DIPARTMENT - HISTORY HONS

SUB: ENVIRONMRNTL STUDIES

NAME - MIHIKA PRAMANIK

(12)

COLLEGE ROLL - 9

09/03/2023

SESSION : 2022-2023

Baiological Hazards

Baiological hazards are orgainismas, or substances produced by organisms, that poes a threat to human health. they are a major concern in food processing because they cause most food borne illness outbreaks.

• Sources ⟶

The major sources of biologicl contaminants in food are :

• animal guts : faecl contumination
• Soil and water contaminated by non-by - treated manure.

• cross conamination :

— human contamination due to poor personal hygine. facal contamination, failure in infection control (illness not reported)

— cross - contamination of food products spread form process exironment due to poor / improper sanition

• Risk ⟶

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisam invade the host and multiply in the body. Intoxication occurse when bacteria produce toxions that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking tempera-atures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, Clostridium botulinum and clostridium perfraingens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before prodeing toxin. these toxins are very difficult to eliminate. they survive normal cooking temperatures and even temperatures highers than 80°c (176°F).

The risk of intoxication is prevented by Controlling the growth of toxin producing bacteria. These include : Clostridium, Bacillus cereus, and Staphylococcus aureus.

← Major Biological Hazards →

- Bacteria : Samonella spp, Enterohamorrhagic Escherichia coli, campylobacter lejuni, Yersinia enterocolitica monocytogenes, Bacillus anthracis Bacillus cereus, Staphlococcus aureus, clostridium botulinum, Clostridium perfringens, Vibio Vulnificus, Vibrio parahaemolyticus
- Virus : hepatitis A Virus, Norwalk viruses, Rotaviruses
- Parasites : Toxoplasma gondii, cryptosporidia, Giardea spp. Trichinella spiralis, Taenia solium, Anisakis spp.

Factors affecting the growth of microorganisms in foods →

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as histeria monocytogens grow at refraigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F).

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← Major Biological Hazards →

- Bacterias : Samanella spp, Enterohamorrhagic Escherichia coli, campylobacter lejuni, yersinia entersocolitica monocytogenes, Bacillus anthracis Bacillus cereus, staphlococcus aureus, clostridium botulinum, Clostridium perfringens, Vibio Vulnificus, Vibrsio parahaemolyticus
- Virsus : hepatitis A Virsus, Norwalk virsuses, Rotavirsus
- Parasites : Toxoplasma gondii, cryptosporidio, Giardea spp. Trichinella spiralis, Taenia solium, Anisakis spp.

Factors affecting the growth of microorganisms in foods →

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as histeria monocytogens grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at high ter temperatures (45°C or 113°F).

- The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bateria. Most bacteria grow in a pH range between 5 and 9.

- The water Activity (a_w) refers to the water available in the product. The more water available, the better bacteria will grow. Table I shows the impact of water activity on bacterial spoilage.

a_w of Product	Bacterial Spoilage	Examples
> 0.90	Spoils easily	fresh Vegetables, fresh meat, milk, fish
0.78 - 0.90	susceptible to spoilage	dry cheeses, flours, cakes, beans, cereals
< 0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of micro-organisms.

← Control and prevention →

The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing practices (GMPs) and Hazards Analysis and Critical control point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occurs during food processing, packaging and storage.

Processing strategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking, pasteurization)
- use of appropriate process controls:
  - storage temperature (ex: temperature and time for cooking, water activity during dehydration)
  - adequate cooling system
- effective cleaning and sanitizing procedures (ex: SSOPs)
- Use of food technologies to prevent the growth of bacteria or others biological hazard:

- Packaging techniques (ex: use of vacuum packaging modified atmosphere packaging)

- preservatives

- processing techniques (ex: dehydration)

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BA HONS 1ST SEMESTER EXAMINATION - 2022-2023

B.A HONS

1ST SEMESTER

DIPARTMENT - HISTORY HONS

SUB- ENVIRONMRNTL STUDIES

(BIOLOGICAL HAZARD)

(12)

By

09/03/2023

NAME:- **MISIPIYA NASRIN**

COLLEGE ROLL NO:- 08

SESSION:- 2022-2023

Biological hazards

Biological hazards are of organic origin or conveyed by biological vectors, including pathogenic microorganisms, toxin and bioactive substances. Examples are bacteria, viruses or parasites, as well as venomous wildlife and insects, poisonous plants, and mosquitoes - carrying disease - causing agents [1]. These hazards are usually the result of a natural occurrence, but can also result from deliberate or accidental release.

Biological hazards also pose a risk to animals, including livestock and to plants. However, we are focusing here on human health. The consequences of a biological hazardous of event may include severe economic and environmental losses.

- The ongoing outbreak of Zika virus infection in the Americas and the pacific region, associated with congenital and other neurological disorders.
- Outbreaks of yellow fever in Angola, the Democratic Republic of Congo and Uganda in 2016.

• Agent diversity :- Biological hazards range from microorganisms, ingestion absorption (through the skin, eyes, mucous membranes wounds) ingestion animal vectors (e.g. mosq vitos or ticks) and bodily fluids (e.g. mother to- child transmission, sexual transmissio

• Routes of transmission :- These include airborne transmission, ingestion absorption (through the skin, eyes, mucous membranes, animal vectors and bodily fluids.

• Pathogenicity and virulence :- Some biological hazards can cause severe disease in extreme low concentrationes and can multiply quickly once within its host. For example, 1-10 aerosolized organisms of Lassa virus and Ebola are sufficient to cause severe disease in humans.

• Hazard identification :- As microbes are not visible to the naked eye, they are often not easy to identify on the basis of epidemiological information derived from clinical signs and symptoms. They therefo require specific diagnosis techniques, includ polymerase chain reation.

- Sensitivity to climate, environmental or land use changes :- Biological hazards - particularly zoonoses 5 and vector-transmitted diseases such as malaria, dengue, Zika and Ebola - may increase in incidence lethality or change geographic distribution or seasonal patterns directly dul to climate and weather sensitivity emironmental or land-use change or mediated through changes in escosystems resulting farm human activities thus changing human exposures and susceptibility to these hazards. An estimated 75 per cent of emerging infectious disses of houmans that have valved from exposure to zoonotic pathogens [3] warrant risk assessments for health threats at the interface between animal, human and ecosystems.
- Endemic diseases with potential for epidemic transmission :- Unlike some other hazards (e.g. earthquakes or floods), biological hazards can be present in the community (i.e. they are endemic) and usually pose low risk when the population

Assessing the risk of biological hazards :-

Approaches in assessing the risk of biological hazards differ according to the purpose of the assessment:

- Strategic Risk Assessment :- is used for risk management planning with a focus on prevention and preparedness measures, capacition development and medium to longer term risk monitoring and evaluation.

- Rapid Risk Assessment :- is used to deter the level of risk associated with detected events and to define response interventions accordingly.

- Post-event assessment :- is used for recovery planning, updating and strengthening the overall risk management system.

Pre-Vent : Strategic Risk Assessments :=
Strategic Risk Assessments are used for risk managment plaaming with a focus on prevention and preparedness and capacity development before enentsoccur. They can be used for medium-to longer-term risk over time. They Catalyse targeted action to reduce the level of risk and consequences for health.

Detection and response: Rapid Risk Assessment

Where an event occurs, and in order to inform early warning and response measure the level of risk posed by the event itself is assessed on a continuous basis through rapid risk assessments [12, 13]. The key parameters to take into account in the risk assessement of communicable diseases are the probability (likelihood of transmission in the population) and the impact (severity of the disease) as well as the context in which the disease occures.

The initial rapid risk assessement must be generated within a short time period when information is often limited and circumstances can evolve rapidly. The assessment should be undertaken in the initial stages of an event or of an incident being reported and verified, and should ideally be produced within 24 to 48 hours. The level of risk should be re-assessed based on evolving information on the event and disease pattern. Risk assessment will phelp determine whether a response is

indicated, the urgency and magnitude of the response, the design and selection of critical control measures; and they will inform the wider implications and further management of the incident.

In the light of time constraints, the assessment generally relies on published research evidence, on specialist expert knowledge, and on experience gathered through, or previous similar events. Some sources for identifying outbreaks and obtaining disease information are listed in the WHO Rapid Risk Assessment manual [12] and in appendix 3 of the ECDC Operational guidance on rapid risk assessment methodology [13]. The principles of transparency explicitness and reproducibility strictly apply to a rapid risk assessment. In addition, Uncertainties must be identified clearly documented and communicated.

TEHATTA GOVERNMENT COLLEGE

NAME: MITRA BISWAS

SUBJECT: ENVS 1st Sem

PHILOSOPHY (H)

REG NO:

(14)

TOPIC: BIOLOGICAL

By

09/03/2023

HAZARDS

YEAR - 2022 - 2023

Biological Hazards

Biological hazards are organisms, or substance produced by organisma, that pose a threat to human health. They are a major concern of food processing because they cause most food illness outbreaks

Risk

These organisms can affect human health, including infaction, intaxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body

Infection can be prevented by properly processing and handing food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperotures.

For example, steam cooking significantly reduces non-spore forming food borne Pathogens, but only inactivates spores, Examples of spore forming bacteria inclivates cereus, clastridium bontulinum and clostridium Perfringens.

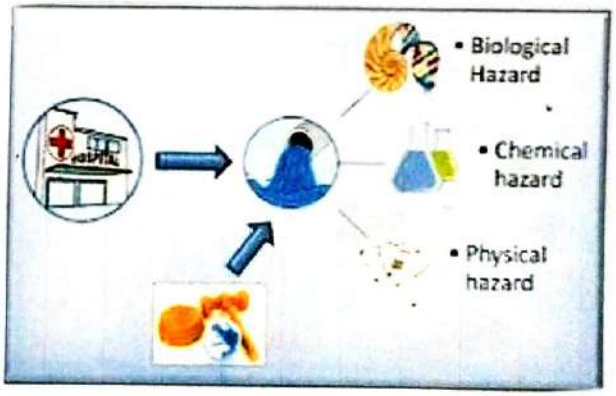
Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even tempertatures higher than 80°c [176°f].

The risk of intoxication is prevented by controlling



Physical Hazards in Food







the growth of Laxin Producing bacteria. These include: clastridium botutiumm, Bacillus cereus, and staphylococcus.

Major biological hazards

- Boctaria ex: Sallmanella spp, Enterohoemorrhogic Escherocalitica, Listering cell campylalbacter jejuni, yersinia enterocollitica Listeria monocylogenes, Bocillunm cereus, staphlccoccus overeus clastridium bolulinum, clastridium Parahaemolyticus

- Virus ex: hepatitis A virus Norwalk Viruses Rotervirus

- Parasites ex: Toxoplasma gandil, cryplasparidia, Giardia spp, Trichinella spiralis, Taenia solium, Anisakis spp.

Sources

The major sources of biological cantaminants in food are.

- animal guts: laecal cantamination
- Soil and water contaminated by non-treated monure.

— human contamination due to Poor personal hygiene faecol contamination, failure in infection control [illness not reported]

— cross contamination at food Products spread from Processing enviconment due to Poor / improper

Sanitation

Factors affecting the growth of microorganisms in foods

- The **temperature** values for microbial growth depend on the type of microorganism. For example, Phych-rotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°c or 39°F], while thermotrophs can grow at higher temperatures (45°c or 13°F).

- The **PH** of a product is related to the acidity or alkalinity of the Product. The PH of Products affects the growth of bacteria. Most bacteria grow in a PH range between 5 and 9.

- The **water Activity** law refers to the water alkalinity of the product. The PH of Products affects the growth of bacteria. Most bacteria grow in a PH range between 5 and 9. Table 1 shows the impact of wather activity on bacterial spoilage.

ow of Product	Bacterial Spoilage	Examples
>0.90	Spoils easily	fresh vegetable, fresh meat milk, fish
0.78-0.90	suseeplible to spoilage	dry cheeses, flour cakes beans, cereals
<0.78	little bacterial spoilage but mould may grow	Rolled oats, dried, fruits caramels, dehydrated foods

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

Control and prevention

The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing Practices [GMPs] and Hazard Analysis and critical Point [HACCP] will help prevent biological hazards in your facility.

GMPs ensure hazards associated with Personnel and environment are controlled during food production HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

Processing stategies to control biological Hazards:

- effective thermal Processing used as a kill step [ex: cooking, Pasteurization].
- Use of appropriate proces controls:

- Storage temperature ures [ex: cooler, freezer]

- Processing Parameters [ex: temperature and time for cooking. water activity during dehydration]

- effective cleaning and sanitizing Procedures [ex: SSOPs]

• use of food technologies to prevent the growth of bacteria or other biological hazards.

- Packaging technologies to prevent the growth of bacteria or other biological hazards.

- Packinging techniques [ex: use of vacuum packing ing modified atmasphere packaging]

- Preservatives.

- Processing techiques [ex: dehydration



UNIVERSITY OF KALYANI

TEHATTA GOVERNMENT COLLEGE



TEHATTA, NADIA

BIOLOGICAL HAZARDS

(13)

09/03/2023

SUB : ENVS

Submitted By : MOSAMMAT RESHMA KHATUN

B.A Pol. Sc. Hons 1st Semester Exam,2023

Registration No. :

Session : 2022-23

Biological Hazards

Risk Assessment

- Biological hazards - what are they ?

Biological hazards are of organic origin or conveyed by biological vectors, including pathogenic microorganisms, toxins and bioactive substances. Examples are bacteria, viruses or parasites, as well as venomous wildlife and insects, poisonous plants, and mosquitoes carrying disease-causing agents [1].[1] These hazards are usually the result of a natural occurrence, but can also result from deliberate or accidental release. Biological hazards also pose a risk to animals, including livestock, and to plants. However, we are focusing here on human health. The consequences of a biological hazardous event may include severe economic and environmental losses. Some examples of recent large outbreaks,[2] epidemics[3] or pandemics[4] due to biological hazards either on their own or following a disaster are:

- Th ongoing outbreak of Zika virus infection in the Americas and the Pacific region, associated with congenital and other neurological disorders.
- Outbreaks of yellow fever in Angola, the Democratic Republic of Congo and Uganda in 2016.

- Outbreaks of Middle East Respiratory syndrome - Corona virus (MERS COV), an emerging disease identified in 2012.

Assessing the risk of biological hazards can be challenging owing to their unique characteristics:

- **Agent diversity.** Biological hazards range from microorganisms such as beederia or viruses, to toxins to insect infestations. Thy They can be transmitted to humans from the environment, from animals, from plants, and from other humans.

- **Routes of transmission.** These include airborne transmission, ingestion, absorption (through the skin, eyes, mucous membranes, wounds), animal vectors (e.g. mosquitos or ticks) and bodily fluids (e.g. blood, mother-to-child transmission, sexual transmission).

- **Pathogenicity and virulence.** Some biological hazards can cause severe disease in extremely low concentrations and can multiply quickly once within its host. For Example, 1-10 aerosolized organisms of Lassa virus or Ebola are sufficient to cause severe disease in humans.

- **Hazard identification.** As microbes are not visible to the naked eye, they are often not easy to identify on the basis of epidemiological information derived from clinical Singns and Symptoms. Thy therefore require specific diagnosis techniques, including palymerase chain reaction (PCR), to amplify a single copy or a few copies of a Piece of DNA, microbial cultures, whole genome sequencing.

ssessing the risk of biological hazards

pproaches in assesing the risk of biological hazards differ ccording to the purpose of the assessment:

- Strategic Rick Assessment: is used for risk managment Planning with a focus on Prevention and preparedness measures, capacity development and medium - to longer-term risk monitoring and evaluation.
- Rapid Risk Assessment: is used to determine the level of risk associated with detected events and to define response interventions accordingly.
- Post - event assessment: is used for recovery Planning, updating and strengthening the overall risk management system.

Pre-event: Strategic Risk Assessments

Strategic Risk Assessments are used of risk management Plannige with a focus on prevention and preparedness and capacity development before events occur. They can be used for medium - to longer - term risk monitoring and evaluation, which tracks changes in risk over for health beseed on assessmens of the hazard, exposure, vulnerabilities and capacities.

Some examples of strategic risk assessment methods for biological hazards are outlined below.

A quantitative microbiological risk assessment (QMRA) is an example of a strategic risk assessment for Prevention and mitigation of risks.

- Detection and response; Rapid Risk Assessment

when an event occurs, and in order to inform early warning and response measures, the level of risk posed by the event itself is assessed on a continous basis through rapid risk assessment. The key parameters to take into account in the assessment of communicable diseases are the probability (likelihood of transmission in the population) and the impact (severity of the disease), as well as the context in which the disease occurs.

The initial rapid risk assessment must be generated with in a short time period when information is often limited and circumstances can evolve rapidly. The assessment should be undertaken in the initial stages of an event or of an incident being reported and verified and should ideally be produced within 24 to 48 hours. The level of risk should be re-assessed based on evolving information on the event and disease factors. Risk assessments will help determine whether a response is indicated, the urgency and magnitude of the response, the design and selection of critical control measures, and they will inform the wider implications and management of the incident.

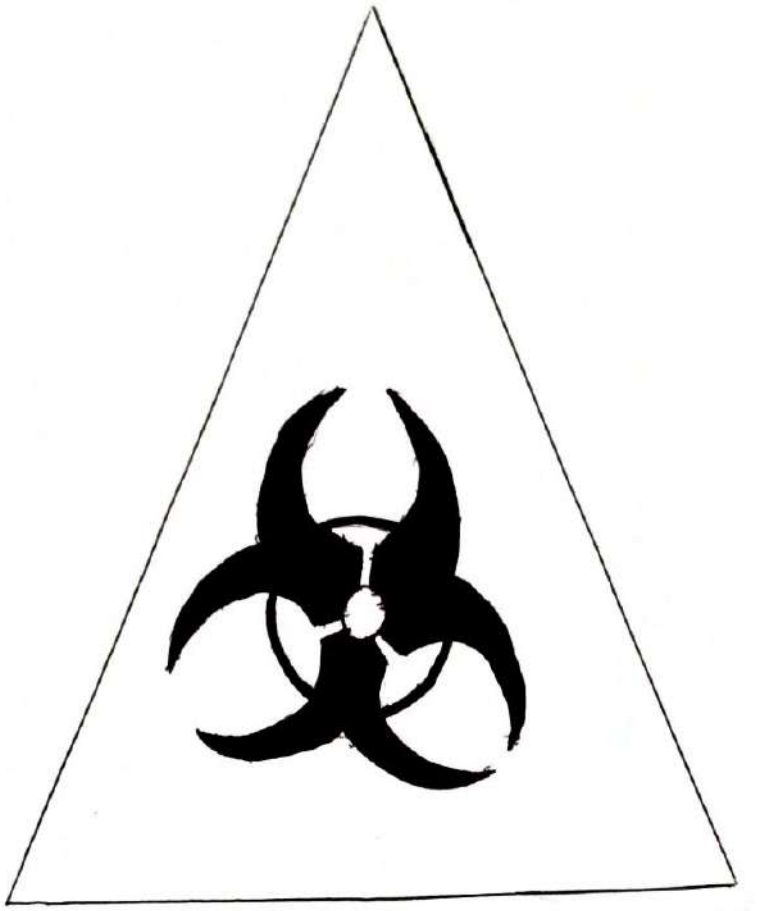
In the light of time constraints, the assessment generally relies on published research, on specialist expert knowledge and on experience gathered through previous similar events. Some sources for identifying out breaks and obtaining disease information are listed in the WHO Rapid Risk Assessment methodology. The principles of transparency, explicitness and reproducibility strictly apply to a rapid risk assessment.

- Risk assessment and use in national DRR measures:

Risk assessment will inform policymaking of the management of the risk, including biological hazards by answering the following important questions:

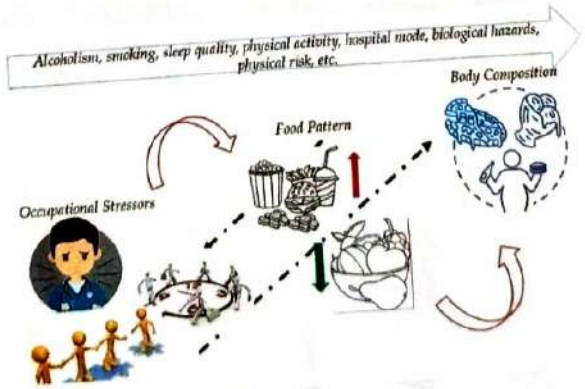
- policy makers and DRR Practitioners use this information to trigger actions that reduce risk of biological hazards i.e. effective and timely prevention, preparedness at increased risk of infection due to biological hazards, contain the spread of the risk, and eventually stopping it.

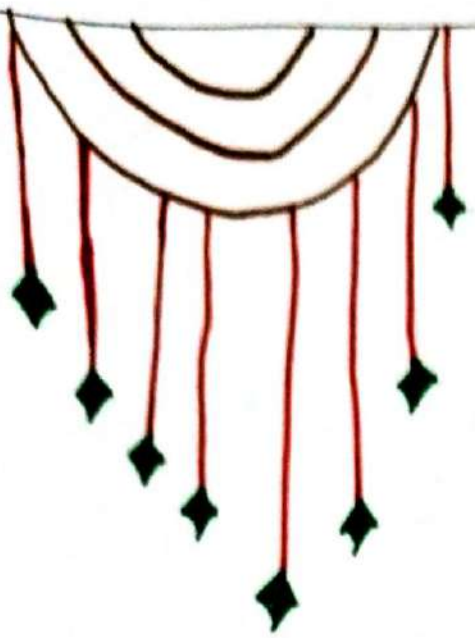
- Measures include protective equipment, behaviour - change practices by raising awareness and education of the public through appropriate communication channels, and effective treatment and/or vaccine if and when available.
- Risk information is also used to inform Preparedness and contingency Planning at various levels and capacity - development measures for health workers to match the full risk profile of the community, including for biological hazards.



BIO HAZARDS




Alcoholism, smoking, sleep quality, physical activity, hospital mode, biological hazards, physical risk, etc.
Body Composition
Food Pattern
Occupational Stressors

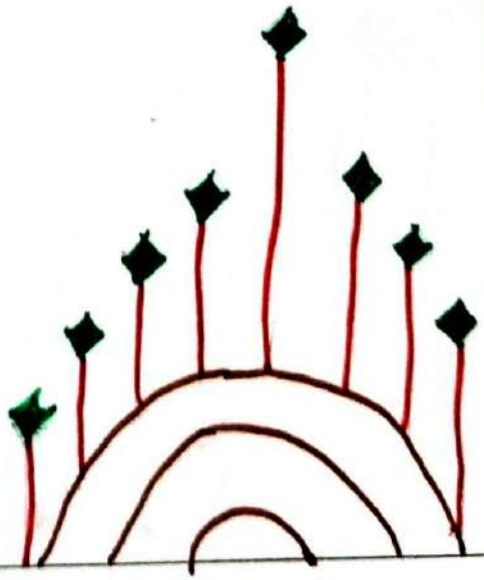


ENVIRONMENT

Project

(12)

09/03/2023



Name :- Mouli Biswas.

Subject :- Environment Project

Sem :- first Sem.

Department :- Student of English de
-partment.

college :- Tehatta Government College

year :- 2022 - 23 ~.

Topic :- Biological Hazards.

• Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

• Risk

These organisms can effect human health, including infection intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that eff-ect the body.

Infection can be prevented by properly pro-cessing and handling food products because Pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly, re-duces non-spore-forming food borne patho-gens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, clostridium botulium and clostridium Perifrigens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bac-teria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking tem-peratures and even temperatures higher than

80°c (176°F).

The risk of intoxication is prevented by controlling the growth of toxin Producing bacteria. These include: Clostridium botulinum, Bacillus cereus, and staphylococcus aureus.

Major biological hazards :-

- Bacteria ex: Salmonella spp., Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botulium, Clostridum Perfrigens, Vibrio Vulnificus, Vibrio Parahaemolyticus.
- Virus ex: hepatitis a virus, Norwalk virus, Rotavirus.
- Parasites ex: Toxoplasma gondii, cyptosporidia, Giardia spp, Trichinella Spinalis, Taenia solium, Anisakis spp.

Sources :-

The major Sources of biological Contaminants in food are:

- animal guts: faecal Contamination
- Soil and Water contaminated by non-treated manure
- Cross Contamination:
  - human contaminon due to poon Personal hygiene, faecal Contamination, failure in infection control [illness not reported.]

- Cross-Contamination of food products spread from processing environment due to poor/improper sanitation.

Factors affecting the growth of microoganisms in foods:-

- The temperature values for microbial growth depend on the type of microorganism. For example, psychotrophs such as listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F).
- The PH of a product is realated to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 8.5.
- The Water aw Activity refers to the Water available in the product. The more Water available, the better bacteria will grow. Table 1 shows the impact of Water activity on bacterial spoilage.

aw of product	~~Biota~~ Bacterial Spoilage	Examples
> 0.90	Spoils easily	fresh vegetables, fresh meat, Processed meat, milk, fish.
0.78-0.90	Susceptible to spoilage	dry cheeses, flour cakes, beans, cereals.

<0.78	Little bacterial spoilage but mould may grow	rolled oats, dried fruits, cereals, dehydrated foods.

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of micro-organisms.

- **Control and prevention:-**

The most effective way to control biological hazards is by Prevention. The implementation of good Manufacturing Pratices (GMPs) and Hazards Analysis and Critical Control Point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personal and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food Processing. Packaging and storage.

Processing stategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking, Pasteurization)
- use of appropriate process controls:
  - storage temperatures (ex: cooler, freezer)

- Processing parameters (ex: temperature and time for cooking, Water activity during dehydratation)
- adequate cooling system

- effective cleaning and sanitizing procedures (ex: SSOPs)
- use of food technologies to prevent the growth of bacteria or other biological hazards:
  - Packaging techniques (ex: use of vacuum Packaging, modified atmosphere packaging)
  - Preservatives
  - Processing techniques (ex: dehydration)

X

-: Acknowledgement :-

I Convey my deep Sense of gratitude to Mam Susmita chowdhury for suggesting the Way I may find suitable for the devolop-ment of my Project and his valuable guiden-ce has been a constant help and encour agement in the preparation of this manu-script. I owe to him in every sense for Providing me with the facilities throu-gh out the cause of the inllestigating I am greatful to all my friends in the class and my group whome I represent for gitting an active support in this respect.

Mouli Biswas.

Date: _____ Date:- 1/3/23

TEHATTA GOVT. COLLEGE

PROJECT NAME : Biological Hazards

SUBJECT NAME : Environmental Science

DEPARTMENT : English Honours . 1st Semester

STUDENT'S NAME : Moumita Biswas

SESSION : 2022 - '23

THE NATURE OF BIOLOGICAL HAZARDS

Biological hazards refer to organic substances that pose a threat to the health of humans & other living-organisms. Biological hazards include pathogenic micro-organisms, viruses, toxins (from biological sources), spores, fungi & bio-active substances. Biological hazards can also be considered to include biological vectors or transmitters of disease.

There are three types of biological hazard:

(i) Pathogens
(ii) Allergens
(iii) Zoonoses

(i) PATHOGENS / INFECTIOUS AGENTS

While micro-organisms are a large and diverse group of organisms only a small subset of micro-organisms – pathogens cause disease in humans. There are four broad classes of micro-organisms that can interact with humans – viruses, bacteria, fungi, parasites – and examples of pathogens can be seen in each of the four classes. Pathogens can be hazardous to workers due to their wide distribution in the working environment

(A) **Viruses**: A virus is a sub-microscopic infectious agent that replicates only inside the living cells of an organism. They are made up of a piece of genetic code, such as DNA or RNA protected by a coating of protein (the "capsid"). Some viruses are surrounded by an outside envelope of lipids. When infected, a host cell is forced to rapidly produce thousands of copies of the original virus. These copies are then released from the host cell – usually damaging or destroying the host cell in the process. Some viruses can remain dormant for a time while viable, before multiplying again. This

length of time depends on several factors the first of which being whether it is inside the host or in the external environment, if the latter the following are important:

→ The surface the virus is on - porous, smooth or otherwise
→ what the environment is like - temperature & humidity impact on the length of time a virus remains viable.

(B) Bacteria: Bacteria are microscopic, single celled organisms that can live anywhere. They are classified as prokaryotes, a simple internal structure that lacks a nucleus. They contain DNA that either floats freely in the cytoplasm or in seperate, circular pieces called plasmids. Not all bacteria are harmful, some are necessary for healthy body function. Bacteria can cause harm by directly invading & damaging tissue, others produce powerful chemicals known as toxins, which damage cells. Antibiotics are commonly used to treat bacterial ~~functions~~ infections, but some bacteria have become resistant to antibiotics, making them difficult to treat. Antibiotic resistance can be transferred between bacterial strains through conjugation.

(C) Fungi: Fungi can be found just about anywhere and include micro-organisms such as yeast & moulds. They are multicellular eukaryotic organisms. Fungi cells contain a nucleus & other components protected by a membrane and a thick cell wall like plants, (making them harder to kill than bacteria & viruses. Mild fungal diseases often results in skin rashes, more serious fungal disease can affect the brain or the blood.

(D) Parasites: Parasites are organisms that live on or in a host organism at the expenses of its host. There are three main classes of parasites that cause disease in humans:

(i) Protozoa: single celled organisms that can live & multiply in the body.
(ii) Helminths: longer multicelled organisms that live inside or outside the body & are commonly known as worms.
(iii) Ectoparasites: live on or feed off skin including ticks & mosquitoes.

(ii) ALLERGENS

Allergies develop when a person's immune system mistakenly identifies a substance (an allergen) as harmful. The allergen stimulates immune system cells to release chemicals, such as histamine, which then lead to allergy symptoms. Allergic reactions can affect the nose, eyes, sinuses, throat, skin, stomach, bowel & lungs. contact with certain plants, plant-materials or fungi may cause non-infectious poisoning, stinging, allergic reactions & irritant-contact or allergic-contact dermatitis. Fungi may be responsible for a variety of diseases such as ringworm or tinea.

(iii) ZOONOSES

Zoonoses are infections transmitted to humans from animals Zoonoses may be bacterial, viral or parasitic.

Scientists estimate that 3 out of 4 new or emerging infectious diseases in people come from animals.

MODE OF TRANSMISSION

1. **Direct person to person transmission**: Direct contact transmission requires physical contact between an infected person & a susceptible person & the transfer of pathogens via touching, sexual contact or contact with body fluids or lesions. Workers with a relatively high risk of direct person to person infection transmission are those exposed to blood or bodily secretions. Eg: Medical & Nursing staffs.

2. **Droplet / Airborne Contamination**: Mucus secretions emitted when a person coughs or sneezes are generally more contagious than infectious agents spread by direct contact. Droplets can travel more than a metre in the air & can enter the respiratory tract.

3. **Indirect Transmission**: Intermediates between the infected person or animal and the susceptible person are →

(i) Surface contact: Surface transmission occurs when an infected person or animal sneezes, coughs or otherwise excretes infectious droplets into the air that land on a surface & than another person comes to contact with the droplets on the surface & transfers those to their mucous membranes, inhales or ingests them.

(ii) Food borne / water borne toxins: Food & drinking water contaminated with pathogenic micro-organisms or toxins can also be a source of infection. Food borne infections contacted through occupational exposure can affect food service workers, medical & hospital personnel, prison officers, military personnel & child-care workers. These infections are usually the result of faecal contamination of food through poor hygiene.

(iii) Vector borne diseases: A vector is an organism that carries disease causing micro-organisms from one host to another. As vectors are mobile, they can increase the range of the disease.

RISK FACTORS

Risks due to infectious biological hazards depends on a number of factors of the agent including:

(i) Virulence
(ii) Infectivity / Transmissibility
(iii) Survivability outside of the host

Occupational fields that are highly susceptible to biohazards →

(i) Outdoor workers such as wildlife rangers, forestry workers, gardeners, farm workers, construction workers.

(ii) People who work with animals.

(iii) Workers exposed to human blood & bodily fluids.

At risk workers:

(i) Those who compromised health or immune systems.
(ii) Those who work across multiple different workplaces.
(iii) Inexperienced & socially vulnerable workers.

CONTROL OF BIOLOGICAL HAZARDS

1. Elimination: We can control biological hazards by eliminating the source of the biological Hazard, eliminating the bio-hazard agent by using pestisides, disinfectants, eliminating the vectors.

2. Engineering Controls: Engineering control such as ventilation systems, engineered safe needles devices & automated equipments can be effective at controlling risk of exposure to biological hazards, when the hazard is clearly identified.

3. Administrative Controls: Immunisation programs are an important administrative control where vaccines are available. Other measures such as infection control policies, safe work procedures and routine practices such as physical distancing & personal hygiene are important in breaking the transmission chain but require explaination through training & supervision.

4. Personal Protective Equipment: Personal protective equipment is generally the last line of defence, when the biological hazard cannot be controlled by other methods. PPE such as gloves, protective clothing, eye protection, face protection respiratory protection may be effective at protecting the individual worker, when the presence of the biological hazard cannot be avoided.

LESSONS FROM THE COVID-19 PANDEMIC

On 31 December 2019 the WHO were first alerted to cases of 'viral pneumonia' in Wuhan, People's Republic of china. On 5 January 2020, the WHO issued its first Disease Outbreak News report on the cases, the WHO's risk assesment & advice on public health measures. Four days later the WHO reported that Chinese authorities had determined that outbreak was caused by a novel corona virus By late January, cases of the novel coronavirus were being

reported in Europe & the Middle East. The WHO declared the COVID-19 outbreak a pandemic on 11 March 2020.

The COVID-19 pandemic exposed deficiencies in current knowledge of transition and appropriate control measures particularly for diseases spread by aerosols. A significant proportion of COVID-19 cases have related to occupational exposure. As the COVID-19 pandemic continues and strategies to limit & manage outbreaks have evolved lessons have been learned.

While these 'learnings' are not new to us it is important that they are reinforced in any management strategy for biological hazards.

Acknowledgement: I, Moumita Biswas, a 1st semester student of Department: English Hons, session: 2022-'23, am glad to complete this project. I am highly acknowledged to our ENVS Teacher for helping us to prepare this project.

Moumita Biswas

Teacher's signature

Student's signature

Date:

Date: 20/02/2023

TEHATTA GOVERNMENT COLLEGE

SUB :- Evns,

BIOLOGICAI HAZARD



NAME :- NIRMAL BISWAS

STUDENT ID :- 1570081

COUSE :- B.A (1 Year Degree) PHILOSOPHY HONS

SESSION :- 2023-2024

(13)

By 09/03/2023

- **Introduction:-** A biological hazard, or bio hazard is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a micro organism, virus or toxin that can adversely affect human health.

The term and its associated symbol are generally used a warning, so that those potentially exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by charles Baldwin, an environmental-health engineer working for the Dow chemical company on the containment products.

It is used in the labeling of biological materials that carry a significant health risk including viral samples and used hypodermic needless.

ANSI Z535/OSHA/ISO regulation:-

Biohazardous safety issues are identified with specified labels, signs and standards Institute (ANSI). Today, ANSI Z535 standards for biohazard are used world wide and should always be used appropriately within ANSI Z535 Hazardous communications (Hazcom) signage, labeling and paragraphy.

■ Biological hazard's symbol design:-

- A red on ~~with or~~ white or white coloured background in used behind a black biohazard symbol when integrated with a 'DANGER' sign, babel or paragraphy.



- An orange or black or white-coloured background used behind a black biohazard symbol when integrated with a 'WARING' sign, label or paragraph.



- A yellow [illegible]e-coloured background is used behind a black biohazard symbol when integrated with a 'CAUTION' sing, labd or paragraph.

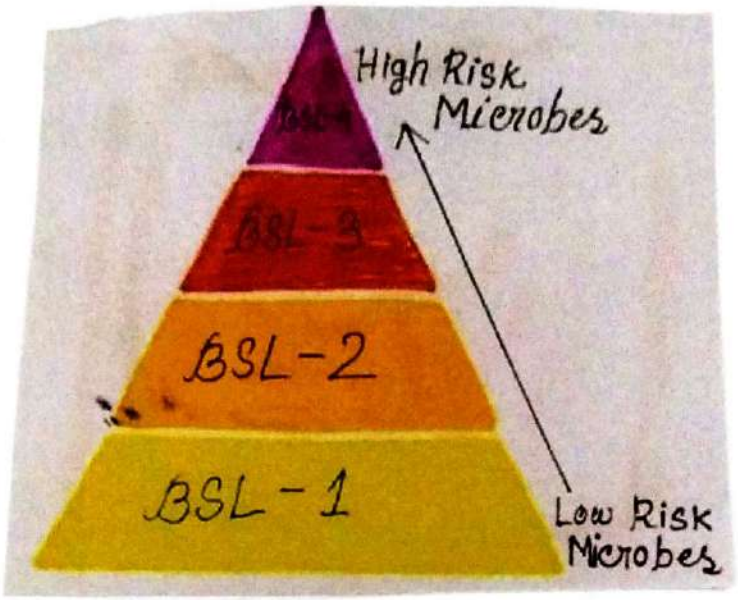


- A green or white or white coloured background is used behind a black biohazard symbol when integrated with a 'NOTICE' sign lable or paragraph.



- UN/ISO classification :- Biohazards agents are classification for transpordation by UN number.
- category A, UN 2814 :- Infectious substances affecting humans: An infectious substance in a from capable of causing peromanent disability or life.
- category B, UN 3373:- Biological substance transpated for diagnostic or investigative purposes.

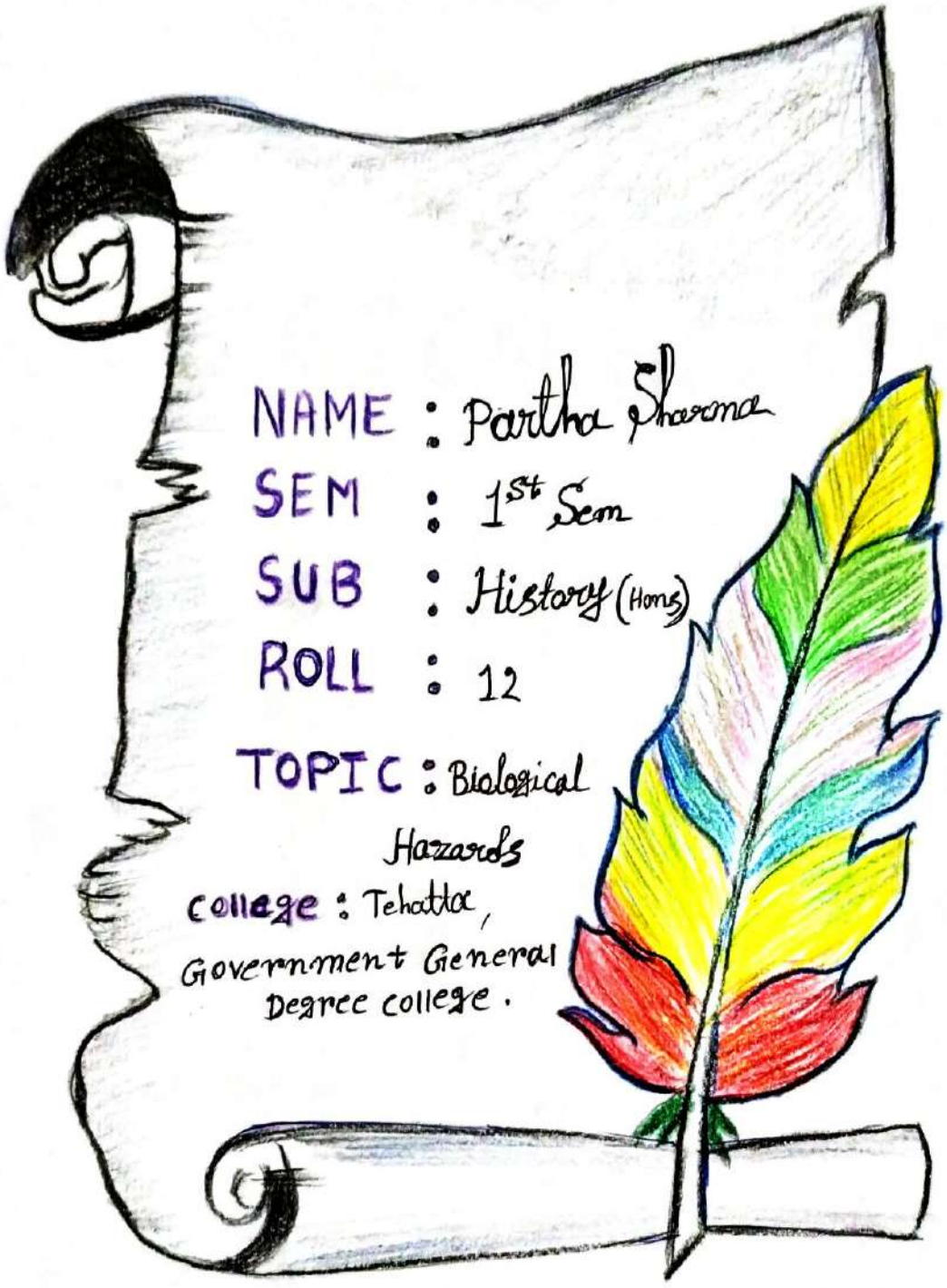
■ Biohazard Safety Levels :-



- **Anthropogenic hazard** :- Hazard caused by human action or inaction.
- **Biocontainment** :- Physical containment of pathogenic organisms or agents in microbiology (laboratories).
- **Biological agent** :- Pathogen that can be weaponized.
- **Hazard** :- ~~Sidara~~ Situation or object that can cause damage or harm.

List of Labaratory biosecurity incedents:-

- Mechanical Hazard:- Hazard with a mechanical energy source.
- Occupationed Hazard:- Hazard experienced in the workplace.
- Phsical prodtection:- Guiding principle of a space mission.
- Public heath:- Promating health tough organized edtorts and informed choices of society and individuls.



NAME : Partha Sharma
SEM : 1st Sem
SUB : History (Hons)
ROLL : 12
TOPIC : Biological Hazards
College : Tehatta, Government General Degree college.

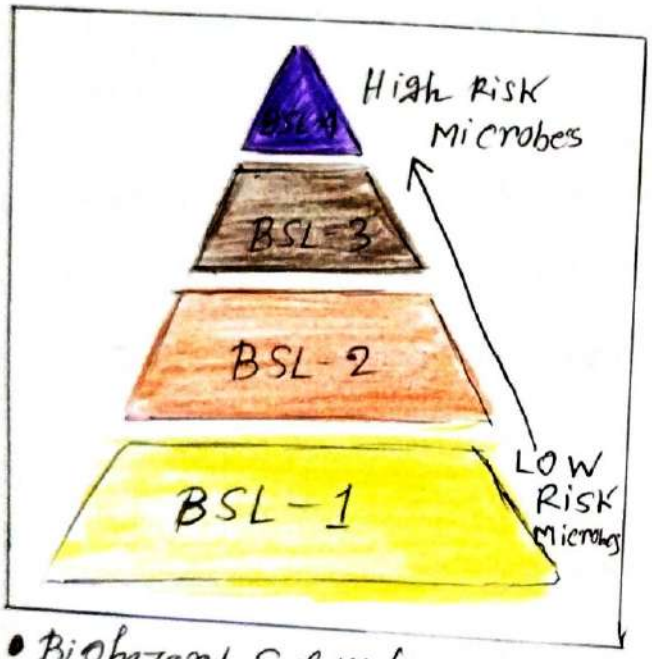
(13)

By 09/03/2023

SUB : ENVS PROJECT

TOPIC

• BIOLOGICAL HAZARDS



• Biohazard Safety Levels.



• Biological hazard's symbol design.

Biological Hazards:

- Biological Hazards are organism, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food become illness outbreaks.

Risk:

- These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.
- Infection can be prevented by properly processing and handling food produts because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.
- For example, steam cooking sigificantly reduces non-spores. Examples of spore forming food borne pathogens, but only inactive spores. Examples of spores forming bacteria include Bacillus cereus, Clostridium botulinum and Clostridium perfringens.
- Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very dificult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C (175°F).

- The risk of Intoxication is prevented by controlling the growth of toxin producing bacteria. These include clostridiaum botulinum, Bacillus cereus, and Staphylococcus aureus.

Major biological hazards :

- **Bacteria ex :** Salmonella SPP, Enterohaemorrhagic Escherichia coli, Campylobactor jejuhi, Yersinia enterrocolities, Listeria monocytogense, Bacillus anthracis, Bacillus cereus, Staphlococcus aurus, Clostridium botulinm, Clostridium perfingens, vibro vulnificus, vibrio parahaemolyticus.

- **virus ex:** hepatitis A virus, Norwalk viruses, Rotavirus.

- **Parasite ex:** Toxoplasma gondii, Cryptosporidia, Giardia SPP; Trichinella spiralis, Taenia Solium, Anisakis SPP.

Source :

The major Sources of biological contaminants in food are :

- animal guts : faecal contamination.
- soil and water contaminated by non treated manure.
- cross contaminitaion :

- human contamination due to poor personal hygience, faecal contamination, failure in infection controll.

Factors affecting the growth of microorganisms in foods

- The temperature ranges for microbial growth depend on the type of microorganism. For Example, psychrotrophs such as Listeria monocytogenes grow at refrigration temperature (4°C or 39°F), while thermotrophs can grow at higer temperatures (45°C or 113°F).

- The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.

- The water Activity (aw) refers to the water available in the product. The more water available the better bacteria will grow. Table 1 shows the Impact of water activity on bacterial spoilage.

aw of product	Bacterial Spoilage	Examples.
>0.90	Spoils easily.	fress vegetables, fress meat, processed meat, milk, fish
0.78-0.90	Susceptible to spoilage	dry cheeses, flour, cakes, beans, cereals.
<0.78	little bacterial spoilage but mould may grow.	rolled oats, dried fruits, caramels dehydrated foods.

control and prevention:

The most effective way to control biological hazards is by prevention. The Implementation of Good Manufacturing practices (GMPs) and Hazard Analysis and critical control point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production HACCP controls hazards that may be present in ingredients and packaging materials and als those that occur during food processing, packaging and storage.

processing strategies to control biological hazards:

- effective thermal processing used as a kill step. (ex: cooking, pasteurization)
- use of appropriate process controls:
  - storage temperatures (ex: cooler; frezen)
  - processing parameters (ex: temperature and time for cooking, water activity during dehydration
  - adequate coling system.
- effective cleaning and sanitizing procedure (ex: SSOPs)
- use of food techologies to prevent the growth of bacteria or other biological hazards.

TEHATTA

GOVERNMENT GENAREL DEGREE COLLEGE

Sub: Envs

Topic: Biological Hazards

Name: Paulami Biswas

Deparment: Bengali Honours (sem-1)

(13)

SESSION: 2023

By 09/03/2023

Biological Hazards -

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk - These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, Clostridium botulinum and Clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C.

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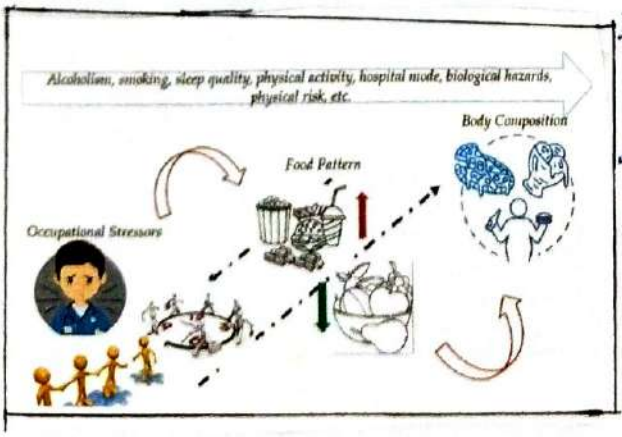

Major biological hazards

- **Bacteria ex:** Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botulinum, Clostridium perfringens, Vibrio vulnificus, Vibrio parahaemolyticus.
- **Virus ex:** Hepatitis A virus, Norwalk viruses, Rotavirus.
- **Parasites ex:** Toxoplasma gondii, Cryptosporidia, Giardia spp, Trichinella spiralis, Taenia solium, Anisakis spp.

Sources-

The major sources of biological contaminants in food are:

- animal guts: faecal contamination
- soil and water contaminated by non-treated manure
- cross contamination:

—human contamination due to poor personal hygiene, faecal contamination, failure in infection control (illness not reported)

—cross-contamination of food products spread from processing environment due to poor/improper sanitation.

Factors affecting the growth of microorganisms in foods-

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Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

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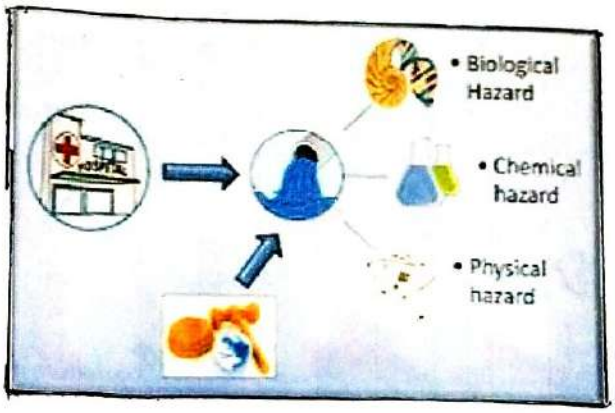

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  - adequate cooling system
- effective cleaning and sanitizing procedures (ex: SSOPs)

- use of food technologies to prevent the growth of bacteria or other biological hazards.
  - packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)
  - preservatives
  - processing techniques (ex: dehydration)





GOVERNMENT GENERAL DEGREE COLLEGE, TEHATTA

Session : 2022 - 2023

Name : Pratima Das

Sub : ENVS

Sem : 1st (History Honours)

Roll : 1

Topic : Biological Hazards

(12)

09/03/2023

Biological Hazards

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Risk

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Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, Clostridium botulinum and Clostridium perfringents.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°c [176°F].

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i. Animal guts: faecal contamination,

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— Packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)
— Preservatives
— Processing techniques (ex: dehydration)

GOVERNMENT GENERAL DEGREE COLLEGE, TEHATTA

Name : Prithwi Mandal

Sub : ENVS

Sem : 1st Sem (History honours)

Roll : 4

Topic : Biological Hazards

(12)

09/03/2023

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- Virus ex: hepatitis A virus Norwalk viruses, Ratavirus

- Parasites ex: Toxoplasma gondii, cryptosporidia, Giardia spp, Trichinella spiralis, Taenia solium, Anisakis spp.

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~~Storage appropriate Process controls~~:

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- use of food technologies to Prevent the growth of bacteria or other biological hazards:

- Packaging teachniques (ex: use of vacuum Packaging, modified atmosphere Packaging)
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UNIVERSITY OF KALYANI

TEHATTA GOVERNMENT COLLEGE



TEHATTA, NADIA

BIOLOGICAL HAZARDS

SUB : ENVS

(12)

Submitted By : PRIYA MONDAL

B.A English Hons 1st Semester Exam,2023

Registration No. :

09/03/2023

Session : 2022-23

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TEHATTA GOVERNMENT COLLEGE

2022-2023

ENVS

NAME: PUJA NATH

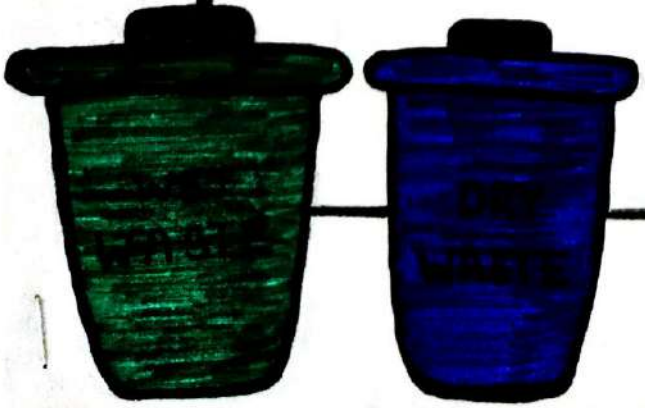
CLASS: B.A. 1st SEM

TOPIC: BIOLOGICAL HAZARDS

DEPARTMENT OF ENGLISH

14 1/2

09/03/2023





Introduction

A biological hazard, or bio-hazard, is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a micro-organism, virus or toxin that can adversely affect human health. A biohazard could also be a substance harmful to other living beings.

The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by Charles Baldwin, an environmental-health engineer working for the Dow chemical company on the containment products.

It is used in the labeling of biological materials that carry a significant health risk including viral samples and used hypodermic needles.

ANSI Z535/OSHA/ISO regulation :-

Biohazardous safety issues are identified with specified labels, signs and paragraphs established by the American National Standard's ~~for~~ Institute (ANSI). Today, ANSI Z535 standards for biohazards are used worldwide and should always be used appropriately within ANSI Z535 Hazardous communications (Hazcom) signage, labeling and paragraphs. The goal is to help workers rapidly identify the severity of a biohazard from a distance and through colour are design standardization.

Biological hazard's symbol design :-

- A red on white or white coloured background is used behind a black biohazard symbol when integrated with a 'DANGER' sign, Label or paragraph.



● An orange on black or white-coloured background is used behind a black biohazard symbol when integrated with a 'WARNING' sign, table or paragraph.



● A yellow on black or white-coloured background is used behind a black biohazard symbol when integrated with a 'CAUTION' sign, label or paragraph.



● A green on white or white coloured background is used behind a black biohazard symbol when integrated with a 'NOTICE' sign lable or paragraph.



'DANGER' is used to identify a biohazard that will cause death. 'WARNING' is used to identify a biohazard that may cause death. 'CAUTION' is used to identify a biohazard that will cause injury, but not death. 'NOTICE' is used to identify a noninjury biohazard message.

OSHA requires the use of proper ANSI Hazcom where appliable in American workplaces, these state and local governments also use these standards as codes and laws within their own jurisdictions. Proper use of ANSI Z535 signs, labels and paragraphs are written into many of OSHA's standards for Hazcom and crafted to integrate with ISO symbols.

Reference ANSI Z535 for a complete description on how to use 'DANGER', 'WARNING', 'CAUTION', 'NOTICE' signs, lables, paragraphs.

UN/ISO Classification :-

Biohazards agents are classification for transportation by UN number.

- **Category A**, UN 2814 - Infectious subtance affecting humans: An infectious subtance in a form capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals when exposure to it occurs.

- **Category A**, UN 2900 - Infectious subtance affecting animals (only): An infectious subtance that is not a form generally capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans and exposure to themselves occurs.

- **Category B**, UN 3373 - Biological subtance transported for diagnostic or investigative purposes.

❁ Regulated Medical Waste, UN3291 - Waste or reusable meterial derived from medical treatment of an animal or human or from biomedical research, which includes the production and testing.

❁ BIOSAFETY LEVEL :

The United states Centers for Disease Control and Prevention (CDC) categorise various diseases in levels of biohazard, Level 1 being minimun risk and level 4 being extreme risk. Laboratories and other facilities are categorized as BSL 1-4 or as P1 through P4 for short (Pathogen or Protection Level).

❁ Biohazard level 1 :- Bacteria and viruses including Bacillus subtilis, canine hepatitis, Escherichia coli ~~cultures~~ and varicella (chickenpox), as well as some cell cultures and non-infectious bacteria. At this level precautions againt the biohazards meterials in question are minimal, most likely involving gloves and some sort of facial protection.

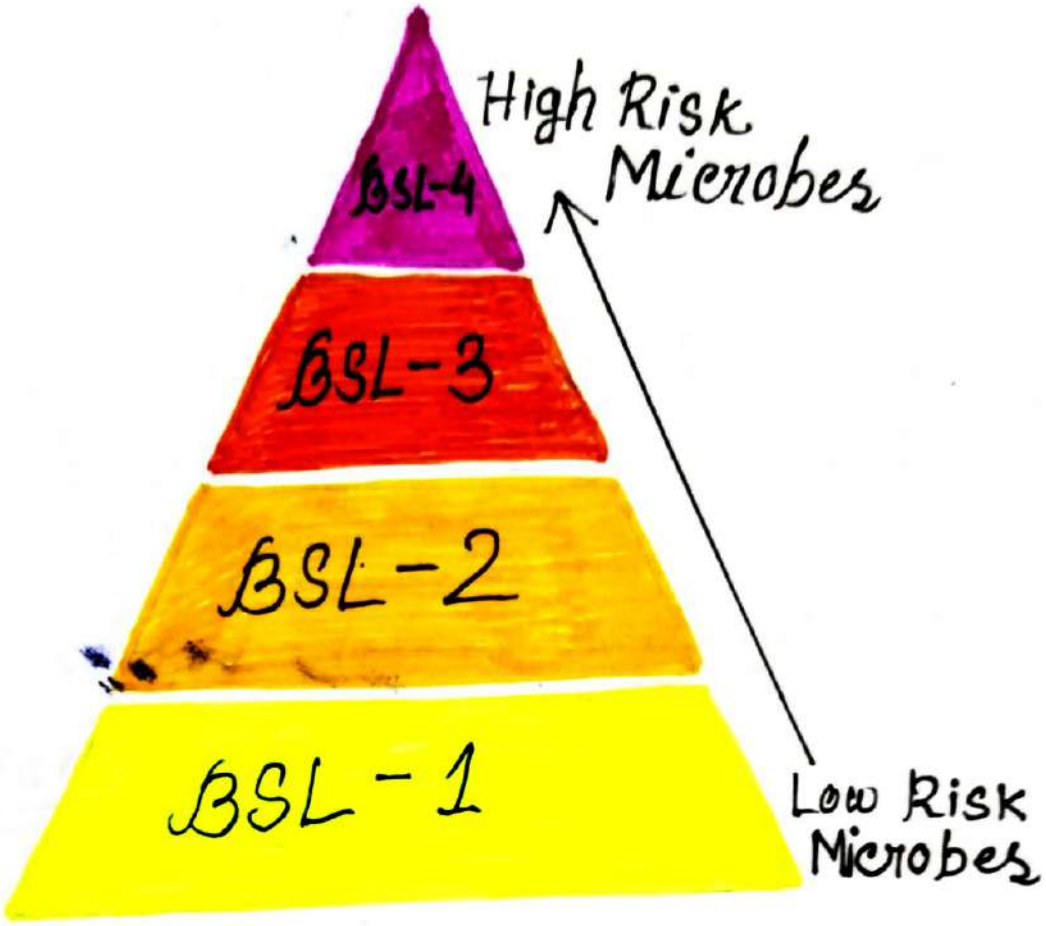
❁ Biohazard level 2 :- Bacteria and viruses that cause only mild disease to humans or are difficult to contract via aerosol in a lab setting, such as hepatitis A, B, C some influenza A stains, Human respiratory syncytial virus, Lyme disease, salmonella, mumps, measles, scrapie, dengue fever and HIV. Routine diagonstic work with clinical specimens can be done safely at Biosafety level 2, using Biosafety level 2 practices and procedures. Research work can be done in a BSL-2 (P2) facility using BSL-3 practices and procedures.

❁ Biohazard level 3 :- Bacteria and viruses that can cause severe to fatel disease in humans but for which vaccines or other treatments exist, such as anthrax, west Nile virus, venezuelan equine encephalitis, SARS coronavirus, MERS coronavirus, SARS-cov-2, Influenza A H5N1, hantavirus, tuberculosis, typhus, Rift valley fever, Rocky Mountain spotted fever, yellow fever and malaria.

❁ Biohazard level 4 :- Viruses that cause severe to fatal disease in humans, and for which vaccines or other treatments are not

available, such as Bolivian hemorrhagic fever, marburg virus. Ebolavirus, Lassa fever virus, crimean-Cango hemorrhogic fever and other hemorrhagic disease, as well as Nipah virus, Variola virus (smallpox) is an agent that is worked with at BSL-4 despite the existence of a vaccine as it has been eradicated and thus the general population is no longer routinely vaccinated. When dealing with biological hazards at this level, the use of a positive pressure personal suit with a segregated air supply is mandatory. The entrance and exit of a level 4 biolab will contain multiple showers a vaccum room, an ultraviolet light room, autonomous detection system ~~at~~ and other safety precaution designed to destroy all traces of the biohazard multiple air locks are employed and are electronically secured to prevent doors from both opening at the same time. All air and water service going to and coming from a Biosafety level 4 (P4) lab will undergo similar de contamination procedures to elminate the possibility of an accidental release currently there are no bacteria classified at this level.

Biohazard Safety Levels



- Anthropogenic hazard - Hazard caused by human action or inaction.

- Biocontainment - Physical containment of pathogenic organisms or agents in microbiology (laboratories).

- Biological agent - Pathogen that can be weaponized.

- Biosafety level - Level of the biocontainment precautions required to isolate dangerous biological agents.

- Chemical hazard - Non-biological substance that has the potential to cause harm to life or health.
- Hazard - Situation or object that can cause damage or harm.
- Interplanetary contamination - Biological contamination of a planetary body by a space probe or spacecraft.

List of Laboratory biosecurity incidents :-

- Mechanical Hazard - Hazard with a mechanical energy source.
- Occupationed Hazard - Hazard experienced in the workplace.
- Physical Hazard - Hazard due to a physical agent.
- Planetary protection - Guiding principle of a space mission.
- Psychosocial Hazard - Occupational hazard to one's psychological well being.
- Public health - Promoting health through organized efforts and informed choices of society and individuals.

GOVERNMENT GENEAL
DEGREE COLLEGE, TEHATT

SUB : ENVS

NAME : RAHUL HALDER

Student Id : 1570084

Sem : I TO VI BA HONOURS.

Year : 2023

11

By 09/03/2023

• Biological Hazards :-

Biological hazards are organisms, or substances, produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

• Risk -

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, Clostridium botulinum and Clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C [176°F].

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include; Clostridium botulinum, Bacillus cereus, and staphylococcus aureus.

Major biological hazards

- Bacteria ex: Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni; Yersinia enterocolitica; Listeria monocytogenes; Bacillus anthracis, Bacillus cereus, staphlococcus aureus, Clostridium botulinum, Clostridium perfringens,
- Virus ex: hepatitis A virus, Norwalk viruses, Rotavirus
- Parasites ex: Toxoplasma gondii, Cryptosporidia, Giardia spp., Trichinella spiralis, Taenia solium, Anisakis spp.

Sources

The major sources of biological contaminants in food are:

- animal guts : faecal contamination
- soil and water contaminated by non-treated
- cross contamination:

-human contamination due to poor personal hygiene, faecal contamination, failure in infection control (illness not reported)

- cross-contamination of food products spread from processing environment due to poor/improper sanitation.

Factors affecting the growth of microorganisms in foods.

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature [4°C or 39°F], while thermotrophs can grow at higher temperatures [45°C or 113°F]
- The pH of a product is related to the acidity or alkalinity of the product: The pH of products affects the growth of bacteria: most bacteria grow in a pH range between 5 and 9.

- The water Activity (aw) refers to the water available in the product. the more water available, the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

aw of Product	Bacterial spoilage	Examples
>0.90	spoils easily	fresh vegetables, fresh meat, processed meat, milk, fish
0.78-0.90	susceptible to spoilage	dry cheeses, flour, cakes, beans, cereals
<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods

Each of these factors is important for the control of microbial growth. it is the interaction among these factors that determines the growth or control of micro-organisms.

Control and Prevention

The most effective way to control biological hazards is by prevention. The implementation of Good manufacturing practices (GMPs) and Hazard Analysis and Critical control Point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and ~~packa~~ also those that occur during food processing, packaging and storage.

Processing strategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking; pasteurization)
- use of appropriate process controls:
  - storage temperatures (ex: cooler, freezer)
  - processing parameters (ex: temperature and time for cooking; water activity during dehydration)
  - adequate cooling system.
- effective cleaning and sanitizing procedures (ex: SSOPs)
- use of food technologies to prevent ~~prevent~~ the growth of bacteria or other biological hazards:
  - Packaging techniques (ex: use of vacuum packaging; modified atmosphere packaging)
  - ~~Preservation~~.
  - Preservatives.

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BA HONS 1st SEMESTER EXAMINATION - 2022-2023

B.A HONS
1st SEMESTER
DIPARTMENT – HISTORY HONS
SUB : ENVIRONMRNTL STUDIES

(11)
09/03/2023

NAME - RAKHI BISWAS

College Roll No - 17

SESSION : 2022-2023

Biological Hazards

Biological Hazards %

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Risk

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Major biological hazards

Bacteria

ex: salmonella spp, Enterohaemorrhagic Escherichia coli campylobacter jejuni yersinia enterocolitica listeria monocytogenes, aureus clostridium botulinum clostridium perfringens vibrio vulnificus vibrio parahaemolyticus, vibrio vulnificus, vibrio parahaemolyticus.

virus :-

ex: hepatitis A virus Norwalk virus uses Rotavirus.

parasites :-

ex: Toxoplasma gondii cryptosporidia giardia spp. Trichinella spiralis Taenia solium, Anisakis spp.

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processing & strategies to control

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- use of food technologies to prevent the growth of bacteria or other biological hazards.

packaging techniques (ex: use of vocum packaging modified almosphere packaging preservaties.

processing techniques (ex: dehydration)

For information on the food safety

program contact the CVO/Food Safety knowledge centre. For technical information call 204-795-7968 or 204-795-8418 in Winnipeg, or e mail foodsafety @ gov. mb. ca. For general information contact your local CVO centre.

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TEHATTA, NADIA

BIOLOGICAL HAZARDS

(14)

SUB : ENVS

09/03/2023

Submitted By : RAMISHA MONDAL

B.A Pol. Sc. Hons 1st Semester Exam,2023

Registration No. :

Session : 2022-23

Biological hazards are a major source of risk that may result in emergencies and disasters. They cause singnificant loss of life, affect many thousands of people, have the potential for major economic losses throught loss of livestock and crops, and may also cause damage and loss the natural heritage, including to endangered fauna and flora.

The management of risks due to biological hazards is a national and community priority. It has been recognized as part of the sendai Framework and is globally addressed under the International Health Regulations (IHR).

Biological hazards - What are they?

Biological hazards are of organic or conveyed by biological vectors including pathogenic micoorganisms, toxins and bioactive substances. Examples are bacteria, viruses or parasites, as well as venomous wildife and insects, poisonous plants, and mosquitoes carrying disease-causing agents (1) These hazards are usually the result of natural occurrence, but can also result from deliberate or accidental release.

Biological hazards also pose a risk to animals, including livestock, and to plants. However, we are focusing here on human health. The consequences of a biological

hazardous event may include severe economic and environmental losses. Some examples of recent large outbreaks, epidmies or pandemics due to biological hazards either on their or following a disaster are:

- The Ebola Virus Disease outbreak in West Africa region, associated with congenital and others neurological with disorders.
- The ongoing outbreak of zika virus infection the Americas and the pacific region, associated with congeintal and other neurological disordes.
- Significant increse in diarrheal diseas incidences following recurrent floods in most African countries or significant increase following the 2004 tsunam in Indonesia and Thailand.
- Outbreaks of yellow fever in Angola, the Democratic Republic of congo and Ugandain 2016.
- Agent diversity. Biological hazards rangefrom microorganisms such as bacteria or viruses, to toxins do insect infestations. They can be transmitted to humans from the environment, from animals, from plants, and from other humans.

• Routes of transmission. These inclde airborne transmission, ingestion, absorption (through the skin, eyes, mucous membranes, wounds), animal vectors (e.g. mosquitos or ticks), and bodily fluids (e.g blood, mother-to-child transmission, sexual transmission).

• Pathogenicity and virulence. Some biological hazards can cause severe disease in extremely low concentrations and can multiply quickly once within its host. For example, 1-10 aerosolized organisms of Lassa virus or Ebola are sufficient to cause severe diseas in humans.

• Hazard identification. As microbes are not visible to the naked eye, they are often not easy to identify on the basis of epidemiological information derived from clinical signs and symptoms. They therefore require specific diagnosis techniques, including polymerase chain reaction (PCR), to amplify a single copy or a few copies of a piece of DNA, microbial cultures, whole genome sequencing.

Assessing the risk of biological hazards.

Approaches in assessing the risks of biological hazards differ according to the purpose of the assessment:

- Strategic Risk Assessment. is used for risk management planning with a focus on prevention and preparedness measures, capacity development and medium- to longer-term risk monitoring and evaluation.

- Rapid Risk Assessment, in used to determine the level of risk associated with detected events and to define response interventions accordingly.

- Post-event assessment, is used for recovery planning, updating and strengthening the overall risk management system.

Pre-event: strategic Risk Assessments:
Strategic Risk Assessments are used for risk management planning with a focus on prevention and preparedness and capacity development before events occur. They can be used for medium- to longer-term risk monitoring and evaluation, which tracks

changes in risk over time. They catalyse dan geted action to reduce the level of risk and consequences for health based on ass essment of the hazard, exposure, vnlnerabili ties and capacities.

In relation to addressing the risk of biolo gical hazards, the term vulnerability refers to the risk factors that exist in exposed populations, such as the burden of endemic diseases, living conditions (e.g. overcrowding) and environment (e.g. favourabe environment for the growing of the pathogen). This is in addition to factors that are addressed in risk assessments for other hazards, such as demographies (e.g. age or gender) the availability of health services to those populations and the degree of resili ence of the health systems.

Some examples of strategic risk assess ment (QMRA) is an example of a strategic risk assessment for prevention and miti gation of risks. This information can be found in the literature and it could be also helpful to search for similar out breaks as references.

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TEHATTA, NADIA

BIOLOGICAL HAZARDS

SUB : ENVS

(11)

11/03/2023

Submitted By : RANA GHOSH

B.A Bengali Hons 1st Semester Exam,2023

Registration No. :

Session : 2022-23

বর্তমানে সংবাদ পত্র, টেলিভিশন এবং বিভিন্ন মহলে Hazard ও Disaster সম্বন্ধে প্রায় শোনা যায়, এ সম্বন্ধে পরিবেশ বিজ্ঞানী, সমাজ বিজ্ঞানী, ভূ- তত্ত্ববিদ এবং ভৌগোলিকেরা নানা সংজ্ঞা ব্যাখ্যা দিয়েছেন, তবে সবাই একমত নন, পরিবেশ বিজ্ঞানীরা Hazard - কে Natural hazard বলতেই বেশি আগ্রহী আবার এই বিষয়ে ভূ- তত্ত্ববিদ ও ভৌগোলিকদের মধ্যে সামান্য মতভেদ রয়েছে, ভূ- তত্ত্ববিদরা Hazard আলোচনায় Natural Geological factors এর উপর বেশী গুরুত্ব আরোপ করেছেন,

প্রকৃত পক্ষে 'Hazard' এবং 'Disaster'- এর মধ্যে বিষয়গত ও প্রয়োগগত ব্যবধান রয়েছে, ভৌগোলিকেরা Hazard - এর ব্যাখ্যা দিয়েছেন যে, এটি হল ভূমিরূপগত বা প্রাকৃতিক প্রক্রিয়া যার মধ্যে নানা প্রাকৃতিক ও ভূমিরূপগত উপাদান অন্তর্ভুক্ত এবং একটি প্রাকৃতিক ও মনুষ্যকৃত, তবে সাধারনভাবে বলা যায় এটি সর্বোচ্চ প্রাকৃতিক ও মানবিক প্রক্রিয়া যার সঙ্গে ক্ষয়ক্ষতি যুক্ত থাকে না, ভূমিরূপবিদ Prof. Savindra Singh (2001) Hazard - এর সংজ্ঞা দিয়েছেন যে, 'Hazards are generally taken to be the Processes (causal factor) and the responses (Results) of extreme events, both natural and anthropo-genic, which cause an accident/extreme events/or danger'.

Prof. S. R. Basu (2004), মতে 'Hazard' হল একটি ভূতাত্ত্বিক / ভূমিরূপগত পদ্ধতির আভ্যন্তরীন বা বাহ্যিক প্রকাশ যার মধ্যে নানান প্রাকৃতিক উপাদান ও প্রক্রিয়া আঙ্গাঙ্গিকভাবে জড়িত, Hazard - এর সঙ্গে ব্যাপকভাবে না হলেও অল্পবিস্তর ক্ষয়ক্ষতি যুক্ত থাকে, যদি মনুষ্য জনজীবনকে স্তব্ধ করতে পারে না,

P.T.O

এটি একটি পরিস্থিতি বিশ্লেষ তবে তা চূড়ান্ত ঘটনা (extreme events) নয়।' পরিশেষে বলা যায় দুর্যোগ (Hazard) প্রাকৃতিক, মনুষ্যসৃষ্ট বা উভয় কারণেই হতে পারে এবং যার মধ্যে ভূ-তাত্ত্বিক ভূমিরূপগত এবং সাংস্কৃতি উপাদান অন্তর্ভুক্ত। অল্প সময়ের জন্য হলেও মানুষের স্বাভাবিক জীবনযাত্রাকে বিঘ্নিত করে থাকে, নীচে Hazard-এর কিছু স্বাভাবিক বৈশিষ্ট্য তুলে ধরা হল —

- এটি প্রাকৃতিক, ভূমিরূপগত, ভূতাত্ত্বিক, মনুষ্যসৃষ্ট বা উভয় উপাদানের সংযুক্ত ক্রিয়া,
- তা সাধারণত ক্ষুদ্র স্কেলে সংঘটিত হয়,
- মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যাহত না করলেও অল্প বিস্তর জীবন-যাত্রার গতিকে রুদ্ধ করে দেয়,
- ক্ষয়ক্ষতির প্রভাব ব্যাপক মাত্রায় না থাকলেও অল্প বিস্তর সামাজিক, প্রাকৃতিক ও অর্থনৈতিক সম্পদের অল্প বিস্তর ক্ষতি হয়,
- দুর্যোগ উপযুক্ত আধুনিক পরিকল্পনার মাধ্যমে নিয়ন্ত্রন করা যায়,

-: বাংলাদেশের দুর্যোগ প্রবনতা :-

বাংলাদেশের মানুষের জীবনে ঝড়, ঘূর্ণিঝড় জলোচ্ছ্বাস, খরা, বন্যা, নদীভাঙ্গন ইত্যাদি প্রাকৃতিক দুর্যোগ নিয়মিত ঘটনা, ভৌগলিক অবস্থানের পৃথিবীর অন্যতম প্রাকৃতিক দুর্যোগপ্রবন দেশ বাংলাদেশের এসব দুর্যোগ প্রায় প্রতি বছর মানব সম্পদসহ অবকাঠামোগত, অর্থনৈতিক ও প্রাকৃতিক সম্পদের বিপুল ক্ষতি সাধন করে, ভৌগলিক অবস্থানগত বাস্তবতাই এর প্রধান কারণ, নদীবিধৌত বাংলাদেশের উত্তরে হিমালয় পর্বতমালা, দক্ষিণে বঙ্গোপসাগর, এদেশের পশ্চিমবঙ্গের কিছু পার্বত্য অঞ্চল ও বিস্তীর্ণ সমতলভূমি জুড়ে রয়েছে সাত শ্রোতাস্বিক নদী, তাই হিমালয়ের বরফগলা পানিতে যেমন বন্যা সৃষ্টি হয় তেমনি হিমবাহ হতে হয় অতিবৃষ্টি,

P.T.O

আমাদের দেশের অবস্থান উষ্ণমণ্ডলীয় অঞ্চলে এবং দক্ষিণের বঙ্গোপসাগরের সমুদ্রপৃষ্ঠের উষ্ণতা ২৭ ডিগ্রী সেলসিয়াস (২৭° সে.), ফলে সমুদ্রে ঘূর্ণিঝড়ের সৃষ্টি হয়, সাম্প্রতিককালে বৈশ্বিক উষ্ণতা বৃদ্ধি ও পরিবেশ বিপর্যয়ের কারণে এসব ঘূর্ণিঝড় মারাত্মক আকার ধারন করেছে। অন্যদিকে নদীমাতৃক বাংলাদেশের প্রধান প্রধান ও গুরুত্বপূর্ণ নদীগুলোর উৎস ভারত ও নেপাল, পার্শ্ববর্তী দেশের নদী শাসনের কারণে এদেশে বন্যা ও খরার মত দুর্যোগের সম্মুখীন হতে হয়, এছাড়া অতিবর্ষণে বন্যা ও নদীভাঙ্গন প্রায় নিয়মিত ঘটনা, অর্থাৎ ভৌগলিক অবস্থান, জলবায়ু, ভূমির গঠন, নদীমাতৃক ভূমিরূপ, সমুদ্রের অবস্থান ইত্যাদি কারণে সৃষ্ট ঝড়, বন্যা, খরা, নদীভাঙ্গন, জলোচ্ছ্বাস ইত্যাদি দুর্যোগের সাথে বসবাস করেই আমাদের জীবনধারন করতে হয়,

-: প্রাকৃতিক দুর্যোগ :-

প্রাকৃতিক ভাবে সৃষ্ট আকস্মিক ও চরম প্রতিকূল পরিবেশগত অবস্থাকে প্রাকৃতিক দুর্যোগ বলা হয়, প্রাকৃতিক দুর্যোগ যে কোনো দেশেই মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যবহৃত, বিপর্যস্ত ও দুর্বিসহ করে তোলে, বিশ্বের প্রাকৃতিক দুর্যোগ কম-বেশি আঘাত হানে, প্রাকৃতিক তান্ডবের মুখোমুখি দাঁড়িয়ে করনীয় প্রায় কিছুই থাকে না, তাই দুর্যোগ ব্যবস্থাপনা অত্যন্ত গুরুত্বপূর্ণ, দুর্যোগ ব্যবস্থাপনা বলতে বোঝায় এমন একটি সমন্বিত ব্যবস্থা যাতে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগ পরবর্তী সময়ে বিভিন্ন পরিকল্পনা, সংগঠন, সমন্বয়, নিয়ন্ত্রনসহ যাবতীয় কার্যক্রম গ্রহন ও বাস্তবায়নের মাধ্যমে দুর্যোগের ক্ষয়ক্ষতি হ্রাস করা যায়, আমাদের দেশের মানুষ বিশ্বের অনেক দেশের তুলনায় প্রাকৃতিক দুর্যোগ মোকাবেলা করে বেশি অভ্যস্ত, যেমন ঝড়, বন্যা, খরা, জলোচ্ছ্বাস ইত্যাদি দুর্যোগ এদেশের মানুষ চিরায়তভাবেই সংগ্রাম করে বেঁচে থাকার চেষ্টা করে, নিয়মতান্ত্রিক ও বৈজ্ঞানিক ভাবে, শৃংখলার সাথে মোকাবেলা করা স্বাভাবিকভাবেই অধিক কার্যকারী হয়, যেমন —

-P.T.O

বাংলাদেশের দক্ষিণাঞ্চলে সমুদ্র থাকায় সমুদ্র সৃষ্টি ঘূর্ণিঝড়, জলোচ্ছ্বাস বারবার দক্ষিণাঞ্চলে আঘাত স্থানে, এতে মানবসম্পদসহ বহু ক্ষয়ক্ষতি সাধিত হয়, এসব ক্ষতি হ্রাস করতে ও বিপর্যয় কাটাতে প্রয়োজন সমন্বিত দুর্যোগ ব্যবস্থাপনা,

-: দুর্যোগ ব্যবস্থাপনার প্রধান উদ্দেশ্য :-

- দুর্যোগকালীন মানবজীবন, গবাদি ও বন্যপ্রাণি এবং পরিবেশগত ক্ষতি হ্রাস করা,
- ক্ষতিগ্রস্থ মানুষের কাছে অগ্রাধিকার ভিত্তিতে দ্রুত ত্রাণসামগ্রী পৌঁছানো,
- দুর্যোগ পরবর্তী উদ্ধার, পুনর্গঠন ও পুনর্বাসন নিশ্চিত করা,

উত্তরোক্ত উদ্দেশ্যসমূহ বিবেচনায় রেখেই দুর্যোগ ব্যবস্থাপনা কার্যক্রম পরিকল্পনা ও পরিচালনা করা হয়.

-: দুর্যোগ ব্যবস্থাপনা :-

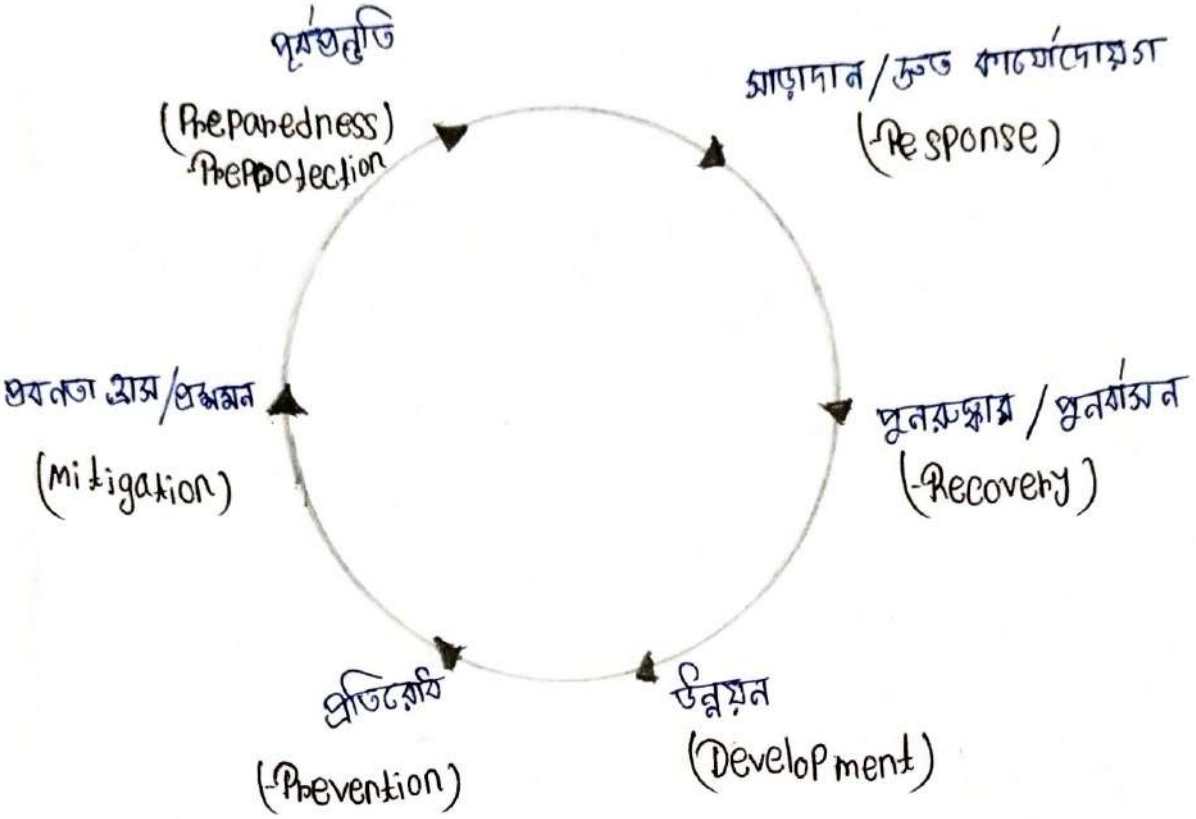
আগেই বলা হয়েছে যে, দুর্যোগ ব্যবস্থাপনা হল একটি সমন্বিত দুর্যোগ মোকাবেলা ব্যবস্থাপনা, দুর্যোগ ব্যবস্থাপনাকে তিনটি স্তরের বা ধাপের একটি সমন্বিত ব্যবস্থাও বলা যেতে পারে, যথা:

- দুর্যোগপূর্ব প্রস্তুতি
- দুর্যোগকালীন সতর্কতা
- দুর্যোগ পরবর্তী পুনরুদ্ধার.

অর্থাৎ দুর্যোগের ভয়াবহতা মোকাবেলায় ক্ষয়ক্ষতি হ্রাসের লক্ষ্যে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগপরবর্তী স্তরে গৃহিত পদক্ষেপ ও কার্যক্রমকেই এক কথায় দুর্যোগ ব্যবস্থাপনা বলে.

দুর্যোগ ব্যবস্থাপনা কার্যক্রমের উপাদানসমূহ কী কী উপায়ে কাজ করে তা নিচে একটি চক্রের সাহায্য দেখানো হল :—

P.T.O



দুর্যোগ ব্যবস্থাপনা চক্র

দুর্যোগ ব্যবস্থাপনা কার্যক্রম সুষ্ঠুভাবে সম্পন্ন করার উদ্দেশ্য সরকারি ভাবে জাতীয় ও স্থানীয় পর্যায়ে বিভিন্ন কমিটি গঠন করা হয়েছে, কমিটিগুলো প্রাকৃতিক দুর্যোগ সংক্রান্ত বিভিন্ন সাংগঠনিক কার্যক্রম সম্পন্ন করার সাথে সাথে দুর্যোগের বিভিন্ন পর্যায়ে সক্রিয় অংশগ্রহন করে থাকে, আসুন, এবার আমরা এসব কমিটিগুলোর কয়েকটির নামের সাথে পরিচিত হই,

X

GOVERNMENT GENERAL
DEGREE COLLEGE, TEHATTA

NAME : Rimon Shaikh
SEM : 1st
ROLL :
SUB : Philosophy (Hons)
TOPIC : Biological hazards

ENVS PROJECT

(13)

09/03/2023

Introduction:

- A biological hazard, or bio-hazard is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a simple of a micro organism, virus or toxin that can adversely affect human health, A biohabazard could also be a substance harmful to other living beings.

- The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substance will know to take precautions. The biohazard symbol to take developed in 1966 by Charles Baldwin, an environmental — health engineer working for the Bow Chicat company on the containment products.

- Its is used in the labeling of biological materials that carry a significant health risk including viral sample and used hypodermic needles.

ANSI Z535/OSHA/Iso regulation

Biohazardous safety issus are identified with specified labels, sings and paragraphs established by the American National standard's Institute (ANSI). Today ANSI Z535 standdard's for biohazard's are used world wide and should always be used appropriately within ANSI Z535 Hazadous communication's (Hazcom) signage, labeling and paragraphs, The goal is to help workker's rapidly identify the sevenity of abia-hazard form a distance and through colour are design standardization.

Biological hezard's symbol desing:

- A red on white or white coloured back-ground is used behind a black, biohazard symbol when integrated with a 'Danger' sign, Label or paragraph.

- An orange on black or white-coloured background is used behind a black biohazard symbol when integrated with a 'WARNING' sign lable or paragraph.

- A yellow on black or white - coloured background is used behind a black biohazard symbol when integrated with a 'CAUTION' sign; Lable or paragraph.

- A green on white or white coloured background is used behind a black biohazard symbol when integrated with a 'NOTICE' sign lable or paragraph.

'DANGER' is used identify a biohazard that will cause death. 'WARNING' is used to identify a biohazard that may couse death. 'CAUTION' is used to identify a biohazard that will cause injury, but not death. 'NOTICE' is used to identify a noninjury biohazard message.

OSHA ~~or~~ requires the use of proper ANSI Hazcom where appliable in American work-places state and local governments also use these standerds as codes and laws within their won jubisdictions. Proper use of ANSI Z535 sign's labels and paragraph's are written in-to many of OSHA's standard's for Hazcom and carfied ~~to~~ integrate ISO symbols.

Reference ANSI Z535 for a complote. description or how to use 'DANGER', 'WARNING', 'CAUTION', 'NOTICE' — sign's, lables paragraph's.

UN/ISO classification :→

Biohazard's agents are ~~cat~~ class-fication for transportation by UN number.

● Category A. UN 2814 —

Infectious substance affecting humans: An infectious substance in a form capable of causing permanent disability or life threatening or fatal disease in otherwise healthy human's or animals when exposure to it occurs.

● Category A. UN 2900 —

Infectious substance affecting animals (only): An infectious substance that is not a form generally capable of causing permanent disability or life threatening or fatal disease in otherwise healthy humans and exposure to themselves occurs.

● Category B. UN 3373 —

Biological substance transported for diagnostic or investigative purposes.

BIOSAFETY LEVEL:

The united states centers for disease control and prevention (CDC) categorise various diseases in levels of biohazard, Level 1 being minimum Risk and level 4 being extreme risk. Laboratories and other facilities are categorized as BSL 1-4 or as P1 through P4 for short. (Pathogen or protection level).

Biohazard level 1 :→

Biochic and viruses including Bacillus subtilis, canine hepatilis, Escherichia coli and varicella, as well as some cell cultures and non-infectious bacteria. At this level precautions againt the biohazards meterials in question are minimal, most likely in valving gloves and some sort of facial fratlction.

Biohazard level 2:

Baclepia and viruses that cause only mild disease to humans or are difficutt to contract via aerosol in a lab setting such

as hepatitis A B C some in flu virus A strains, human respiratory syncytial virus, Lyme disease, salmonella, mumps, measles, serapie, dengue fever and HIV routine. diagonstic work with clinical specimens can be done safely level at biosafety level 2, using biosafety level-2 particas and procedures. Research work: can be done in a BSL-2 (P2) facility using BSL-3 practicas and procedures.

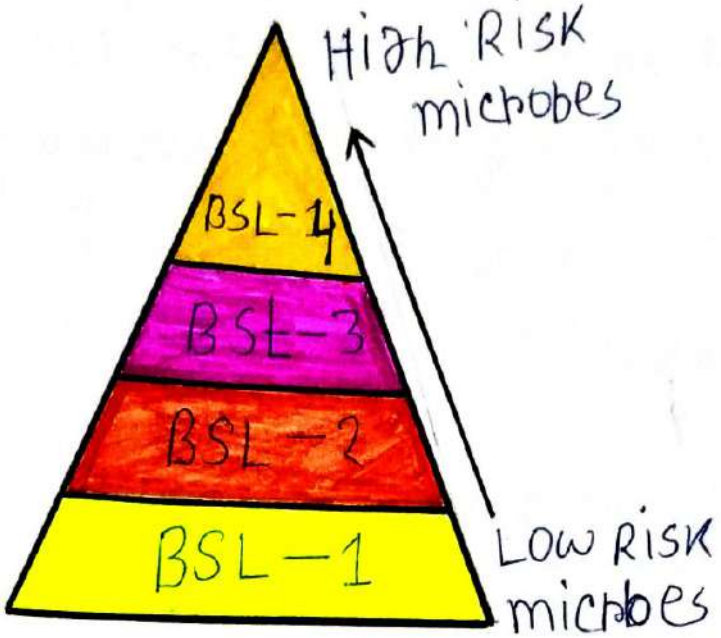
● Biohazard level 3:→

Bacteria and viruses that can cause severe to fatel discase in humans but for which vaccines or other treet ments exist. such as anthrax. wast Nile virus, vere zuein equine encephalits, SARS coronavirus, MERS coronavirus, SARS - COV2, Influenza, A H5N1 hantavirus; tuberculosis, typhus; Rift valley fever; rocky mountain; spotted fever, jellow fever and malobia

⊖ Biohazard level 4:

viruses that cause severe to fatal disease in humans, and for which vaccines or other treatments are not available. such as Bolivian hemorrhagic fever, marburg virus, Ebolavirus, Lassa fever and other hemorrhagic disease, as well as ~~Ebola~~ Nipah virus, variola virus is an agent. that is worked with at BSL-4 despite. the existence of a vaccine as it has been, eradicated and thus the general population is not longer routinely vaccinated. when dealing with. biological hazard's at this level, the use of a positive pressure personal. suit with a secured air supply is mandatory. The entrance and exit of a level 4 biolab will contain multiple showers a vaccum room, an ultraviolet light room, automonous detection system at and other safety precaution designed to destroy all traces of the biohazard multiple air locks are employed and are electronically secured to prevent doors from both opening at the same time: All air and water service going to and coming from a Biosafety level 4 (P4).

Biohazard safety levels :→



⊖ Anthropogenic hazard — ~~Hard~~ Hazard caused by human action or inaction.

⊖ Biocontainment — Physical containment of pathogenic organisms or agent is microbiology (laboratories)

⊖ Biological agent — pathogen that can be weaponied.

⊖ Biosafty level — Level of the biocomtainment precautions required to isolate dangerous biological agents.

⊖ Hazard :- situation or object that can cauze damage or harm.

- chemical hazard —

Non-biological substance that has the potential to cause harm to life or health.

- Inter planetory contamination —

Biological contamination of a planetory body by a space probe or spacecraft.

List of Laboratory biosecurity :—

Incidents :—

- Mechanical Hazard — Hazard with a mechnical energy source.
- Occpuationed Hazard — Hazard pxperi-enced in the workplace.
- Physical Hazard — Hazard due to a physical agent.
- Planetory Hazard — Guiding principle of a space mission.
- Psychosocial Hazard :— occupational hazard to one's psychological well being.

GOVERNMENT GENERAL DEGREE COLLEGE AT TEHATTA

Name: Rimpa Mondal

Sub: ENVS

Sem: 1st (History Honours)

Roll: 3

Topic: Biological Hazards

(12)

09/03/2023

Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria ~~include~~ that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, Clostridium botulinum and Clostridium Perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very

difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C (176°F).

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include: Clostridium botulinum, Bacillus cereus, and Staphylococcus aureus.

Major biological hazards

- Bacteria ex: Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphylococcus aureus, Clostridium botulinum, Clostridium perfringens, Vibrio vulnificus, Vibrio parahaemolyticus.
- Virus ex: hepatitis A virus, Norwalk viruses, Rotavirus.
- Parasites ex: Toxoplasma gondii, Cryptosporidia, Giardia spp., Trichinella spinalis, Taenia solium, Anisakis spp.

Sources

The major sources of biological contaminants in food are:

- animal guts: faecal contamination
- Soil and water contaminated by non-treated manure
- Cross contamination:
  - human contamination due to poor personal hygiene, faecal contamination,

failure in infection control (illness not reported)
- Cross-contamination of food products spread from processing environment due to poor/ improper sanitation.

Factors affecting the growth of microorganisms in foods

- The temperature values for microbial growth depend on the type of microorganisms. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F).

- The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.

- The water Activity (a_w) refers to the water available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

a_w of product	Bacterial Spoilage	Examples
>0.90	Spoils easily	fresh vegetables, fresh meat, processed meat, milk, fish
0.78 - 0.90	Susceptible to spoilage	dry cheeses, flour, cakes, beans, cereals
<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

Control and prevention

The most effective way to control biological hazards is by prevention. The implementation of good Manufacturing Practices (GMPs) and Hazard Analysis and Critical Control Point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food Production. HACCP controls

hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

Processing strategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking, pasteurization)
- Use of appropriate process controls:
  - Storage temperatures (ex: cooler, freezer)
  - Processing parameters (ex: temperature and time for cooking, water activity during dehydration)
  - adequate cooling system
- effective cleaning and sanitizing procedures (ex: SSOPs)
- Use of food technologies to prevent the growth of bacteria or other biological hazards:
  - Packaging technologies to prevent the growth of bacteria. (ex: use of vacuum packaging, modified atmosphere packaging)
  - Preservatives
  - Processing techniques (ex: dehydration)

ASSIGNMENT

Academic Year - 2022-23

TEHATTA GOVERNMENT COLLEGE

Environmental Studies Project
on
Biological Hazards

Submitted by

Name: Rina Biswas
Course: B.A Philosophy Honours
Registration No:

Submitted to

Susmita Chowdhury
Assistant Prof. in Chemistry.
Govt. General Degree College, Tehatta

Date of Submission: 01/03/2023

(13)

09/03/2023

Professor Sign

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- Cross-contamination of food products spread from processing environment due to poor/ improper Sanitation.

Factors affecting the growth of microorganisms in foods :

- The temparature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temparatures (45°C or 113°F).
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a_w of product	Bacterial Spoilage	Examples
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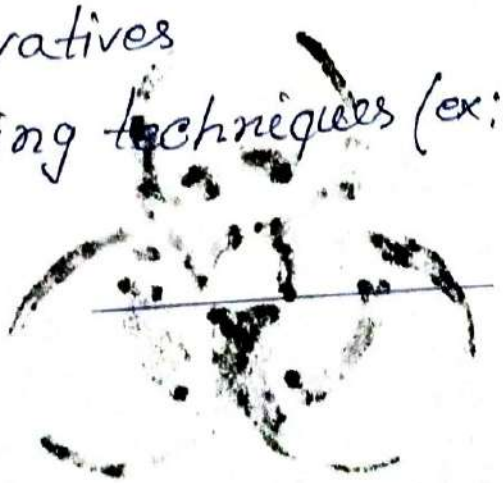

TEHATTA GOVERNMENT COLLEGE



TEHATTA * NADIA

UNIVERSITY OF KALYANI

BA HONS 1st SEMESTER EXAXINATION - 2022-2023

B.A HONS

1st SEMESTER

DIPARTMENT - HISTORY HONS

SUB : ENVIRONMRNTL STUDIES

NAME - RINKU MANDAL

COLLEGE ROLL - 10

(13)

09/03/2023

SESSION : 2022-2023

Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk:

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, Clostridium botulinum and clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C (176°F)

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Majors biological hazards :

- Bacteria ex: Salmonella spp, Enterohaemorrhagic Escherichia coil, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, clostridium botulinum, clostridium perfringens, Vibrio vulnificus, vibrio parahaemolyticus.
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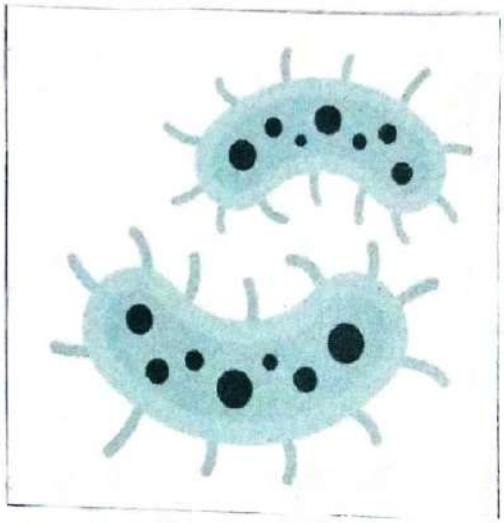

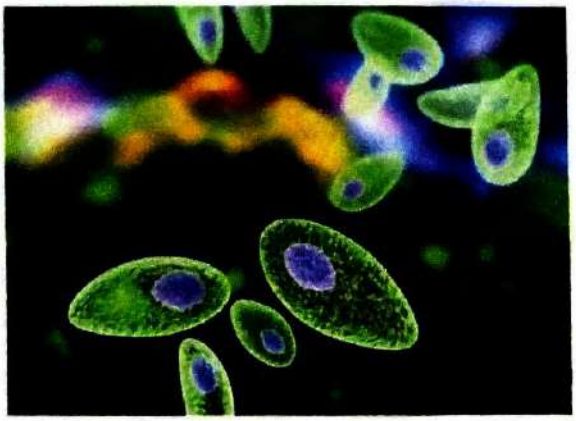

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Government General Degree College Tehatta

Project- ENVS

Name- Riya Ghosh

Department - political Science hons

Season - 2022 - 2023

Sem - 1st Sem

Roll -

Date - 01/03/2023

Biological Hazards Risk Assessment :-

Biological hazards are a major source of risk that may result in emergencies and disasters. They cause significant loss of life, affect many thousands of people have the potential for major economic losses through loss of livestock and crops, and may also cause damage and loss to the natural heritage, including to endangered fauna and flora.

The management of risks due to biological hazards is a national and community priority. It has been recognized as part of the Sendai framework, and is globaly addressed under the International Health Regulations (I.H.R).

Biological hazards - what are they ?

Biological hazards are of organic origin or conveyed by biological vectors, including pathogenic microorganisms, toxins and bioactive substances. Examples are bacteria, viruses or parasites, as well as venomous wildlife and insects, piosonous plants, and mosquitoes carring desease-causing agents [1]. These hazards are usually the result of a natural occurrence but can also result from deliberate or accidental release.

Biological hazards also ~~people~~ pose a risk to animals, including livestock, and to plants. However we are focusing here on human health. The consequences of

a biological hazardous erent may include Severe economic and enrinomental losses. Some examples of recent large outbreaks,[2] epidemics[3] or pandemics[4] due to biological hazards either on their own following a disaster are:

* The Ebola virus Disease outbreak in west Africa in 2013-2016, the largest epidemic of its kind to date in the populations of Guinea, Liberia and Sierra Leone.

* The ongoing outbreak of zika virus infection in the Americas and the paeific region, associated with congenital and other neurological disorders.

* Significant increase in diarrheal disease incidenses following recurrent floods in most African countries or Significant increase following the 2004 tsunami in Indonesia and Thailand [2].

* outbreaks of yellow fever in Angola, the Democractic Republic of congo and uganda in 2016.

* outbreaks of middle East Respiratory Syndrome-coronavirus (MERS COV), an emerging disease identified in 2012.

Assessing the risk of biological hazards can be challenging owning to their unique characteristics:

* Agent diversity: Biological hazards range from microorganisms such as bacteria or viruses, to toxins to insect infestations. They can be transmitted to humans from the environment, from animals, from plants and from other humans.

* Routes of transmission: These include airborne transmission, ingestion, absorption (through the skin, eyes, mucous membranes, wounds) animal vectors (e.g mosquitos or ticks) and bodily fluids (e.d blood, mother-to-child transmission, sexudl transmission).

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* Hazard Identification: As microbes are not visible to the naked eye, they are often not easy to identify on the basis of epidemiological information derived from clinical signs and symptoms. They therefore require specific diagnosis techniques, including polymerase chain reaction (PCR) to amplify a single copy or a few copies of a piece of DNA,

microbial cultures, whole genome sequencing.

*Endemic diseases with potential for epidemic transmission: Unlike some other hazards (e.g earthquakes or floods), biological hazards can be present in the community (i.e they are endemic) and usually pose low risk when the population is largely immune. The risk may change when crises or emergencies arise exacerbating the conditions favourable for disease transmission of the desease resulting in cases in excess of normal expectancy. Biological hazards, which are not endemic also pose a risk when they are introduced to a new host community with no immunity.

* Sensitive to climate, environmental or land use changes: Biological hazards - particularly zoonoses and vector-transmitted diseases such as malaria, dengue, zika and Ebola — may increase in incidence, lethality or change geographic distribution or seasonal patterns directly due to climate and weather sensitivity, environmental or land use changes or mediated through changes in ecosystems resulting from human activities, thus changing human exposures and susceptibility to these hazards. An estimated 75 percent of emerging infectious diseases of humans

that have evolved from exposure to zoonotic pathogens [3] warrant risk assessments for health threats at the interface between animal human and ecosystems.

Assessing the risk of biological hazards

Approaches in assessing the risks of biological hazards differ according to the purpose of the assessment:

* Strategic Risk Assessment is used for risk management planning with a focus on prevention and prevention and preparedness measures, capacity derelopement and medium to longer term risk monitoring and evolution.
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UNIVERSITY OF KALYANI

TEHATTA GOVERNMENT COLLEGE



TEHATTA, NADIA

BIOLOGICAL HAZARDS

SUB : ENVS

Submitted By : RIYA MONDAL

B.A Bengali Hons 1st Semester Exam,2023

Registration No. :

09/03/2023 (12)

Session : 2022-23

Biological Hazards

Biological hazards aren organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk

→ These organisms can affect human heath, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C (176°F).

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include : clostridium botulinum, Bacillus cereus, and Staphylococcus aureus.

Major biological hazards

- Bacteria ex : Salmonella Spp, Enterohaemorrhogic Escherichia coli, Campylobacter jejuni, yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, clostridium botulinum, clostridium perfringens, vibrio vulnificus, vibrio parahaemolyticus.

- Virus ex : Hepatitis A virus, Norwalk viruses, Rotavirus.

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Sources :- The major Sources of biological Contaminants in food are.

- Animal guts : faecal contamination
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Factors affecting the growth of microor-ganisms in foods

• The temperature values for microbial grow-th depend on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration tem-perature [4°C or 39°F].

• The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.

• The water Activity (aw) refers to the water available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

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- Effective thermal processing used as a kill step (ex : cooking, pasteurization)
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TEHATTA GOVERNMENT COLLEGE

ENVS

PROJECT

(12)

By
09/03/2023

NAME :- ROHAN PAL

SUBJECT:- ENVS

COURSE :- B.A.HONS(ENGLISH)

SEM :- 1ST SEMESTER

YEAR:-2022-2023

TOPIC :→

BIOLOGICAL HAZARDS



Biological Hazards:

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aw of product	Bacterical spoilage

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my teacher Mrs Susmita chowdhury as well as our Principal Mr. sibsankar Pal who gave me the golden opportunity to do this wonderful project on the topic Biological Hazards.

Secondly, I would aslo like to thank my Parents and friends who helped me a lot in finalizing this project within the limited time frame.

Lastly, I like to thank all my supporters who have mativated me to fulfill their Project before the timeline.

TEHATTA GOVT. GENERAL DEGREE COLLEGE



TEHATTA -741160 ,NADIA

SUBJECT-ENVS

HISTORY HONOURS

NAME :-RUBINA KHATUN

(13)

SEMESTER -1st

09/03/2023

SESSION-2022-23

ROLL NO-

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NAME
RUBINA KHATUN
COURSE
FIRST SEM
SUB
ASSIGNMENT OF ENVIRONMENT
TOPIC
BIOLOGICAL HAZARDS
YEAR
2023

13

09/03/2023



BIOLOGICAL HAZARD

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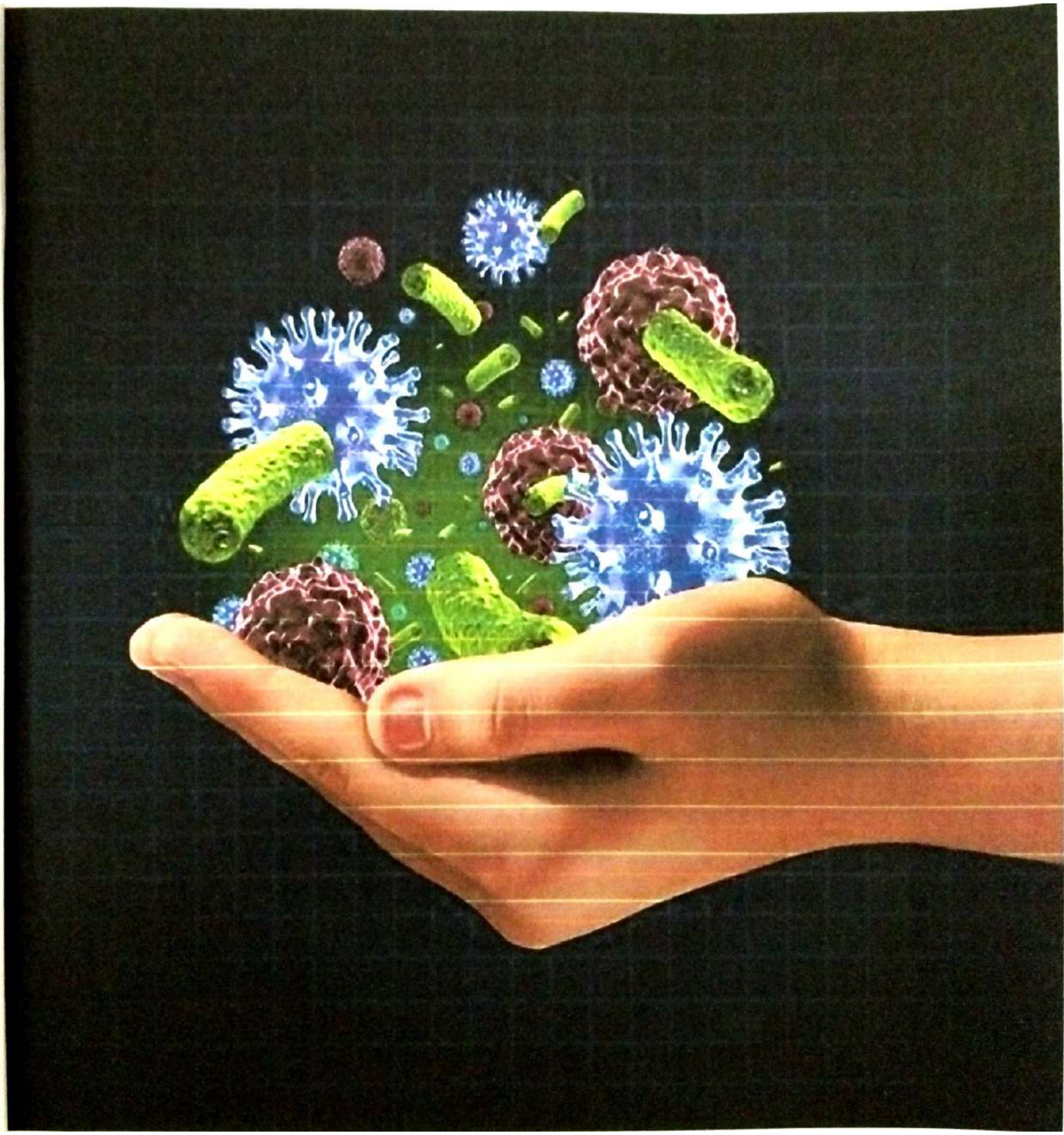
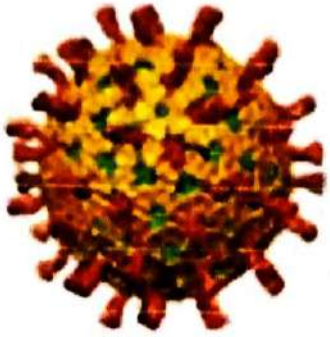


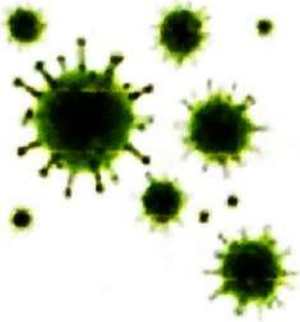
BIOLOGICAL HAZARDS



Salmonella Bacteria



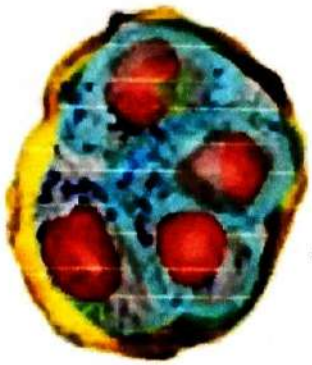
Rotavirus



Norwalk Viruses

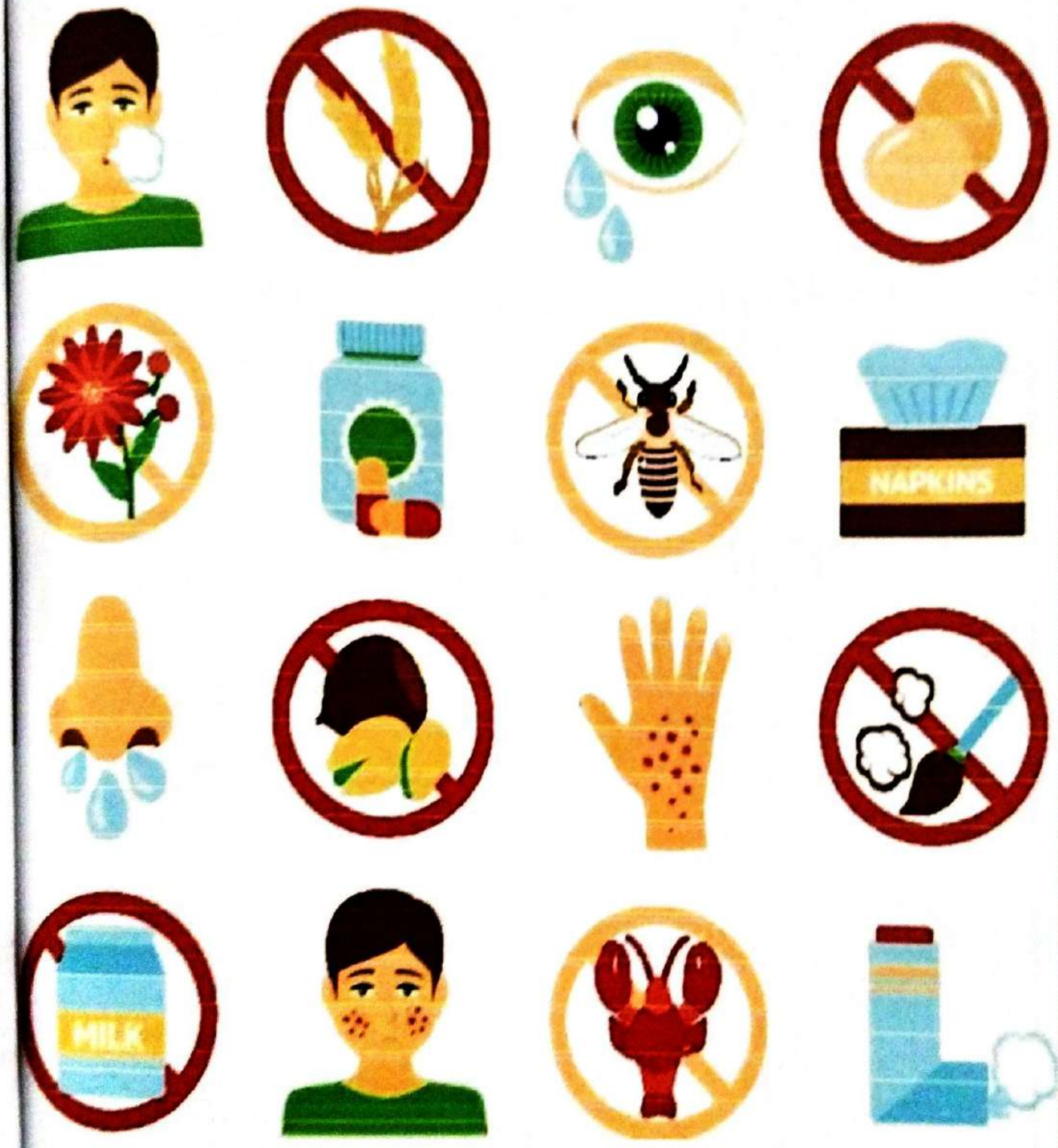


Trichinella spiralis



Toxoplasma gondii

Pearl
EDUCATION


NAPKINS
MILK

ACKNOWLEDGEMENT

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I would like to sincerely thank my family and friends for their endless support and encouragement throughout the project.

I am ensuring that this project was finished by me and not copied.

Date - 01/03/2023

Rubina Khatun

Signture of Teacher

Signature of Student



TEHATTA
GOVERNMENT COLLEGE

NAME: RUPKATHA PAUL

SUBJECT: ENVS

COURSE: ENGLISH HONOURS [1st SEM]

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PROJECT WORK

TOPIC

BIOLOGICAL HAZARDS

BIOLOGICAL HAZARDS

Defination:

A Biological Hazard or Bio Hazard ; is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a micro organism, virus or toxin that

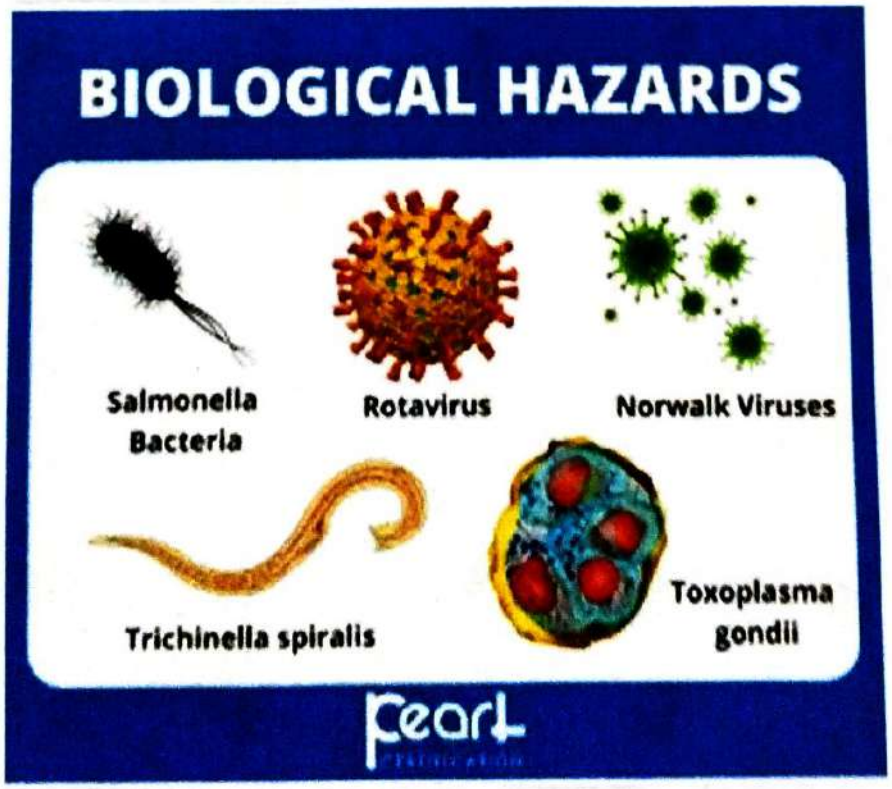


can adversely affect human health. A bio-hazard could also be a substance harmful to other living beings.

Representation :

The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substances will no to take precautions. The bio-hazard symbol was developed in 1966 by Charles Baldwin, an environmental health engineer working for the dow chemical company on the containment products.

- Biological health hazards include different kind of Bacteria, viruses, parasites and moulds or fanzi. They can pose a threat to human



health when they are inhaled, eaten or coming contact with skin. They can cause illness such as food poisoning, tetanus, respiratory infections or parasite infection.

■ There are many ways where biological hazards do harm to us ——

ⓐ In hospital industry when biological waste are not properly disposed, then they can spread various diseases through fungus, bacteria and virus.

ⓑ Biological wastage of markets also can harm people when they are not properly disposed.

ⓒ Contegious disease like Corona / Covid-19 patients and their belongings are not properly handled. The disease can spread rapidly. This is the best example of bio-hazard.

ⓓ There are many fungus grows on food and affects on human beings.



© There are many disease like Cholera, caused by bacteria which are found in our environment, are also bio-hazard.

▨ The United States Centers for Disease Control and Prevention (CDC) categorizes various diseases in levels of bio-hazard, Level 1 being minimum risk and Level 4 being extreme risk. Laboratories and other facilities are catagorized as BSL (Biosafety Level) 1-4 or as P1 through P4 for short (Pathogen or Protection Level).

Biohazard Level 1:

Bacteria and viruses including Bacillus subtilis, canine hepatitis, Escherichia coli,

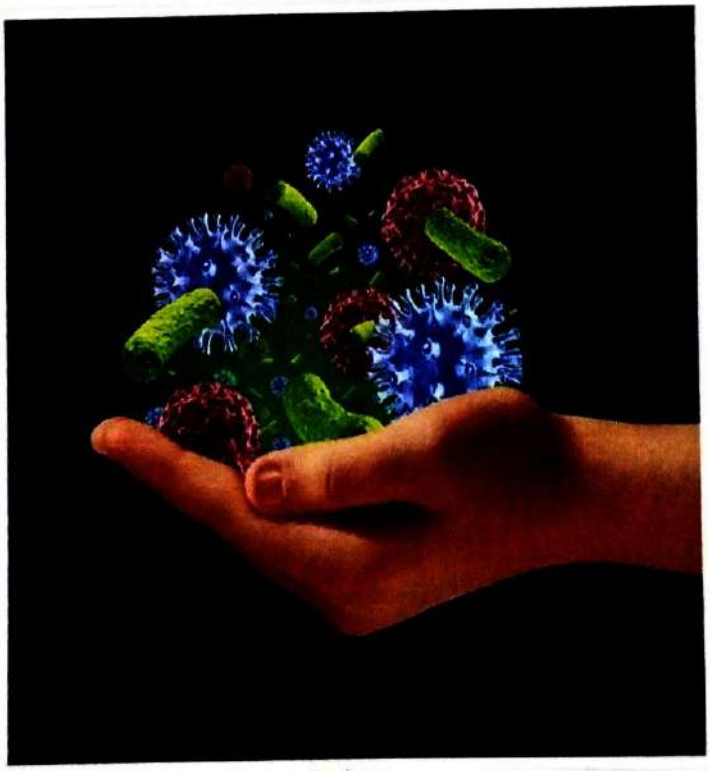
and varicella (chickenpox), as well as some cell cultures and non-infectious bacteria. At this level precautions against the biohazardous materials in question are minimal, most likely involving gloves and some sort of facial protection.

Biohazard Level 2: Bacteria and viruses that cause only mild disease to humans, or are different to contract via aerosol in a lab setting, such as hepatitis A, B, and C, some influenza A strains, Human respiratory syncytial virus, Lyme disease, salmonella, mumps, measles, scrapie, dengue fever, and HIV. Routine diagnostic work with clinical specimens can be done safely at Biosafety Level 2, using Biosafety Level 2 practices and procedures. Research work (including co-cultivation, virus replication studies, or manipulations involving concentrated virus) can be done in a BSL-2 (P2) facility, using BSL-3 practices and procedures.

Biohazard Level 3: Bacteria and viruses that can cause severe to fatal disease in humans, but for which vaccines or other treatments exist, such as anthrax, West Nile virus, Venezuelan equine encephalitis,

SARS corona virus, MERS corona virus, SARS-CoV-2, Influenza, typhus, Rift Valley fever, and malaria.

Biohazard Level 4: Viruses that cause severe to fatal disease in humans, and for which vaccines or other treatments are not available, such as Marburg virus, Ebola virus, Nipah virus. All air and water service going to and coming from a Biosafety level 4 lab will undergo similar decontamination procedures to eliminate the possibility of an accidental release. Currently there are no bacteria classified at this level.



Conclusion: Ultimately we can say properly disposal and labeling biological hazard item can keep us safe from

various unwanted disease so we must educated all of us so that all can be safe.

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Date : 01/03/2023

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PROJECT WORK IN ENVIRONMENTAL STUDIES

CLASSROOM

ON

BIOLOGICAL HAZARDS

TEHATTA GOVERNMENT COLLEGE

BY

(12)

SADIK MONDAL

By
09/03/2023

1st YEAR 1st SEMESTER

Biological Hazard (জৈবিক বিপদ)

বর্তমানে সংবাদপত্র, টেলিভিশন এবং বিভিন্ন মহলে Hazard ও Disaster সম্পর্কে প্রায়ই শোনা যায়। এ সম্পর্কে পরিবেশ বিজ্ঞানী, সমাজবিজ্ঞানী, ভূ-তত্ত্ববিদ এবং ভৌগোলিকেরা নানান মন্তব্য ও ব্যাখ্যা দিয়েছেন। তবে সবাই একমত নন। পরিবেশ বিজ্ঞানীরা Hazard-কে Natural hazard বলতেই বেশি আগ্রহী আবার এই বিষয়ে ভূ-তত্ত্ববিদ ও ভৌগোলিকদের মধ্যে যথেষ্ট মতভেদ রয়েছে। ভূ-তত্ত্ববিদরা Hazard আলোচনা Natural Geological factors আর ভৌগোলিকেরা Anthropogenic factors-এর উপর বেশী গুরুত্ব আরোপ করেছেন।

প্রকৃত পক্ষে 'Hazard' এবং 'Disaster'-এর মধ্যে বিষয়গত ও প্রয়োগগত ব্যবধান রয়েছে। ভৌগোলিকেরা Hazard-এর ব্যাখ্যা দিয়েছেন যে, এটি হলো ভূমিরূপগত বা প্রাকৃতিক প্রক্রিয়া যার মধ্যে নানা প্রাকৃতিক ও ভূমিরূপগত উপাদান অন্তর্ভুক্ত এবং এটি প্রাকৃতিক ও মনুষ্যকৃত। তবে সার্বিরূপ-ভাবে বলা যায় এটি সর্বোচ্চ প্রাকৃতিক ও মানবিক প্রক্রিয়া যার মধ্যে ক্ষয়ক্ষতি যুক্ত থাকে না। ভূমিরূপবিদ Prof. Savindra Singh (2001) Hazard-এর সংজ্ঞা দিয়েছেন যে,

'Hazards are generally taken to be the processes (causal factor) and the responses (results) of extreme events, both natural and anthropogenic, which cause an accident / extreme event / or dangers.

Prof. S.R. Basu (2004), মতে 'Hazard' হল একটি ভূতাত্ত্বিক / ভূমিরূপগত পদ্ধতির অভ্যন্তরীণ বা বাহ্যিক প্রকাশ যার মধ্যে নানান প্রাকৃতিক উপাদান ও প্রক্রিয়া আক্রান্তিকভাবে জড়িত। Hazard - এর সঙ্গে ব্যাপকভাবে না হলেও অল্পবিস্তর ক্ষয়ক্ষতি যুক্ত থাকে, যদিও মনুষ্য জনজীবনে ক্ষতি করতে পারে না। এটি একটি পরিস্থিতি বিশেষ তবে তা চূড়ান্ত ঘটনা (extreme-events) নয়।'

পরিশেষে বলা যায় দুর্যোগ (Hazard) প্রাকৃতিক, মনুষ্যসৃষ্ট বা উভয় কারণেই হতে পারে এবং যার মধ্যে ভূ-তাত্ত্বিক ভূমিরূপগত এবং সংস্কৃতি উপাদান অন্তর্ভুক্ত। অল্প সময়ের জন্য হলেও মানুষের স্বাভাবিক জীবনযাত্রাকে বিঘ্নিত করে থাকে। যার Hazard - এর কিছু স্বাভাবিক বৈশিষ্ট্য হলে বিবৃত হল -

① এটি প্রাকৃতিক, ভূমিরূপগত, ভূতাত্ত্বিক এবং সংস্কৃতিক উপাদানের সংযুক্ত ক্রিয়া।

② তা সাধারণত ক্ষুদ্র স্কেলে সংঘটিত হয়।

③ মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যাহত না করলেও অল্প বিস্তর জীবনযাত্রার গতিকে মুগ্ধ করে দেয়।

④ ক্ষয়ক্ষতির প্রভাব ব্যাপক মাত্রায় না থাকলেও সামাজিক, প্রাকৃতিক ও অর্থনৈতিক সম্পদের অল্প বিস্তর ক্ষতি হয়।

⑤ দুর্যোগ উপযুক্ত আধুনিক পরিকল্পনার মাধ্যমে নিয়ন্ত্রণ করা যায়।

বাংলাদেশের দুর্যোগ প্রবণতা :—

বাংলাদেশের মানুষের জীবনে ঝড়, ঘূর্ণিঝড়, জলোচ্ছ্বাস, খরা, বন্যা, নদীভাঙ্গন ইত্যাদি প্রাকৃতিক দুর্যোগ নিয়মিত ঘটনা। ভৌগলিকভাবেই পৃথিবীর অন্যতম প্রাকৃতিক দুর্যোগপ্রবন দেশ বাংলাদেশের এসব দুর্যোগ প্রায় প্রতি বছর মানব সম্পদসহ অবকাঠামোগত, অর্থনৈতিক ও প্রাকৃতিক সম্পদের বিপুল ক্ষতি সাধন করে। ভৌগলিক অবস্থানগত বাস্তবতাই এর প্রধান কারণ। নদীবিধৌত বাংলাদেশের উত্তরে হিমালয় পর্বতমালা, দক্ষিণে বঙ্গোপসাগর। এদেশের পশ্চিমাঞ্চলের কিছু পার্বত্য অঞ্চল ও বিস্তীর্ণ সমতলভূমি জুড়ে রয়েছে সাত শতাধিক নদী। তাই হিমালয়ের বরফগলা পানিতে যেমন বন্যা সৃষ্টি হয় তেমনি হিমবাহ হতে হয় অতিবৃষ্টি।

আমাদের দেশের অবস্থান উষ্ণমণ্ডলীয় অঞ্চলে এবং দক্ষিণের বঙ্গোপসাগরের সমুদ্রপৃষ্ঠের উষ্ণতা 27 ডিগ্রী সেলসিয়াস (27° সে.)। ফলে সমুদ্রে ঘূর্ণিঝড়ের সৃষ্টি হয়। আন্তর্জাতিক কারণে বৈশ্বিক উষ্ণতা বৃদ্ধিও পরিবেশ বিপর্যয়ের কারণে-এসব ঘূর্ণিঝড় আরও ভয়ংকর আকার ধারণ-করেছে। অন্যদিকে নদীমাতৃক বাংলাদেশের প্রধান প্রধানও গুরুত্বপূর্ণ নদীগুলোর উৎস ওরও ও নেপাল। পার্শ্ববর্তী দেশের নদী শাসনের কারণে-এদেশে বন্যা ও খরার মত দুর্যোগের সম্মুখীন হতে হয়। এছাড়া অতিবর্ষণে- বন্যা ও নদী-ভাঙ্গন প্রায়-নিয়মিত ঘটনা। অর্থাৎ ভৌগোলিক অবস্থান, জলবায়ু, ভূমির গঠন, নদীমাতৃক ভূমিরূপ, সমুদ্রের অবস্থান ইত্যাদি কারণে- সৃষ্টি ঝড়, বন্যা, খরা, নদী-ভাঙ্গন, জলোচ্ছ্বাস ইত্যাদি দুর্যোগের সাথে বসবাস করেই আমাদের জীবনধারণ-করতে হয়।

প্রাকৃতিক দুর্যোগ

প্রাকৃতিকভাবে সৃষ্ট আকস্মিক ও চরম প্রতিকূল পরিবেশগত অবস্থাকে প্রাকৃতিক দুর্যোগ বলা হয়। প্রাকৃতিক দুর্যোগ যে কোনো দেশেই মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যহত, বিপর্যস্ত ও দুর্বিসহ করে তোলে। বিশ্বের সর্বত্রই প্রাকৃতিক দুর্যোগ কম-বেশি আঘাত হানে। প্রাকৃতিক বস্তুর মুখোমুখি দাঁড়িয়ে করণীয় প্রায় কিছুই থাকে না। তাই দুর্যোগ ব্যবস্থাপনা অত্যন্ত গুরুত্বপূর্ণ। দুর্যোগ ব্যবস্থাপনা বলতে বোঝায় এমন একটি সমন্বিত ব্যবস্থা যাতে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগ পরবর্তী সময়ে বিভিন্ন পরিকল্পনা, সংগঠন, সমন্বয়, বিস্তৃতসহ যাবতীয় কার্যক্রম গ্রহণ ও বাস্তবায়নের মাধ্যমে দুর্যোগের ক্ষয়ক্ষতি হ্রাস করা যায়। আমাদের দেশের মানুষ বিশ্বের অনেক দেশের তুলনায় প্রাকৃতিক দুর্যোগ মোকাবেলা করে বেশি অভ্যস্ত। যেমন ঝড়, বন্যা, খরা, ভূমিকম্প ইত্যাদি দুর্যোগে এদেশের মানুষ চিরায়তভাবেই সংগ্রাম করে বেঁচে থাকার চেষ্টা করে। বিজ্ঞানভিত্তিক ও বৈজ্ঞানিকভাবে, শৃঙ্খলার সাথে দুর্যোগ মোকাবেলা করা স্বাভাবিকভাবেই অধিক কার্যকরী হয়। যেমন - বাংলাদেশের দক্ষিণাঞ্চলে সমুদ্র থাকায় সমুদ্রে সৃষ্টি ঘূর্ণিঝড়, ভূমিকম্প বারবার দক্ষিণাঞ্চলে আঘাত হানে।

এতে মানবসম্পদসহ বহু ক্ষয়ক্ষতি সাধিত হয়। তবে ক্ষতি হ্রাস করতে ও বিপর্যয় কাটাতে প্রয়োজন সমন্বিত দুর্যোগ ব্যবস্থাপনা।

দুর্যোগ ব্যবস্থাপনার প্রধান উদ্দেশ্য

ক) দুর্যোগ কালীন মানবজীবন, গবাদিও বন্যপ্রাণি-এবং পরিবেশগত ক্ষতি হ্রাস করা।

খ) ক্ষতিগ্রস্থ মানুষের কাছে ন্যায্যাধিকার ভিত্তিতে দ্রুত ত্রাণ-সামগ্রী পৌঁছানো।

গ) দুর্যোগ পরবর্তী উদ্ধার, পুনর্গঠন ও পুনর্বাসন নিশ্চিত করা।

উপরোক্ত উদ্দেশ্যসমূহ বিবেচনায় রেখেই দুর্যোগ ব্যবস্থাপনা কার্যক্রম পরিকল্পনা ও পরিচালনা করা হয়।

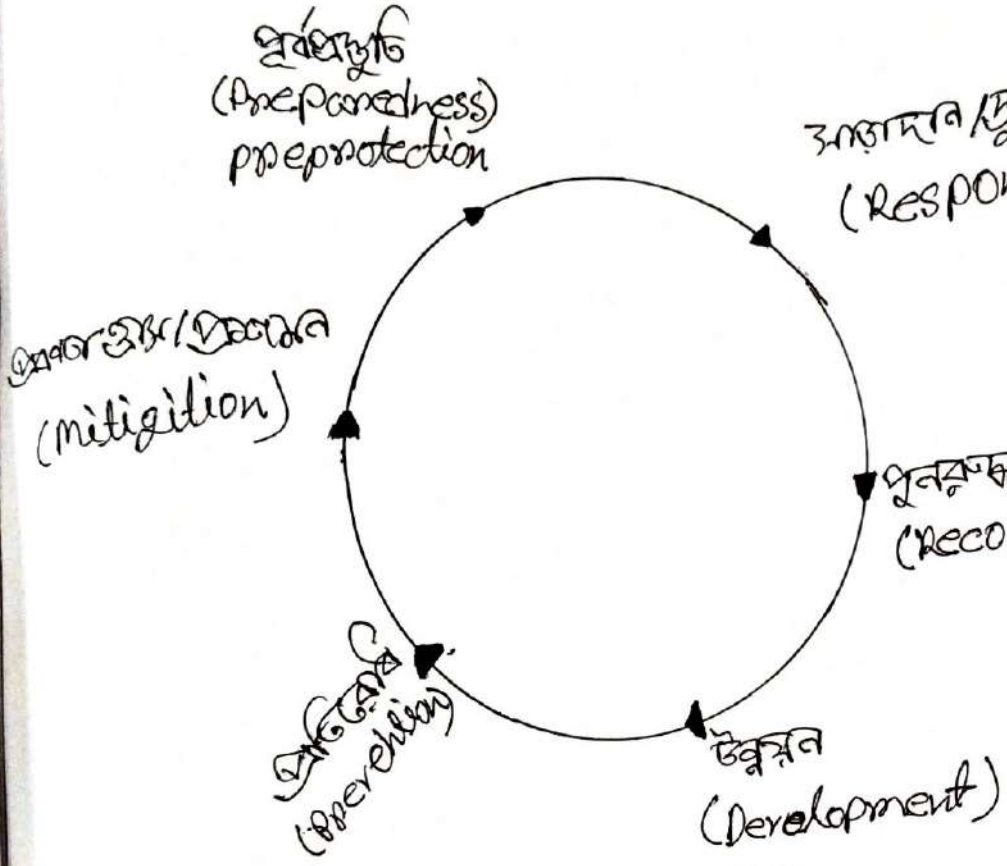
দুর্যোগ ব্যবস্থাপনা

আগেই বলা হয়েছে যে, দুর্যোগ ব্যবস্থাপনা হল একটি সমন্বিত দুর্যোগ মোকাবেলা ব্যবস্থাপনা। দুর্যোগ ব্যবস্থাপনাকে তিনটি স্তরের বা ধাপের একটি সমন্বিত ব্যবস্থাও বলা যেতে পারে। যথা:

১) দুর্যোগপূর্ব প্রস্তুতি
২) দুর্যোগকালীন সতর্কতা
৩) দুর্যোগ পরবর্তী পুনরুদ্ধার

অর্থাৎ দুর্যোগের ক্ষয়াবহতা মোকাবেলার ক্ষয়ক্ষতি হ্রাসের লক্ষ্যে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগ পরবর্তী স্তরে গৃহিত পদক্ষেপ ও কার্যক্রমকেই এককথায় দুর্যোগ ব্যবস্থাপনা বলে।

দুর্যোগ ব্যবস্থাপনা কার্যক্রমের উপাদানসমূহে কী কী ভাবে কাজ করে তা নিচে একটি চক্রের সাহায্যে দেখানো হল-



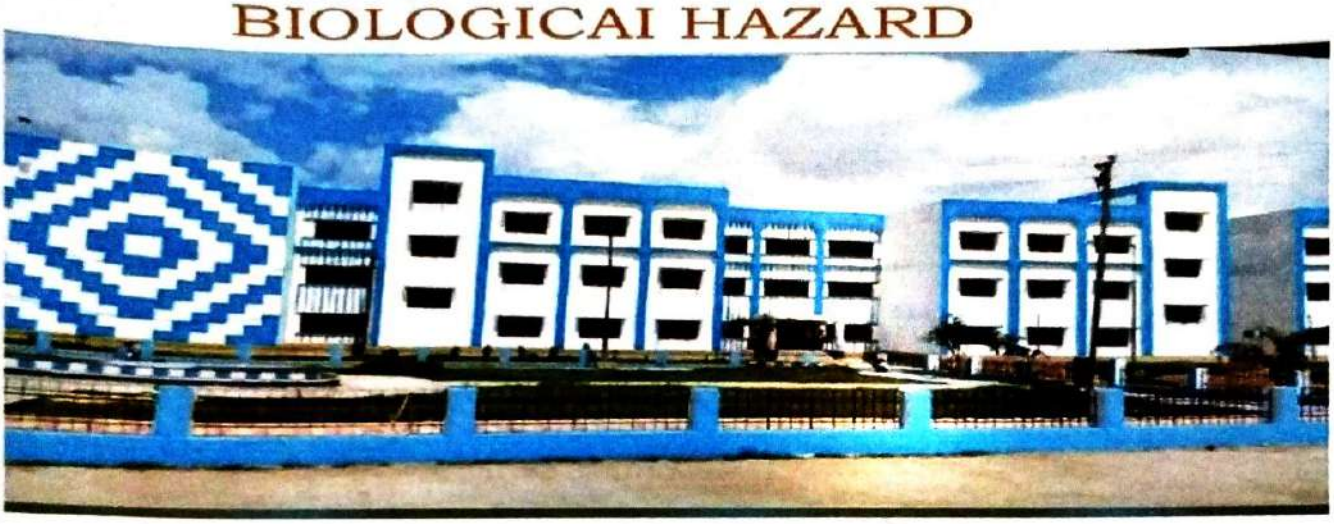
দুর্যোগ ব্যবস্থাপনা চক্র

দুর্যোগ ব্যবস্থাপনা কার্যক্রম সুষ্ঠুভাবে সম্পন্ন করার উদ্দেশ্যে সরকারিভাবে জাতীয় ও স্থানীয় পর্যায়ে বিভিন্ন কমিটি গঠন করা হয়েছে। কমিটিগুলো প্রাকৃতিক দুর্যোগ সংক্রান্ত বিভিন্ন সাংগঠনিক কার্যক্রম সম্পন্ন করার সাথে সাথে দুর্যোগের বিভিন্ন পর্যায়ে সক্রিয় অংশগ্রহণ করে থাকে। আসুন, এবার আমরা এসব কমিটিগুলোর কয়েকটির নামের সাথে পরিচয় হই।

TEHATTA GOVERNMENT COLLEGE

SUB :- Evns,

BIOLOGICAI HAZARD



NAME :- SANCHU DAWN

ROLL :- 05

COUSE :- B.A (1 Year Degree) History Hons

SESSION :- 2023-2024

(11)

09/03/2023

Food Safety Program, for Processors and Distributors

Bilogical Hazards :-

Bilogical hazards are organisms, or substance produced by organisms, That pose a threat to human health. They are a major concern in food Proccessing because they cause most food borne illness outb-reaks.

Risk →

These organisms can affect human health, Including infection, Intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, Steam cooking significantly reduces non-spore-forming food-borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, Clostridium botulinum and Clostridium and Clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers.

Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and even temperatures higher than 80°C (176°F).

The risk of infoxication is prevented by controlling the growth of toxin producing bacteria. These include. Clostridium botutinum Bacillus cereus, and Staphylococcus aureus.

Major biological hazards →

- Bacteria ex: Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter injuni, Yersinia enthracis, Blisteria monocytogences, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Vibrio vulnificus, Vibrio parahaemolyticus.
- Virus ex: hepatitis A Virus, Norwalk Viruses, Ratavirus.
- parasites ex: Toxoplasma gondii Cryptosporidia, Giardia spp., Trichinella spiralis,

Taenia Salium, Anisakis Spp.

Sources →

The major sources of biological contaminats in food are;

- animal guts: Faecal contamination.
- Soil and water contaminated by non-treated manure.
- Cross contamination:

- human contamination due to poor personal hygiene, faecal contamination, Failure in infection control (illness not reported)

- Cross-contamination due to poor products spread from processing environment due to poor/improper Sanitation.

Factors affecting the growth of microorganisms in foods

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can

grow at higher temperatures (45°C or 113°F).

- The pH of product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in pH range between 5 and 9.

- The Water Activity (a_w) refers to the water available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

a_w of Product	Bacterial Spoilage	Examples
> 0.90	Spoils easily	fresh vegetables, fresh meat. Processed meat, milk, fish
0.78-0.90	Susceptible to Spoilage	dry cheeses, flour, cakes, beans, cereals.
< 0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods.

Each of these factors is important for the control of microbial growth. It is the intera-

-ction among these factors that determines the growth or control of microorganisms.

Control and prevention

The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing Practices (GMPs) and Hazard Analysis and Critical Control point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

- effective thermal processing used as a kill step ex: cooking, pasteurization)
- use of appropriate process controls:
  - Storage temperatures (ex:- cooler, freezer)
  - Processing parameters (ex: temperature and time for cooking, water activity during de-hydration)
  - adequate cooling system
- effective cleaning and sanitizing procedures (ex: SSOPs)
- use of food technologies to prevent the growth of bacteria or other biological hazards:

- Packaging technologies. (ex: use of vacuum packaging, modified atmosphere packaging)
  - —— Preservatives.
  - —— Processing techinques (ex: dehydration)

Government General Degree college Tehatta

Project - ENVS

Name - Sandipa Biswas

Department - political Seience hons

Season - 2022 - 2023

Sem - 1st Sem

Roll -

Date - 01/03/2023

(11)

By 09/03/2023

* Biological Hazards Risk Assessment :-

Biological hazards are a major source of risk that may result in emergencies and disasters. They cause significant loss of life, affect many thousands of people have the potential for major economic losses through loss of livestock and crops and may also cause damage and loss to the natural may also cause damage and loss to the natural heritage, including to endangered fauna and flora.

The management of risks due to biological hazards is a national and community priority. It has been recognized as part of the Sendai framework and is globaly addressed under The International Health Regulations (I.H.R).

Biological hazards - what are they?

Biological hazards are of organic origin of conveyed by biological vectors, including pathogenic microorganisms, toxins and bioactive substances, as well as venomous wildlife and insects poisonous plants, and mosquitoes carring desease-causing agents [1]. These hazards are usually the result of a natural occurrence but can also result from deliberate or accidental release.

Biological hazards also pose a risk to animals including livestock, and to plants. However we are focusing here on human health. The consequences of a biological hazardous event may include Severe economic and environmental losses. Some examples of recent large out outbreaks[2], epidemics[3] or pandamics[4] due to biological hazards either on their own following a disaster are:

* The Ebola virus decease outbreak in west Africa in 2013-2016, the largest epidemic of its kind to date in the populations of Guinea, Liberia and Serra Leone.

* The ongoing outbreak of zika virus infection in the Americas and the pacific region, associated with congenital and other neurological disorders.

* Significant increase in diarrheal disease incidences following recurrent floods in most African countries or Significant increase following the 2004 tsunami in Indonesia and Thailand [2].

* outbreaks of yellow fever in Angola, the democratic Republic of congo and uganda in 2016.

* outbreakes of Middle East Respiratory syndrome coronavirus (MERS CoV) an emerging disease identified in 2012.

Assessing the risk of biological hazards can be challenging owning to their unique characteristics

* Agent diversity: Biological hazards range from microorganisms such as bacteria or viruses to toxins to insect infestations. They can be transmitted to humans from the environment from animals, from plants and from other humans.

* Routes of transmission: These include airborne transmission, ingestion, absorption (through the skin, eyes, mucous membranes, wounds) animal vectors (e.g mosquitoes or ticks) and bodily fluids (e.d blood, mother-to-child transmission, sexual transmission).

* pathogenicity and virulence: Some biological hazards can cause serene disease in extremely low concentrations and can multiply quickly once within its host. For example, 1-10 aerosolized organisms of Lassa virus or Ebola are sufficient to cause Sorou disease in humans.

* Hazard Identification: As microbes are not visible to the nacked eye, they are often not easy to identify on the basis of epidemilogical information derived from clinical Signs and Symptoms. They therefore require Specific diagnosis techniques, including polymerase chain reaction (PCR) to amplify a Single copy or a few copies of a peace of DNA, microbial cultures, whole genome Sequencing.

* Endemic diseases with potential for epidemic transmission: Unlike Some other hazards (e.g earthquakes or floods), biological hazards can be present in the community (i.e they are endemic) and usually pose low risk when the population is largely immune. The risk may change when crises or emergenicies arise exacerbating the conditions favourable for disease transmission of the disease resulting in cases in excess in normal expectency. Biological hazards which are not endemic also pose a risk when they are introduced to a new host community with no immunity.

* Sensitive to climate, enviornmental or land use changes: Biological hazards particularly zoonosses and rector-transmitted disease Such as malaria, dengue, zika and

Ebola - may increase in incidence, lethality or change geography distribution or Seasonal pattern directly due to climate and wheather sensitivity, environmental or land use changes or mediated through changes in ecosystems resulting from human activities thus changing human exposures and susptibility to these hazards. An estimated 75 Percent on emerging infections disease of humans that have evolved from exposure to zoonotic pathogens [3] warrant risk accessments for health threats at the interface between animal human and ecosystems.

Assessing the risk of biological hazards

Approaches in accessing the risks of biological hazards differ according to the purpose of the assessments:

* Strategic Risk Assessment is used for risk management planning with a focus on prevention and preparedness measures, capacity developement and medium to longer term risk monitoring and revolution.
* Rapid Risk Assessment is used to determine the level of risk associated with detected events and to define responce interventions accordingly.

post event Assessment is used for recovery planning, updating and Strengthing the overall risk management System.

Pre-event: Strategic Risk Assessments

Strategic Risk Assessments are used for risk management planning with a focus on prevention and preparedness and capacity developement before events occured. They can be used for medium-to longer-term risk monitoring and evalution, which trackes changes in risk over time. They catalyse targeted action to reduce the level of risk and consequences for health based on assessment of the hazard exposure, vulnerabilities and capacities.

In relation to addressing the risk of biological hazards, the term vulnerability refers to the risk factors that exist in exposed populations. Such as the burden of endemic desease, living conditions (e.g. overcrowding) and environment (e.g favourable environment for the growing of the pathogen) This is in addition to factors that are addressed in risk assessments for other hazards, Such as demographics (e.g age or gender) the availability of health Services to those populations and the degree of resilience of the health Systems.

GOVERNMENT GENERAL DEGREE COLLEGE TEHATTA

ASSIGNMENT

09/03/2023

SESSION :- 2022 - 2023

NAME :- SANHITA BISWAS

SUBJECT:- ENVIRONMENTAL STUDIES

TOPIC:- BIOLOGICAL HAZARDS

PAGE NO.
DATE

Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food processing because they cause most food borne illness outbreaks.

Risk :-

These organisms can affect human health, including infection, intoxication occurs and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products ~~between~~ because.

Teacher's Signature.....

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DATE

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For example, steam cooking Significantly reduces non-spore ~~Examples of Spore~~ - forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, clostridium botulinum and clostridium perfringens.

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The risk of intoxication is prevented by Controlling the growth of toxin producing bacteria. These include: clostridium botulinum, Bacillus cereus, and staphylococcus aureus.

Major biological hazards :-

- Bacteria : Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis Bacillus cereus, staphlococcus aureus, clostridium botulinum, clostridium perfringens, Vibrio vulnificus, Vibrio parahaemolyticus
- Virus : hepatitis A virus, Norwalk viruses Rotavirus
- parasites : Toxoplasma gondii, Cryptosporidia, Giardia spp, Trichinella spiralis, Trichinella spiralis, Taenia solium, Anisakis spp.

EXCELLENT QUALITY

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DATE

Sources :-

The major sources of biological contaminants in food are :-

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- Soil and water contaminated by non-treated manure
- Cross Contamination :
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  - stronge temparatures (ex: ~~temp~~ cooler, freezer)
  - processing parameters (ex: temperature and time for cooking, water activity during dehydration)
  - adequate cooling system
- Effective cleaning and sanitizing procedures (ex: SSOPs).

Teacher's Signature.....

GOVERNMENT GENERAL DEGREE COLLEGE, TEHATTA

- NAME : SANTANU SARNAKAR
- SEMESTER: 1st . BA GENERAL
- STUDENT ID: 1570140
- FATHER. NAME : CHITTA RANJAN SARNAKAR
- Year of SUBMISSion Of The project -> 2023
- NAME OF project: -> BIOlogICAL HAZARDS
- NAME OF THE SUBJect :

(11)

10/03/2023

Signature of Teacher

ভূমিকা -> একটি জৈবিক বিপদ বা জৈব - হ্যাজার্ড একটি জৈবিক পদার্থ বা জীবিত প্রাণীর স্বাস্থ্যের জন্য ঝুঁকি সৃষ্টি করে, প্রাথমিক ভাবে মানুষের। এটি একটি অনুঘটক, ভাইরাস বা ব্যাকটেরিয়ার একটি নমুনা অন্তর্ভুক্ত করতে পারে যা মানুষের স্বাস্থ্যের প্রতি বিরূপ প্রভাব ফেলতে পারে। একটি বায়োহ্যাজার্ড তাদের জীবন্ত প্রাণীর জন্য ক্ষতিকারক পদার্থও হতে পারে এই শব্দটি এবং এর সাথে সম্পর্কিত প্রতিকৃতি সাধারণত একটি সতর্কতা হিসাবে ব্যবহৃত হয়: যাতে সম্ভাব্যভাবে যারা পদার্থের সংস্পর্শে আসে তারা সতর্কতা অবলম্বন করতে জানে। বায়োহ্যাজার্ড প্রতিকৃতি 1966 সালে চার্লস বালুউইন দ্বারা তৈরী করা হয়েছিল একজন পরিবেশগত - স্বাস্থ্য প্রকৌশলী তাও কেমিক্যাল কোম্পানির জন্য কন্টেইনার গুলিতে কাজ করছেন।

ভাইরাল নমুনা এবং ব্যবহৃত হাইপোডার্মিক সুঁচ সহ একটি উল্লেখযোগ্য স্বাস্থ্য ঝুঁকি বহন করে এমন জৈবিক পদার্থের লেবেলিংয়ে এটি ব্যবহার করা হয়। ইউনি কোডে, বায়োহ্যাজার্ডের প্রতীক হল U + 2623 (☣)।

জৈবিক বিপদ প্রতীক নকশা :

* DANGER চিহ্ন, লেবেল বা অনুচ্ছেদের সাথে একত্রিত হলে সাদা বা সাদা রঙের পটভূমিতে একটি কালো বায়োহাজার্ড চিহ্নের পিছনে একটি লাল ব্যবহার করা হয়

* কালো বা সাদা রঙের পটভূমিতে একটি কমলা ও একটি কালো বায়োহাজার্ড চিহ্নের পিছনে ব্যবহৃত হয় যখন একটি সতর্কতা চিহ্ন, লেবেল বা অনুচ্ছেদের সাথে একত্রিত করা হয়.

* একটি নোটিস চিহ্ন, লেবেল বা অনুচ্ছেদের সাথে একত্রিত হলে সাদা বা সাদা রঙের পটভূমিতে একটি কালো বায়োহাজার্ড চিহ্নের পিছনে একটি সবুজ ব্যবহার করা হয়.

* DANGER একটি জৈব বিপদ সনাক্ত করতে ব্যবহৃত হয় যা মৃত্যুর কারন হবে। সর্তকতা ব্যবহার করা হয় একটি জৈব বিপদ সনাক্ত করতে যা মৃত্যুর কারন হতে পারে। সতর্কতা একটি জৈব বিপদ সনাক্ত করতে ব্যবহৃত হয় যা আঘাতের কারন হবে কিন্তু মৃত্যু নয়. NOTICE একটি নন-ইনজুরি বায়োহাজার্ড বার্তা সনাক্ত করতে ব্যবহৃত হয় (যেমন স্বাস্থ্যবিধি, পরিচ্ছন্নতা বা সাধারন লাব পলিসি)

শ্রেনিবিন্যাস →

* জৈব বিপজ্জনক বর্জ্য পরিবহনের জন্য জাতিসংঘের নম্বর দ্বারা শ্রেনীবদ্ধ করা হয় :

- ক্যাটাগরি A, UN 2814 - সংক্রামক পদার্থ, মানুষকে প্রভাবিত করে : একটি সংক্রামক পদার্থ যা স্থায়ী অক্ষমতা বা জীবন হুমকি বা মারাত্মক রোগ সৃষ্টি করতে সক্ষম অন্যথায় সুস্থ মানুষ বা প্রাণীর সংস্পর্শে এলে।

- ক্যাটাগরি B UN 3373 - ডায়াগনস্টিক বা অনুসন্ধান মূলক উদ্দেশ্য পরিবহন করা জৈবিক পদার্থ

- নিয়ন্ত্রিত মেডিকেল বর্জ্য, UN 3291 - একটি প্রাণী বা মানুষের চিকিৎসা থেকে প্রাপ্ত বর্জ্য বা পুনর্ব্যবহার যোগ্য উপাদান.

*** বায়োহ্যাজার্ডের মাত্রা → যুক্তরাষ্ট্রে ডিজিজ কন্ট্রোল এন্ড প্রিভেনশন (CDC) বিভিন্ন রোগকে বায়োহ্যাজার্ডের স্তরে শ্রেনীবদ্ধ করে * লেভেল 1 সর্বনিম্ন ঝুঁকি এবং লেভেল 4 চরম ঝুঁকি

- বায়োহ্যাজার্ড লেভেল [1]: ব্যাকটেরিয়া এবং ভাইরাস যা বাসিলাস সাবটিলিস, হেপাটাইটিস, ভেরিসেলা (চিকেনপক্স) এই স্তরে থাকা জৈব বিপজ্জনক উপাদান গুলির বিরুদ্ধে সতর্কতা ন্যূনতম, এবং স্বাস্থ্যের সুরক্ষা কিছু ধরনের জন্য।

- বায়োহ্যাজার্ড লেভেল [2]: ব্যাকটেরিয়া এবং ভাইরাস যা মানুষের জন্য মাঝারি মৃদু রোগ সৃষ্টি করে.

→ → →

যেমন - হেপাটাইটিস A, B, এবং C, কিছু ইনফ্লুয়েঞ্জা A স্ট্রেন, হিউম্যান রেসপিরেটরি সিনসিটিয়াল ভাইরাস, লাইম রোগ, সালমোনেলা, মাম্পস, হাম, স্ক্রাপি, ডেঙ্গু জ্বর এবং এইচ আইভি। ক্লিনিকাল নমুনা গুলির সঙ্গে রুটিন ডায়াগনস্টিক কাজ বায়োসেফটি লেভেল 2-এ বায়োসেফটি লেভেল 2 অনুশীলন এবং পদ্ধতি ব্যবহার করে নিরাপদে করা যেতে পারে। ~~সবেষনা ক~~

■ বায়োহাজার্ড লেভেল $\boxed{3}$: ব্যাকটেরিয়া এবং ভাইরাস যা মানুষের মধ্যে মারাত্মক থেকে মারাত্মক রোগের কারন হতে পারে, কিন্তু যেগুলির জন্য ভ্যাকসিন বা অন্যান্য চিকিৎসা বিদ্যমান, যেমন অ্যানথ্রাক্স, ওয়েস্ট নাইল ভাইরাস, ভেনিজুয়েনাল ইকুইন এনসেফালাইটিস, SARS করোনা ভাইরাস, MERS করোনা ভাইরাস, SARS - COV-2, ইনফ্লুয়েঞ্জা A H5N1 হান্টার ভাইরাস, যক্ষ্মা, টাইফাস, রিফ্ট ভ্যালি জ্বর, রকি মাউন্টেন স্পট জ্বর, হলুদ জ্বর এবং ম্যালেরিয়া।

■ বায়োহাজার্ড লেভেল $\boxed{4}$: ভাইরাস যা মানুষের মধ্যে মারাত্মক রোগ সৃষ্টি করে এবং সেগুলির জন্য কোনো ভ্যাকসিন বা চিকিৎসা পাওয়া যায় না, যেমন বলিভিয়ান হেমোরেজিক ফিভার, মারবার্গ ভাইরাস, ইবোলা ভাইরাস, লাসা ফিভার ভাইরাস, ক্রিমিয়ান-কঙ্গো হেমোরেজিক ফিভার এবং হেমোরেজিক রোগ, সেইসাথে নিপাহ ভাইরাস →

ভেরিওলা ভাইরাস (গুটিবসন্ত) একটি এজেন্ট যার সাথে একটি টিকা থাকা সত্ত্বেও BSL -4 এ কাজ করা হয়, কারন এটি নির্মুল হয়েছে। এই ধরনে জৈবিক বিপদ মোকাবিলা করার সময় পৃথক বায়ু সরবরাহের সাথে একটি ইতিবাচক চাপের কমিডের সুট ব্যবহার বাধ্যতামূলক।

* তথ্যসূত্র : 1) বাংলাদেশে প্রতীক ইতিহাস। 13 ফেব্রুয়ারি, 2012 তারিখে মূল থেকে আর্কাইভ করা হয়েছে।

2) লাবরেটরি এবং প্রযুক্তি গত সুবিধাগুলিতে জৈব বিপজ্জনক বর্জ্য দূষণ মুক্ত করন, ব্যবস্থাপনা, এবং গুনমান নিয়ন্ত্রন সম্পর্কিত ইউ এস এ নিতি ও পদ্ধতি। ✓ USDA মার্চ 5, 2017 এ মূল থেকে আর্কাইভ করা হয়েছে। 17 ডিসেম্বর, 2016 পুনরুদ্ধার করা হয়েছে।

* প্রকল্প রূপায়নের সীমাবদ্ধতা → প্রকল্পটি তৈরির সময় আমি কিছু সীমাবদ্ধতা উপলব্ধি করেছি। যেমন মহা বিদ্যালয়ে অনান্য বিষয়ের পড়ালেখায় অত্যধিক সময় যায়। ফলে উক্ত প্রকল্পের কাজটি করার যথেষ্ট সময় পায়নি। "BIOLOGICAL HAZARDS" শব্দটি বলাটা সার্থক ছিল সে বিষয়ে পর্যাপ্ত তথ্য পেলেনি।

* উপকরন → প্রকল্পটি বাস্তবায়িত করতে গিয়ে আমি যে সমস্ত উপকরন ব্যবহার করেছি সেগুলি- A4 পেপার, কলম, স্কেল, পেনসিল ইত্যাদি।

* তথ্যসূত্র → সহপাঠী বন্ধুদের ও শিক্ষক / শিক্ষিকার সাক্ষাৎকারের ভিত্তিতে প্রাপ্ত প্রশ্নমালার উত্তর সমূহ এবং পর্যবেক্ষন।

* কৃতজ্ঞতা স্বীকার →

আমি সব প্রথম কৃতজ্ঞতা জানাচ্ছি আমাদের বিদ্যালয়ের মাননীয় শিক্ষক / মাননীয়া শিক্ষিকার প্রতি। তাঁর আন্তরিক সহযোগিতা ছাড়া এ কাজটি শেষ করে আমার পক্ষে এই প্রতিবেদন লেখা সহজতর হতো না। আমি কৃতজ্ঞতা জানাই সেই সব পরিবারদের যারা তাদের সময় ব্যয় করে সাক্ষাৎকার দিয়েছেন। সেই সঙ্গে কৃতজ্ঞতা জানাই প্রধান শিক্ষক ও শিক্ষিকা সহ অন্যান্য সকল শিক্ষক / শিক্ষিকাদের যারা প্রত্যক্ষ ও পরোক্ষ ভাবে আমাকে প্রকল্প রূপায়নের ক্ষেত্রে সহায়তা করিয়েছেন। আমার সহপাঠীরা যারা প্রকল্প রূপায়নের কাজে কোনো না কোনোভাবে সাহায্য করেছে তাদেরও ধন্যবাদ জানাই।

SANTANU SARNAKAR

ছাত্র/ ছাত্রীর স্বাক্ষর

শিক্ষক / শিক্ষিকার স্বাক্ষর

NAME- SAPTARSHI SAHA

SUB- 1st Sem-Env

DEPARTMENT- PHILOOSOPHY HONS

SEM-1st SEM

ROLL NO-

DATE- 10/03/2023

(11)

10/03/2023

Biological Hazards

Biological Hazards are organisms, or substances Produced by organisms, that pose a threat to human health. They are major concern in food processing because they cause most food borne illness outbreaks.

Risk

These organisms can affect human health, including infection; intoxication and even death. Infection occurs when organisms

invade the host and multiply in the body. Intoxication occurs when bacteria Produce toxins that affect the body.

Infection can be prevented by properly Processing and handling food products because Pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For Example, steam cooking significantly reduces non-spore-forming food borne Pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, clostridium botulinum and clostridium Perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. they survive normal cooking temperatures and even temperatures and even temperatures higher than 80°c(176°F).

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include: Clostridium botulinum, Bacillus cereus, and staphylococcus aureus.

Major biological hazards

- Bacteria ex: Salmonella spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, staphlococcus aureus, clostridium, clostridium perfringens, vibrio vulnificus, vibrio parahaemolyticus,
- Virus ex: hepatitis A virus, Norwalk viruses, Rotavirus.
- Parasites ex: Toxoplasma gondii, cryptosporidia Giardia spp., Trichinella spiralis, Taenia solium, Anisakis spp.

Sources

The major sources of biological contaminants in food are

- animal guts: faecal contamination
- soil and water contaminated by non-treated
- ~~cross guts~~ :

- cross contamination:

- human contamination due to personal hygiene faecal contamination, failure in infection control (illness not reported)

- cross-contamination of food products spredd from processing environment due to poor / im proper sanitation

Factors affecting the growth of microorganisms in foods

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F).
- The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.
- The water Activity (a_w) refers to the water available in the product. The more water available, the better bacteria will grow. Table I shows the impact of water activity on bacterial spoilage.

aw of Product	Bacterial spoilage	Examples
> 0.90	Spoils easily	fresh vegetables fresh meat Processed meat, milk, fish
0.78-0.90	Susceptible to spoilage	dry cheeses, flour, cakes, beans, cereals
< 0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of micro-organisms.

control and prevention

The most effective way to control biological hazards is by prevention. The implementation of good-Manufacturing Practices (GMP) and Hazard Analysis and critical Point (HACCP) will help prevent biological hazard in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, Packaging and storage.

Processing strategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking pasteurization)

- use of appropriate process controls:
  - storage temperatures (ex: coolen, freeze)
  - processing parametens (ex: tempenatune a time for cooking, water activity during dehydration)
  - adequate cooling system

- effective cleaning and sanitizing procedures (ex: SSOPs)

use of food technologies to prevent the growth of bacteria or other biological hazards:

- Packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)
- preservatives
- processing techniques (ex: dehydration)

GOVERNMENT GENERAL DEGREE COLLAGE AT TEHATTA

NAME — Sathi Mallick

SUb – ENVS

Sem – 1st (History Honours)

Roll – [redacted] 11

TOpic – Biological Hazards

(12)

Sy 09/03/2023

Food Safety program,
for Processors and Distributors

Biological Hazards :—

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Risk

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Sources

The major sources of biological contaminants in food are:

- animal guts: faecal contamination.
- Soil and water contaminated by non-treated manure.
- Cross Contamination:
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  - processing parameters (ex: temperature and time for cooking, water activity during dehydration).
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- effective cleaning and sanitizing procedures (ex: SSOPs).
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TEHATTA GOVERNMENT COLLEGE



TEHATTA * NADIA

UNIVERSITY OF KALYANI

BA HONS 1st SEMESTER EXAMINATION - 2022-2023

B.A HONS
1st SEMESTER
DIPARTMENT – HISTORY HONS
SUB : ENVIRONMRNTL STUDIES

NAME - SATHI MANDAL

College Roll No - 16

(12)

SESSION : 2022-2023

09/03/2023

Biological Hazards

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□ RISK →

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GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

processing strategies to control biological hazards:

- effective thermal processing used as a kill step (ex: cooking, pasteurization)
- use of appropriate process controls:
  - storage temperatures (ex: cooler, freezer)
  - processing parameters (ex: temperature and time for cooking, water activity during dehydration)
  - adequate cooling system
- effective cleaning and sanitizing procedures (ex: SSOPs)
- use of food technologies to prevent the growth of bacteria of other biogical hazards:
  - packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)
  - preservatives
  - processing techniques (ex: dehydration)

UNIVERSITY OF KALYANI

TEHATTA GOVERNMENT COLLEGE



TEHATTA, NADIA

BIOLOGICAL HAZARDS

(12)

SUB : ENVS

09/03/2023

Submitted By : SAYAN DAS

B.A Pol. Sc. Hons 1st Semester Exam,2023

Registration No. :

Session : 2022-23

□ Introduction: A biological hazard, an bio-hazard is a biological substance that poses a threat to the health of living organisms, primarily human. This could include a simple of a ~~ma~~micro-organism river or toxin that can adversely affect human helth.. A bioharazard could also be a substance harmful to other living beings.

The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by Charles Baldwin, an environmental-health engineen working for the Dow Chemical company on the containment products.

It is used in the labeling of biological materials that carry a significant health risk including viral samples and used hypodermic needles.

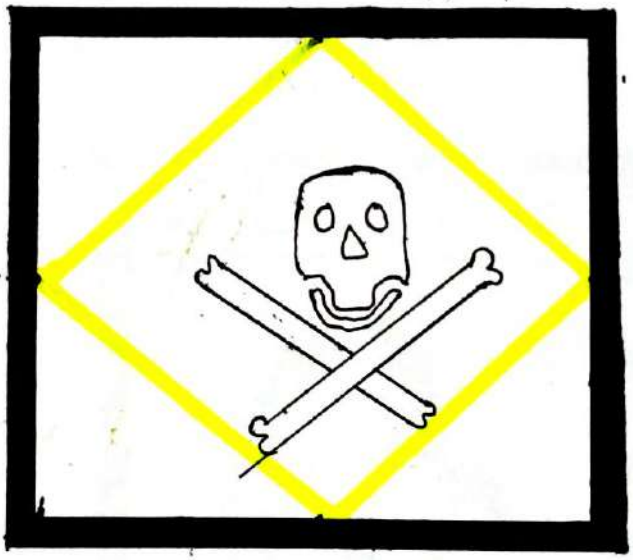
*ANSI Z535/OSHA/ISO regulation :-

Biohazardous safty issues are identified with specified labels, signs and paragraphs established by the American National Standards Institute (ANSI). Today, ANSI Z535 Standards

Tor biohazards are sued world wide and should always be used appropriately within ANSI Z535 Haradibbus communiation (Hazcom) Signage, labeling and pragraphs. The goal is to help workers rapidly identify the severity of a biohazard form a distance and through cabur are design standardization.

Biological hazard's symbol design:-

* A red on white or whik coloured background is used behind a black biohazard ~~sy~~ symbol when integrated with a 'DANGER' sigh, label or paragreaph.



⊛ An orange on black on white. coloured background is used behing a black biohazard symbol when integrated with a 'WARNING' sign lable ool paragraph.



⊛ A yellow on black or white-coloured background is used behind a black biohazard symbol when integrated with a 'CAUTION' sign. label on pradgraph.



A green on white or white coloured background is used behind a back biohazard symbol when integrated with a 'NOTICE' sign table or paragraph.



'DANGER' is used to identify a biohazard that will cause death. 'WARNING' is used to identify a biohazard that may cause death. 'CAUTION' is used to identify a biohazard that will cause injury, but not death. 'NOTICE' is used to identify a non injury biohazard message.

OSHA requires the use of proper ANSI Hazard Hazcom where applicable in American workplaces, state and local governments also use these standards as codes and laws within their own jurisdictions. Proper use of ANSI Z535 Signs, labels and paragraphs are ~~will~~ written into many of OSHA's standards for Hazcom and crafted to integrate with ISO Symbol.

Referance ANSI Z535 for a complete description on how to use 'DANGER', 'WARNING', 'CAUTION', 'NOTIC', sings. lables, ~~prap~~ paragraphs.

□ UN/ISO Clasification:- Biohazards agents are classification for transportation by UN number.

⊛ Category A. UN 2814 - Infectious substance, affection human: An infectious substance in a form capable of causing permanent disability on life threatening or fatal dissease in other wise health human or animals when exposure to it occurs.

⊛ Category A. UN 2900 - Infectious substance affecting animals (only): An infections substance that is not a form generally capable of causing permanent disabitaty or life theratening or fatal disease in otherwish health human and exposure to themselves occurs.

⊛ Category B, UN 3373 - Biological sbutance transported for ~~dis~~ diagnostic or investigative purposes.

* Regulated medical Waste. UN3291- Waste or reusable meterial, derived from medical treatment of an animal, or human or from biomedical research, which includes the production and testing.

□ Biosefty Level:- The United states centers for Disease various diseases in levels of biohazard, level, 1 being ~~min~~ minimum risk and Level 4 being extreme risk. Labaratories and other facilities are categorized as BSL 1-4 or as P1 through P4 for short (Pathgen or Protection Level).

* Bichazard level 1:- Bacteria and riverses including Bacillus Subtilis, canine hepatetis (Chickenpox), as well as some call cultceres and non-infectious bacteria. At this level precautions against and minimal. most likely invaling gloves and some sort of facial protiction.

* Biohazard level-2 :- Bacteria and viruses that cases only mild disease to humans or are difficult to contract via aerasal in a lab setting. Such as hepatilies A, B, C some influenza A stains, Hcoman respiratory syneytial virus, Lyme disease, Salmonella, mumps measles, Scrapie, dengue fever and HIV. Routine diagonstic work with clinical specimens can be

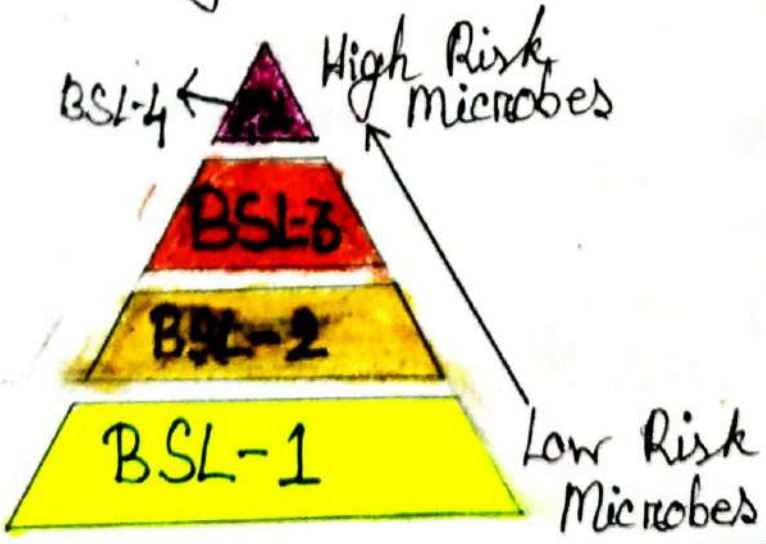
done safely at Biosafety level 2, using Biosafety level-2 practices and procedures. Research work can be done in a BSL-2 (P2), facility using BSL-3 practics and Procedures.

❀ Biohazard level-3 :- Becteria and virwese that can cause severe to fatel disease in humans but for which vaccines or other treatments exist, such, as anthrax, west Nile virus, venezuelan equine encephalitis, SARS Coronavirus, MERS Coronavirus, Tuberculosis, typhus, Rift valley fever, Rocky Mountain spotted fever, yellow fever and malaria.

❀ Biohazard level 4 :- Viruses that cause severs to fatal disease in human, and for which vaccines or other treatments are not available, such as Bolivian hemorrhagic fever, marburg virus, Ebolavirus, Lassa fever virus, Crimean-congo hemorrhagic fever and other hemorrhagic, disease. as well as Nipah virus, variola virus (smallpox) is an agent that is worked with at BSL-4 despite the existence and thus the general as it has been, eradicated and thus the general. Population is no longer routinely vaccination.

When dealing with Biological hazards at this level, the use of a positive pressure personal suit with a sepregated air supply is mandatory. The entrance multiple shows a vaccum room, an ultraviole light room, autonomous delection system at and other safety precaution designed to destroy all traces of the biohazard multiple. air locks are employed and are electronically seemeed to prevent doors form both opening at the same time. All air and water service going to and coming from a Biosafety level-4 (P4) lab will sondergo similar be contamination procedures to elminate the possibility of an accidental release currently there are no bacteria-classified at this level.

□ Biohazard Safety Levels,



⊛ Anthropogenic hazard - Hazard caused by human acting or inaction.

⊛ Biocontainment - Physical containment of pathogenic organisms or agents in microbiology (laboratories).

⊛ Biological agent - Pathogen that can be weaponized.

⊛ Biosafety level - Level of the biocontainment precautions required to isolate dangerous biological agents

* Chemical hazard - Non-biological substance that the potentional to cause harm to life or health.

* Hazard - Situation or object that can cauge damage or harm.

* Interplanetary contamination - Biological contamination of a planetary body by a spece probe or speceeratt.

□ List of Laboratory biosecurity incidents :-

* Mechanical Hazard - Hazard with a mechanical energy source.

* Occupationed Hazard :- Hazard exprienced in the workplace.

* Physical Hazard - Hazard due to a physical agent.

* Planetary protection - Cuiding principle of a space & mission.

* Phychosical hazard - Occupational hazard to one's phychological well being.

* Public health - Promoting health through organized efforts and informed choices of society and individuals.

TEHATTA GOVERNMENT COLLEGE

BIOLOGICAL HAZADRS

NAME :- Shreya Mandal

SUB :- ENVS

DEPARTMENT :- Political science hons

SEASON :- 2022-23

SEM :- 1st sem

ROLL NO. :-

DATE :- 01/03/2023

(12)

By 09/03/2023

Biological Hazards

Biological hazards are a major source of risk that may result in emergencies and disasters. They cause significant loss of life, affect many thousands of People, have the potential for mayor economic losses through loss of livestock and crops, and may also cause damage and loss to the natural heritage, including to endangered fauna and flora.

The management of risks due to biological hazards is a national and community priority. It has been recognized as Part of the Sendai framwork, and globally addressed under the International Health Regulations (IHR).

Biological hazards – What are they?

Biological hazards are of organic origin or conveyed by biological vectors, including Pathogenic, microorganisms, toxins and bioactive substances. Examples are bacteria, viruses or Parasites, as well as venomous wildlife and insects, Poisonous Plants, and mosquitoes carrying disease-causing agents [1]. These hazards are usually the result of a natural occurrence, but can also result from deliberate to accidental release.

Biological hazards also Pose a risk to animals, including livestoke, and to Plants. Howevere, we are focusing here on human health. The consequences of a biological hazardous event may include severe economic and environmental losses. Some example

of recent large outbreaks, epidemics, Pandemics due to biological hazards. either on three own of following a disaster are:

- The Ebola virus Disease outbreak in West Africa in 2013-2016, the largest epidemic of its kind to date in the Populations of Guinea, Liberia, and Sierra Leone.
- The ongoing outbreak of zika virus infection in the Americas and the Pacific region, associated with Congenital and others neurological disorders.
- Significant increase in diarrheal disease incidences following recurrent floods in most African countries or significant increase following the 2004 tsunami in Indonesia and Thailand.
- outbreaks of yellow fever in Angola, the Democratic Republic of Congo and Uganda in 2016.
- out breaks of covid-19 in the world. on 2020.

Assessing the risk of biological hazards can be challenging owing to their unite characteristics:

- Agent diversity.
- Routes of transmission.
- Pathogenicity and virulence.
- Hazard identification.
- Endemic disease with Potential for epidemic transmission.
- sensitivity to climate, environmental or land use changes.

Assessing the risk of biological hazards :-

Approaches in assessing the risks of biological hazards often according to the purpose of the assessment:

- Strategic Risk Assessment is used for risk management planning with a focus on prevention and preparedness measures, capacity development and medium-to longer-term risk monitoring and evaluation.
- Rapid Risk Assessment is used to determine the level of risk associated with detected events and to define response interventions accordingly.
- Post-event Assessment is used for recovery planning, updating and strengthening the overall risk managment system.

Pre-event : Strategic Risk Assessments :-

Strategic Risk Assessments are used for risk management planning with a focus on prevention and preparedness and capacity development before events occur. They can be used for medium to longer term risk monitoring and evaluation, which tracks changes in risk over time. They catalyse targeted assessment of the hazard, exposures, vulnerabilities and capacities.

Some examples of strategic risk assessment methods for biological hazard are outined below.

A quantitative microbiological risk assessment (QMRA) as a example stategic risk assessment for prevention

and mitigation of risks. The hazard identifications includes identifying the characteristics of the pathogen / microbial agent (i.e. case fatality ratios, transmission routes, incubation times...) and the human diseases associated with the specific microorganism. This information can be found in the literature and it could be also helpful to search for similar outbreaks as references.

Detection and response: Rapid Risk Assessment:-

When an event occurs, and in order to inform early warning and response measures, the level of risk posed by the event itself is assessed on a continuous basis through rapid risk assessment. The key parameters to take into account in the risk assessment of communicable diseases are the Probability (likelihood of transmission in the population) and the impact (severity of the disease), as well as the context in which the disease occurs.

It is important for the Public health team in charge of risk assessment to have the following available:

- A respository of events that occurred in the past.
- Evidence-based protocols and guidance ready to use for responding to incidents.
- Protocols for identifying sources of key information for rapid risk assessment.
- Strategies for rapid literature searches.
- Lists of experts who can be consulted.

Post-event or post-disaster assessments and after action reviews:-

As health needs might not be immediately, it is important to assess the risk of biological hazard after natural or human-induced disasters. Damage to health-care facilities and diagnostic and treatment equipment and interruption of services such as power cuts can have long-reaching consequences affecting the proper functioning of health facilities, including the preservation of the vaccine cold chain.

List of entities to consult for more guidance on health risk assessment:-

Departments of health at national, provincial and municipality levels.

- Health emergency management sections
- Civil protection agencies
- Food safety agencies
- water and sanitations
- Vector control agencies
- civil society organizations working on health: including NGOs, associations of doctors, nurse, Public health professionals and foundations on health
- International and regional organizations working on health, such as WHO and ECDC.


BIO HAZARDS

TEHATTA GOVERNMENT COLLEGE



TEHATTA * NADIA

UNIVERSITY OF KALYANI

BA HONS 1st SEMESTER EXAMINATION - 2022-2023

B.A HONS
1st SEMESTER
DIPARTMENT – HISTORY HONS
SUB : ENVIRONMRNTL STUDIES
(BIOLOGICAL HAZARD)

NAME - SNEHA HALDER

College Roll No - 21 (12)

SESSION : 2022-2023

09/03/2023

Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

□ Sources → The major sources of biological contaminants in food are:

- animal guts: foecal contamination.
- soil and water contaminated by non-treated manure.
- cross contamination:

— human contamination due to poor personal hygiene, faecal contamination, failure in infection control (illness not reported)

— cross-contamination of food products spread from processing environment due to poor/improper sanitation.

□ Risk →

These organisms can affect human health, including infection, intoxication and even death. Infection accurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forspore forming bacteria include Bacillus cereus. clostridium botulinum and clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They

Survive normal cooking temperatures and even temperatures higher than 80°C (176°F).

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include: clostridium botulinum, Bacillus cereus, and staphylococcous aureus.

□ Major biological hazards →

- Bacteria : Salmonella spp. Enterohaemorrhagic Escherichia coli, campylobacter jejuni, Yerosinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus. Staphlococcus aureus, clostridium botulinum, clostridium perfroigens, vibrio vulnificus, vibrio paorahaemolyticus.
- virus → hepatitis A virus, Norwalk viruses Rotarirous.
- Parasites → Toxoplasma gondii, cryptosporidia, Giardia spp, Trichinella spiralis Taenia solium, Anisakis spp.

◻ Factors affecting the growth of microorganisms in foods ⟶

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F).
- The pH of a product is related to the acidity or alkanlinity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.
- The water Activity (a_w) refers to the water available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

a_w of product	Bacterial Spoilage	Examples
>0.90	Spoils easily	fresh vegetables fresh meat, processed meat, milk. fish
0.78-0.90	Susceptible to Spoilage	dry cheeses, flour. fruits, caramels, dehydrated foods. beans.

<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods.

Each of these factors is important is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of micro-organisms.

□ Control and prevention →

The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing Practices (GMPs) and Hazard Analysis and critical control Point (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be also ~~be~~present in ingredient's and packaging materials and also those that occur during food processing, Packaging and Storage.

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- effective thermal processing used as a kill step (ex: cooking, pasteurization)
- use of appropriate process controls:
  - storage temperatures (ex: cooler, freezer)
  - processing parameters (ex: temperature and time for cooking, water activity during dehydration)
  - adequate cooling system.
- effective cleaning and sanitizing procedures (ex: SSOPs)
- use of food technologies to prevent the growth of bacteria or other biological hazards:
  - packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)
  - preservatives
  - processing techniques (ex: dehydration)

GOVERNMENT GENERAL DEGREE COLLEGE TEHATTA

2023

Biological Hazards

Sub : ENVS

Name : SOMA MONDAL

Sem : 1st (BA HONOURS) BENGALI

Roll : 13

Student ID : 1570019

(13)

09/03/2023

Biological Hazards

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Risk

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Major biological hazards

- Bacteria ex: Salmonella spp, Enteraheamorrhagic Escherichia coli, Campylobacter jejuni, Yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botulinum, Clostridium perfringens, Vibrio vulnificus, Vibrio parahaemolyticus.

- Virus ex: hepatitis A virus, Norwalk viruses, Rotavirus

• Parasites ex : Taxaplasma gondii, Cryptasporidia, Giardia spp, Trichinella spinalis, Taenia solium, Anisakis spp.

Sources

The major sources of biological contaminats in food are :

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Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

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TEHATTA GOVERNMENT COLLEGE



TEHATTA : NADIA

UNIVERSITY OF KALYANI

BA HONRS 1ST SEMESTER EXAMINATION : 2022-2023

B.A. HONOURS

(12)

DEPARTMENT : HISTORY

09/03/2023

SUB : ENVS STUDIES

(BIOLOGICAL HAZARD)

NAME : SONALI HALDER

COLLEGE ROLL NO : 07

SESSION : 2022 - 2023

■ Biological Hazards : Biological hazards are organisms, or Substance produced by organisms that pose a threat to human health. They are major concern in food processing because they cause most food borne illness outbreaks.

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Major biological hazards :

- Bacteria : ex : Salmonella spp, Enterohaemorrhagic Escheriachia coli, Yersinia enterocolitica, Bacillus anthracis, Bacillus cereus, vibria vulnificus, vibrio parahaemolyticus.
- Virus : ex : hepatitis A virus, Norwalk viruses, Rotavirus.
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  - Storage temparature (Ex. cooler, freezers)
  - processing parameters (Ex. temparature

and time for cooking, water activity during dehydration)

- adequate cooking System.

• effective cleaning and Sanitizing procedures (Ex: SSOPs)

• use of food technological to prevent the growth of bacteria on others biological hazards:

- Packaging techniques (Ex: use vacum packaging modified atmosphere packaging)
- Preservation
- processing techniques (Ex: dehydration)

GOVERNMENT GENERAL DEGREE COLLEGE JEHATA

NAME :- SOUMI SAHA

SUB :- ENVS

TOPIC :- BIOLOGICAL HAZARDS

DEPARTMENT :- BENGALI HONOURS (SEM-1)

REG. NO :-

SESSION :- 2023

(12)

09/03/2023

বর্তমানে সংবাদপত্র, টেলিভিশন এবং বিভিন্ন মহলে Hazard ও Disaster সম্পর্কে প্রায়ই শোনা যায়। এই সম্পর্কে পরিবেশ বিজ্ঞানী, সমাজবিজ্ঞানী, ভূ-তত্ত্ববিদ এবং ভৌগোলিকেরা নানান সংজ্ঞা ও ব্যাখ্যা দিয়েছেন। তবে সবাই এক মত নন। পরিবেশ বিজ্ঞানীরা Hazard-কে Natural hazard বলতেই বেশি আগ্রহী আবার এই বিষয়ে ভূ-তত্ত্ববিদ ও ভৌগোলিকদের মধ্যে সামান্য মতভেদ রয়েছে। ভূ-তত্ত্ববিদরা Hazard আলোচনায় Natural Geological factors আর উপর ভৌগোলিকরা Anthropogenic factors-এর উপর বেশী গুরুত্ব আরোপ করেছেন।

প্রকৃত পক্ষে 'Hazard' এবং 'Disaster'-এর মধ্যে বিষয়গত প্রয়োগগত ব্যবধান রয়েছে। ভৌগোলিকেরা Hazard এর ব্যাখ্যা দিয়েছেন যে, এটি হল ভূমিরূপগত বা প্রাকৃতিক প্রক্রিয়া যার মধ্যে নানা প্রাকৃতিক ও ভূমিরূপগত উপাদান অন্তর্ভুক্ত এবং এটি প্রাকৃতিক ও মানুষ্যকৃত। তবে সাধারণত বলা যায় এটি সর্বোচ্চ প্রাকৃতিক ও মানবিক প্রক্রিয়া যার সাথে ক্ষয়ক্ষতি যুক্ত থাকে না। ভূমিরূপবিদ Prof. Savindra Singh Hazard এর সংজ্ঞা দিয়েছেন যে, 'Hazards are generally, taken to be the processes and the responses of extreme events, both natural and anthropogenic, which cause an accident/extreme events/or danger.

Prof. S.R Basu (2004) মতে 'Hazard' হল একটি ভূতাত্ত্বিক/ভূমিরূপগত পদ্ধতির আভ্যন্তরীণ বা বাহ্যিক প্রকাশ যার মধ্যে নানান প্রাকৃতিক উপাদান ও প্রক্রিয়া আঙ্গিকভাবে জড়িত। Hazard এর সাথে ব্যাপক ভাবে না হলেও অল্পবিস্তর ক্ষয়ক্ষতি যুক্ত থাকে, যদিও মানুষ্য জীবজীবনকে স্তম্ভ করতে পারে না। এটি একটি পরিস্থিতি বিশেষ তবে তা চূড়ান্ত ঘটনা (extreme events) নয়।

পরিশেষে বলা যায় দুর্যোগ (Hazard) প্রাকৃতিক, মানুষ্যসৃষ্ট বা উভয় কারণেই হতে পারে এবং যার মধ্যে ভূ-তাত্ত্বিক ভূমিরূপ গত এবং সাংস্কৃতিক উপাদানের অন্তর্ভুক্ত হয়। অল্প সময়ের জন্য হলেও মানুষের স্বাভাবিক জীবন যাত্রাকে বিঘ্নিত করে থাকে। নিম্নে Hazard এর কিছু স্বাভাবিক বৈশিষ্ট্য তুলে ধরা হল—

(১) এটি প্রাকৃতিক, ভূমিরূপগত, ভূতাত্ত্বিক এবং সাংস্কৃতিক উপাদানের সংযুক্ত ক্রিয়া।

(২) তা সাধারণত ক্ষুদ্র স্কেলে সংগঠিত হয়।

(৩) মানুষের স্বাভাবিক জীবনযাত্রাকে বাহ্যত না করলেও অল্প বিস্তর জীবনযাত্রার গতিকে রুদ্ধ করে দেয়।

(৪) ক্ষয়ক্ষতির প্রভাব ব্যাপক মাত্রায় না থাকলেও সামাজিক, প্রাকৃতিক, অর্থনৈতিক সম্পদের অল্প বিস্তর ক্ষতি হয়।

(৫) দুর্যোগ উপযুক্ত আধুনিক পরিকল্পনার মাধ্যমে নিয়ন্ত্রণ করা হয়।

বাংলাদেশের প্রেক্ষাপট :—

বাংলাদেশের মানুষের জীবনে ঝড়, ঘূর্ণিঝড় জলোচ্ছ্বাস, খরা, বন্যা, নদীভাঙন ইত্যাদি প্রাকৃতিক দুর্যোগ প্রায় প্রতিবছর নিয়মিত ঘটনা। ভৌগলিক দোষেই পৃথিবীর অন্যতম প্রাকৃতিক দুর্যোগপ্রবণ বাংলাদেশে এই সব দুর্যোগ মানব সম্পদসহ অবকাঠামোগত, অর্থনৈতিক ও প্রাকৃতিক সম্পদের বিপুল ক্ষতি সাধন করে। ভৌগোলিক অবস্থান এর প্রধান কারণ। নদীবিধৌত বাংলাদেশের উত্তরে হিমালয় পর্বতমালা, দক্ষিণে বঙ্গোপসাগর। এদেশের পলিমাটির কিছু পার্বত্য অঞ্চল ও বিস্তীর্ণ সমতলভূমি জুড়ে রয়েছে অসংখ্য স্বাভাবিক নদী। তাই হিমালয়ের বরফগলা পানিতে যেমন বন্যা সৃষ্টি হয়, তেমনি ভিন্নরূপ হতে হয় অতিবৃষ্টি। আমাদের দেশের অবস্থান উষ্ণমণ্ডলীয় অঞ্চলে এবং চীনের বঙ্গোপসাগরের সমুদ্রপৃষ্ঠের উষ্ণতা ২৭ ডিগ্রী সেলসিয়াস (২৭° সে.) থাকলে সমুদ্রে ঘূর্ণিঝড়ের সৃষ্টি হয়। আন্তর্জাতিকভাবে বৈশ্বিক উষ্ণতা বৃদ্ধি ও পরিবেশ বিপর্যয়ের কারণে এইরূপ ঘূর্ণিঝড় ধারণ করছে। অন্যদিকে নদীমাতৃক বাংলাদেশের প্রধান প্রধান নদী গুলোর উৎস পরত ও নেপাল। পার্শ্ববর্তী দেশের নদী শাসনের কারণে এদেশের বন্যা ও খরার মত দুর্যোগের সম্মুখীন হতে হয়। এছাড়া অতিবর্ষণে বন্যা ও নদীভাঙন প্রায় নিয়মিত ঘটনা। অর্থাৎ ভৌগোলিক অবস্থান, ভূমিরূপ, ভূমির গঠন, নদীমাতৃক নদীভাঙন, জলোচ্ছ্বাস ইত্যাদি দুর্যোগের সাথে বসবাস করাই আমাদের জীবনধারণ করতে হয়।

প্রাকৃতিক দুর্যোগ :-

প্রাকৃতিকভাবে সৃষ্ট আকস্মিক ও চরম পরিকূল পরিবেশ গত অবস্থাকে প্রাকৃতিক দুর্যোগ বলা হয়। বিশ্বের সর্বত্রই প্রাকৃতিক দুর্যোগ ও কোন দেশেই মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যহত, বিপর্যস্ত ও দুর্বিসহ করে তোলে। বিশ্বের সর্বত্রই প্রাকৃতিক দুর্যোগ কম-বেশি আঘাত হানে। প্রাকৃতিক তাণ্ডবের মুখমুখি দাঁড়িয়ে করণীয় প্রায় কিছুই থাকে না। তাই দুর্যোগ ব্যবস্থাপনা অত্যন্ত গুরুত্বপূর্ণ। দুর্যোগ ব্যবস্থাপনা বলতে বোঝায় এমন একটি সমন্বিত ব্যবস্থা যাতে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগ পরবর্তী সময়ে বিভিন্ন পরিকল্পনা, সংগঠন, সমন্বয়-নিয়ন্ত্রণ সহ যাবতীয় কার্যক্রম গ্রহণ ও বাস্তবায়নের মাধ্যমে দুর্যোগের ক্ষয়ক্ষতি হ্রাস করা যায়। আমাদের দেশের মানুষ বিশ্বের অনেক দেশের তুলনায় প্রাকৃতিক দুর্যোগ মোকাবেলা করে বেশি অভ্যস্ত। যেমন ঝড়, বন্যা, খরা, জলচ্ছ্বাস ইত্যাদি দুর্যোগ এ দেশের মানুষ চিরায়তভাবেই সংগ্রাম করে বেঁচে থাকার চেষ্টা করে। নিয়মতান্ত্রিক ও বৈজ্ঞানিকভাবে, শৃংখলার সাথে দুর্যোগ মোকাবেলা স্বাভাবিক ভাবেই অধিক কার্যকারী হয়। যেমন— বাংলাদেশের দক্ষিণাঞ্চলে সমুদ্র থাকায় সমুদ্র সৃষ্টি ঘূর্ণিঝড় জলচ্ছ্বাস বারবার দক্ষিণাঞ্চলে আঘাত হানে। এতে মানবসম্পদসহ বহু ক্ষয় ক্ষতি স্বাধিত হয়। এইসব ক্ষতি হ্রাস করতে ও বিপর্যয় কাটাতে প্রয়োজন সমন্বিত দুর্যোগ ব্যবস্থাপনা।

দুর্যোগ ব্যবস্থাপনার প্রধান উদ্দেশ্য :—

(ক) দুর্যোগকালীন মানবজীবন, গবাদি ও বন্যপ্রাণী এবং পরিবেশগত ক্ষতি হ্রাস করা।
(খ) ক্ষতিগ্রস্থ মানুষের কাছে অগ্রাধিকার ভিত্তিতে দ্রুত ক্রান সামগ্রী পৌঁছানো।
(গ) দুর্যোগ পরবর্তী উদ্ধার পুনর্গঠন পুনর্বাসন নিশ্চিত করা।

উপরোক্ত উদ্দেশ্য সমূহ বিবেচনায় দুর্যোগ ব্যবস্থাপনা কার্যক্রম পরিকল্পনা ও পরিচালনা করা হয়।

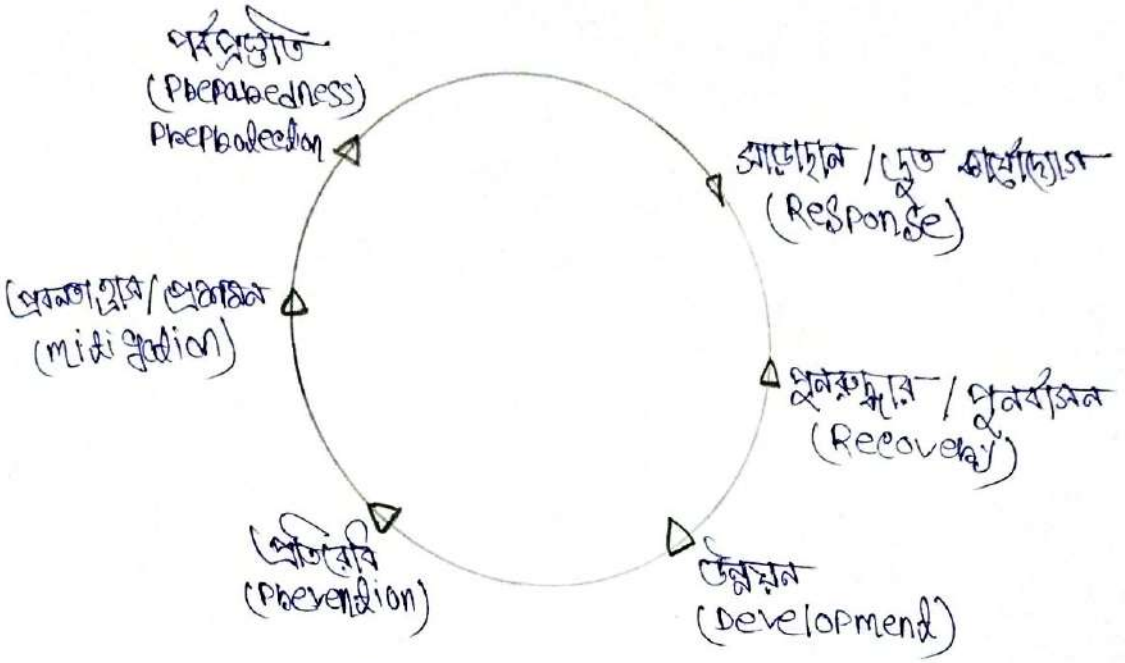
দুর্যোগ ব্যবস্থাপনা :—

আগেই বলা হয়েছে যে, দুর্যোগ ব্যবস্থাপনা হল একটি সমন্বিত দুর্যোগ মোকাবিলা ব্যবস্থাপনা। দুর্যোগ ব্যবস্থাপনাকে তিনটি স্তরের বা ধাপের ব্যবস্থাও বলা হতে পারে। যথা —

(১) দুর্যোগপূর্ব প্রস্তুতি
(২) দুর্যোগকালীন সতর্কতা
(৩) দুর্যোগ পরবর্তী পুনরুদ্ধার

দুর্যোগের ভয়াবহতা মোকাবেলার ক্ষয় ক্ষতি হ্রাসের লক্ষ্যে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগ পরবর্তী স্তরে গৃহিত পদক্ষেপ ও কার্যক্রমকেই এক কথায় দুর্যোগ ব্যবস্থাপনা বলা হয়।

দুর্যোগ ব্যবস্থাপনা কার্যক্রমের উপাদান সমূহ কী কী উপায়ে কাজ করে তা নীচে চিত্রের মাধ্যমে দেখানো হল—



চিত্র ১০.১ : দুর্যোগ ব্যবস্থাপনা চিক্র

দুর্যোগ ব্যবস্থাপনা কার্যক্রম সুষ্ঠুভাবে সম্পন্ন উদ্দেশ্যে সরকারি ভাবে জাতীয় স্থানীয় পর্যায়ে বিভিন্ন কমিটি গঠন করা হয়েছে। কমিটি গুলি প্রাকৃতিক দুর্যোগ সংক্রান্ত বিভিন্ন সাংগঠনিক কার্যক্রম সম্পন্ন করার সাথে সাথে দুর্যোগের বিভিন্ন পর্যায়ে সক্রিয় অংশগ্রহণ করে থাকে।

TEHATTA GOVERNMENT COLLEGE

SESSION :- 2023-24

Sub :- Evns,

Biological Hazard

Name :- Soumyadeep Halder

Department :- History Honours

Semester 1

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Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health they are a major concern in food processing because they cause most food borne illness outbreaks.

- Sources →

i) animal guts :- faecal Contamination

ii) Soil and water Contaminated by non-treated manure.

iii) Cross Contamination

— human Contamination due to poor Personal hygiene, faecal contamination, failure in infection Control.

— Cross Contamination of food products spread from processing environment due to poor/ improper sanitation.

- Risk ⟶

The organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. intoxication occurs when bacteria produce toxins and that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

for example, steam cooking significantly reduces non spore-forming food borane pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, clostridium botulium and clostridum perfringes.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survie normal cooking temperatures and even temperatures higher than 80°C [176°F].

The risk of intoxication is....

prevented by controlling the growth of toxin producing bacteria. These include:
Clostridium botulinum, Bacillus cereus, and staphylococcus aureus.

← Major biological hazards →

- Bacteria —
Salmonella spp, Enterohaemorrhagic Escherichia, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, staphlococus aureus Clostridium botulium, Clostridium perfringens vibrio vulnitius, vibrio. parahaemalyticus,

- virus —
hepatitis A virus, Norwalk viruses, Rotaviruses.

- parasites —
Toxoplasma gondii, Cryptosporidia, Giadia spp, Trichinella Spiralis, Taenia Sulium, Anisakis spp.

Factors affecting the growth of microorgaisms in food →

- The temperature values for microbial growth depend on the type of microorganism. for example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F)

- The pH of product is related to the acidity or alkainity of the product. The pH of products affects the growth of bacteria. most bacteria grow in pH range between 5 and 9

- The water Activity (a_w) to the water available in the product. The more water available the better bacteria will grow. Table 1 Show the Impact of water activity on bacterial Spoilage.

a_w of product	Bacterial spoilage	Examples
> 0.90	Spoils easily	fresh vegetables, fresh meat, processed meat, milk, fish.
0.78 – 0.90	susceptible to spoilage	dry cheese, flour, cake, beans, cereals
< 0.78	little bacterial Spoilage but mould may grow	rolled oats, dried, fruits, caramels dehydrated foods

Each of these factors is important at Control of microbial growth. It is the total Interaction or among these factors that determines the growth or Control of microorganisms.

~ Control and prevention ~

The most effective way to control biological hazards is by prevention. The implementation of Good manufacturing practices (GMPs) and Hazard Analysis and Critical Control Point (HACCP) will help prevent biological hazard in your facility.

GMPs ensure Hazards associated with personnel and environment are controlled during food production HACCP controls hazard that may be present in ingredients and packaging material and also those that occur during food processing, packaging and storage.

processing strategies to control biological hazards :—

- effective thermal processing used as a kill step [ex cooking, Pasteurization]
- use of appropriate process control:
  - storage temperature (ex, cooler, freezer)
  - processing parameters [ex: temperature and time for cooking water activity during dehydration)
- use of food technologies to prevent the growth of bacteria of other biological hazards
  - preservatives
  - processing techniques [ex: dehydration]

TEHATTA GOVERNMENT COLLEGE

SUB :- Evns,

BIOLOGICAI HAZARD



NAME :- SOURAV GHOSH

STUDENT ID :- 1570106

COUSE :- B.A (1 Year Degree) POL.SCIENCE Hons

SESSION :- 2023-2024

(11)

By 09/03/2023

Introduction

A biological hazard or biohazard is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a microorganism, virus or toxin that can adversely affect human health. A biohazard could also be substance harmful to other living beings.

The term and its associated symbol are generally used as a warning so that those potentially exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by charles Baldwin, an environmental health engineer working for the Dow chemical company on the containment products.

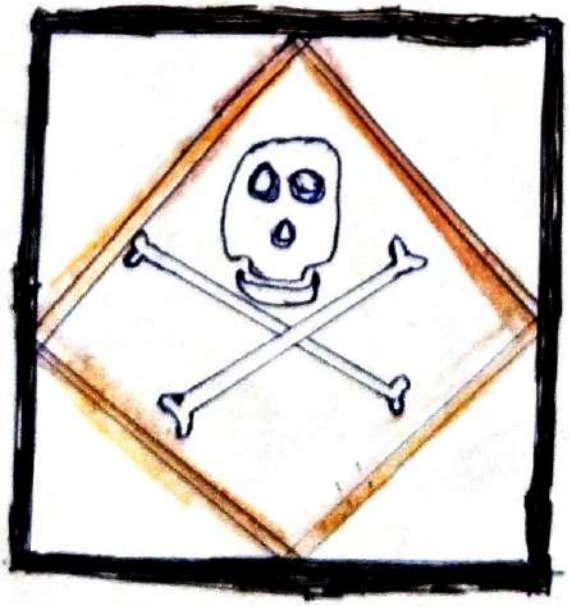
It is used in the labeling of biological materials that carry a significant health risk including viral samples and used hypodermic needles.

ANSI Z535/OSHA/ISO regulation :-

Biohazardous safety is usare identified with specified labels, sings and paragraphs established by the American National standards institute (ANSI). Today ANSI Z535 standrds for biohazards are used worldwide and should always be used appropriately within ~~AN~~ ANSI Z535 Haradows communications (Hazcom) singage. labeling and paragraps. The goal is to help workers repidiyidentify the severity of a biohazard from a distance and through colour are design standardization.

Biological hazards symbol design :→

- A red or white or white coloured background is used behind a black. bio hazard symbol when integrated with a 'DANGER' sing. Label or paragraph.



An orange one black or white-coloured background is used behind a black biohazard symbol when integrated with a WARNING sign label or paragraph.



A yellow on black or white-coloured background is used behind a black biohazard symbol when integrated with a CAUTION sign label or paragraph.



Reference ANSI Z535 for a complete description on how to use 'DANGER' 'WARNING' 'CAUTION', 'NOTICE' sings, lobed paragraphs.

UN/ISO classification:

Biohazards agents are classification for transpation by UN number.

- catagary A. UN 2814

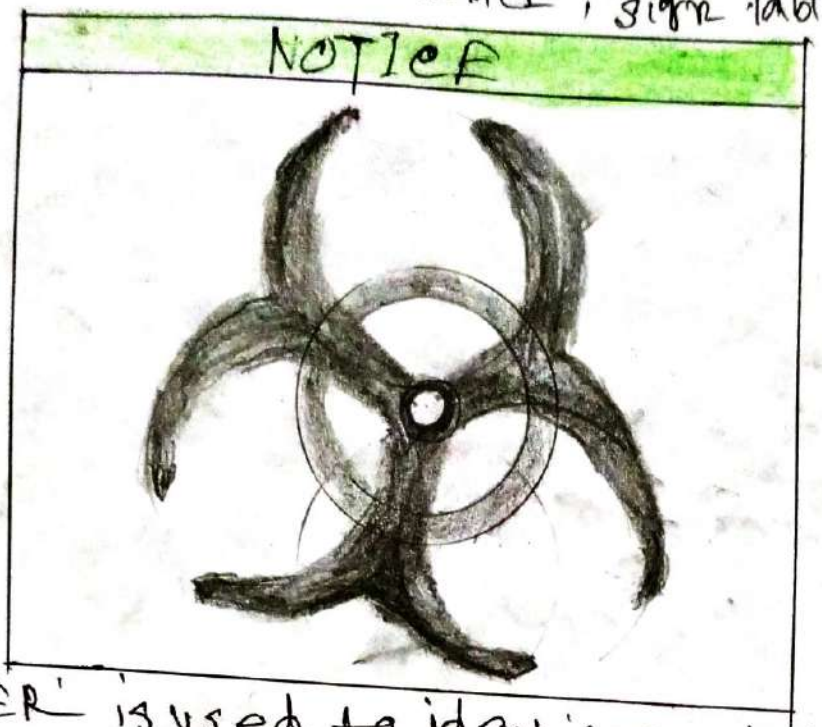
- Infectious subtance affecting human: AN infectious subtance in a from capable of causing permanent disability or life thratining or fatal disease. in other wish helthy human or animals when expoze to it occurs.

- catagary A. UN 2900

Infectious subtance affecting animals (only): AM infectious subtance that is not from generally capable of causing permanent disease in otherwise helthy human and exposure to themselves occurs.

- catagary B. UN 3373 - Biological subtance thransported for diagnostic or investigative purposes.

A green on white or white coloured back ground is used behaind a black biohazard symbol, when integreted white 'NOTICE', sign table or paragraph



'DANGER' is used to identify a biohazard that whill cause deth' WARNING is used to identify a biohazard that may cause death.

'CAUTION' is used to identify a biohazard that will cause injury, but not death. NOTICE is used to identify a noninjury biohazard massage.

OSHA requires the use of proper ANSI Hazcom where appliable in American workplace. Phase state and local government is also use these inisdictions. Proper use of use of ANSI 2535 signs, tables and pragraphs are written into many of OSHA's standards for Hazcom and crafiled to integrat with ISO symbols.

TEHATTA GOVERNMENT COLLEGE

SUB :- Evns,

BIOLOGICAI HAZARD



NAME :- SOUVIK GHOSH

STUDENT ID :- 1570107

COUSE :- B.A (1 Year Degree) POL.SCIENCE Hons

SESSION :- 2023-2024

(13)

09/03/2023

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The term and its associated Symbol are generally used as a warning, So that those potentialy exposed to the Substances will know to take precautions. The biohazard Symbol was developed in 1966 by charles Baldwin, an environmental-health engineer working for the Dow chemical Company on the Containment products.

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ANSI Z535/OSHA/ISO regulatation :=

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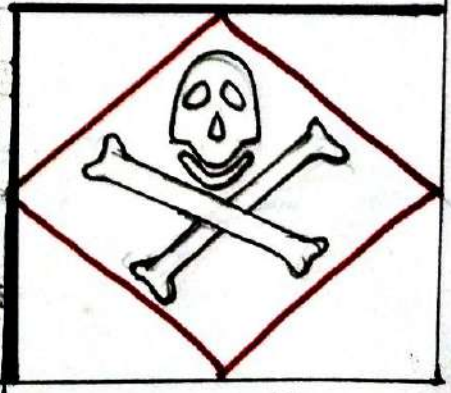
Biological hazard's Symbol design :=

- A red on white or while colored background is used behind a black biohazard Symbol. when integrated with a 'DANGER'. label or paragraph.



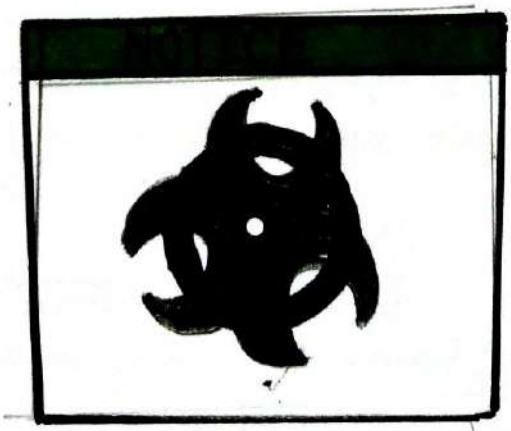
- An orange on black or white-colored background is used behind a black biohazard symbol when integrated with a 'WARNING' sing. lable an paragraph.



- A yellow on black or white coloured back ground is used behind a black biohazard symbol when intengrated with a 'CAUTION' sign, label or paragraph.



- A green on white or white coloured back ground is used behind a black biohazard symbol when integrated with a 'NOTICE' sign lable or paragraph.



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- 'OSHA' requairs the use of proper ANSI flazeom where applicable in American workplaces these state and local goverment also use these standerds as codes and low within their own inrisdictions, proper use of ANSI Z535 Signs, lables and Paragraphs are written into many of 'OSHA's standards for flazeom and Grafled in integrate with Iso Symblos.

Reference ANSI 7535 for a complete description on how to use 'DANGER', 'WARNING', 'CAUTION', 'NOTICE' Signs, lables, paragraph.

- **UN/ISO Classification** :=

Biohazard agents ar classification for transportation by UN number.

- Category A, UN 2814 :-

Infectious substance affecting human: An infectious sublance in a form capable causing permanent disability or life threathing an falal discase in otherwise healty humans ar animals when exposer to it occurs.

- Category A, UN 2900 :-

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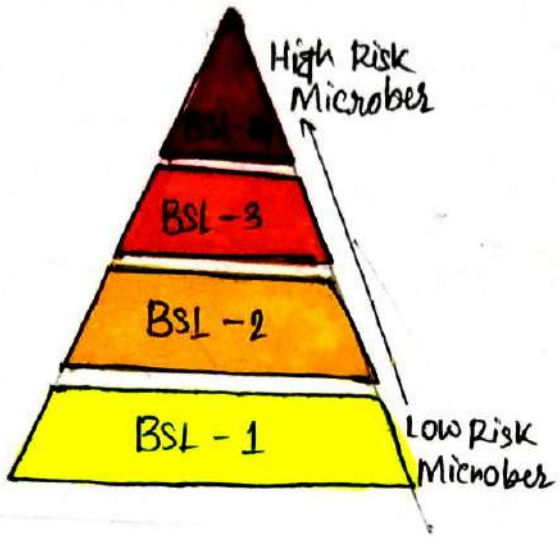
- Category B, UN 3373 :- Biological Sublance transported for diagnostic on investigative purposes.

Biohazard Safety levels :-



- **Anthropogenic hazard** :- Hazard caused by human action or inaction.
- **Biocontainment** :- physical containment of pathogenic organisms or agents in microbiology (laboratories).
- **Biological agent** :- Pathogen that can be weaponized.
- **Biosafety level** :- level of the biocontainment precautions required to isolate dangerous Biological agents.

- **chemical hazard** :- Non-biological substance that has the potential to cause harm to life or health.
- **Hazard** :- Situation or object that can cause damage or harm.
- **Interplanetary contamination** :- Biological contamination of a planetary body by a space probe or spacecraft.

List of laboratory biosecurity incidents :-

- **Mechanical Hazard** :- Hazard with a mechanical energy source.
- **Occupational Hazard** :- Hazard experienced in the workplace.
- **Physical Hazard** :- Hazard due to a physical agent.
- **planetary protection** :- Guiding principle of a space mission.
- **psychosocial Hazard** :- occupation. Hazard to one's psychological well being.
- **public Health** :- promoting health through organized efforts and informed choices of society and individuals.

TEHATTA GOVERMENT COLLEGE



ENVS

TOPIC: BIOLOGICAL HAZARD

(12)

NAME : SUBHOJIT MODAK

SUBJECT : ENVS (Project)

SEMESTER : 1ST SEMESTER

COLLEGE : TEHATTA GOVERMENT COLLEGE

CLASS : BA HONOURS ENGLISH

YEAR : 1ST YEAR 2022 - 2023

By
09/03/2023

Introduction :-

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The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substances will know to take precautions. The biohazard symbol was developed in 1966 by charles Baldwin, an environmental-health engineer working for the Dow chemical company on the containment products.

ANSI Z535/OSHA/ISO regulation :-

Biohazardous safety issues are identified with specified labels, signs and paragraphs established by the American National standards Institute (ANSI). Today, ANSI Z535 standards for biohazards are used worldwide and should always be used appropriately within ANSI Z535 Hazardous communications (Hazcom) signage, labeling and paragraphs. The goal is to help workers rapidly identify the severity of a biohazard from a distance and through colour and design standardization.

Biological hazard's symbol design :

A red on white on white coloured background is used behind a black biohazard symbol when integrated with a 'Danger' sign. Label on Paragraph.



An orange on black on white - coloured background is used behind a black biohazard symbol when integrated with a 'WARNING' sign, lable on Paragraph.





A yellow on black on white - coloured background is used behind a black biohazard symbol when integrated with a 'CAUTION' sign, lable on Paragraph.

Refenence ANSI Z535 fona complete descrip-tion on how to use 'DANGER', 'WARNING', 'CAUTION', 'NOTICE' Signs, lables, panagraphs.

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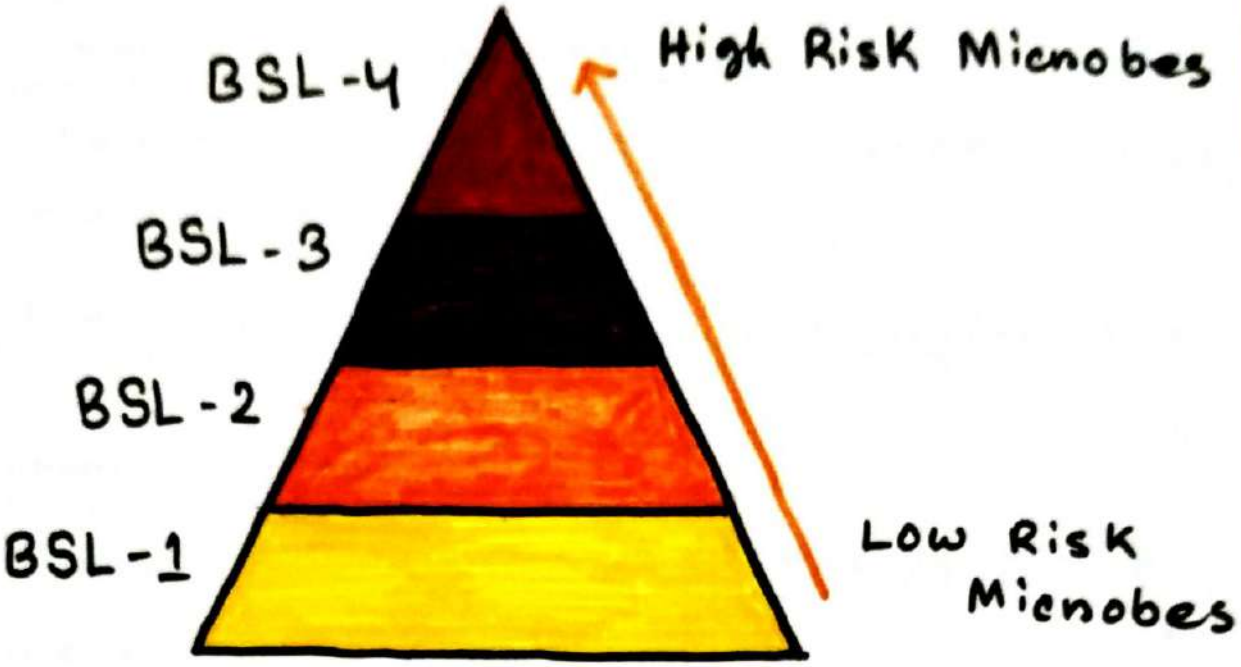
- Categony A. UN 2814 - Infeetious subtanee affeeting humans: An infeetious subtanee in a fonm capable of causing penmanet disability on lifethnreatening on fatal disease in othen wise healthy humans on animals when exposune to it occuns.
- Categony A. UN2900 - Infeetious subtanee affeeting animals (only): An infeetious subtance that is not a fonm genenally capable of causing penmane disability on life-thnreatening on fatel disease in othenwise healthy humans and exposune to themselves occuns.
- Categony B. UN 3373 - Biological subtance transponted for diagnostic on investigative punpose
- Regulated Medical waste, UN 3291 waste metenial delived from medical treatment of an animal on human.

BIOHAZARD SAFETY LEVELS:



BIOHAZARD SAFETY LEVEL

- **Anthropogenic Hazard:-**

  Hazard caused by human action on inaction.

- **Biocontainment:**

  Physical containment of Pathogenic ongnanisms or agentsin micro biology (abonatonies).

- **Biological agent:-**

  Pathogen that can be weaponized.

- **Bio safety level:-**

  Level of the biocontainment precautions required to isolate dangerous biological agents.

- **Chemical Hazard:-**

  Non-biological substance that has the potential to cause hanm to life on health.

- **Hazard :**

Situation on object that can cause damage on harm

- **Interplanetary contamination :-**

Biological contamination of a planetary body by a space probe on spacecraft.

List of Laboratory biosecurity Incidents :

- **Mechanical Hazard -**

Hazard with a mechanical energy source.

- **Occupationed Hazard -**

Hazard experienced in the workplace.

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Hazard due to a physical agent.

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Guiding principle of a space mission.

- **Psychosocial Hazard -**

Occupational hazard to one's psychological well being.

- **Public health -**

Promoting health through organized efforts and informed choices of society and individuals.

ACKNOWLEDGEMENT:

I would like to express my special thanks of gratitude to my Envs teacher "Susmita Chowdhury" for their able guidance and support in this project process. I think the completion of this project would not have been possible without their guidance and support.

I would like to sincerely thank my family and friends for their endless support and encouragement throughout the project.

I am ensuring that this project was finished by me and not copied.

✓

✓ Subhojit Modak

Teachers signature

student signature

DATE: 01/03/2023

UNIVERSITY OF KALYANI

TEHATTA GOVERNMENT COLLEGE



TEHATTA, NADIA

(11)

BIOLOGICAL HAZARDS

SUB : ENVS

By 11/03/2023

Submitted By : SUMAJIT GHOSH

B.A Bengali Hons 1st Semester Exam,2023

Registration No. :

Session : 2022-23

বর্তমান সংবাদপত্র, টেলিভিশন এবং বিভিন্ন মহলে Hazard ও Disaster সম্পর্কে প্রায়ই শোনা যায়। এ সম্পর্কে পরিবেশ বিজ্ঞানী, সমাজবিজ্ঞানী, ভূ-তত্ত্ববিদ এবং ভৌগোলিকেরা নানান সংখ্যা ও ব্যাখ্যা দিয়েছেন। তবে সবাই একমত নন। পরিবেশ বিজ্ঞানীরা Hazard-কে Natural hazard বলতেই বেশি আগ্রহী আবার এই বিষয়ে ভূ-তত্ত্ববিদ ও ভৌগোলিকদের মধ্যে সামান্য মতভেদ রয়েছে। ভূ-তত্ত্ববিদরা Hazard আলোচনায় Natural Geological factors আর ভৌগোলিকদের মধ্যে সামান্য মতভেদে Anthropo-genic factors-এর উপর বেশী গুরুত্ব আরোপ করেছেন।

প্রকৃত পক্ষে 'Hazard' এবং Disaster'-এর মধ্যে বিষয়গত ও প্রয়োগগত ব্যবধান রয়েছে। ভৌগোলিকেরা Hazard-এর ব্যাখ্যা দিয়েছেন যে, এটি হল ভূমিরূপগত বা প্রাকৃতিক প্রক্রিয়া যার মধ্যে নানা প্রাকৃতিক ও ভূমিরূপগত উপাদান অন্তর্ভুক্ত এবং এটি প্রাকৃতিক ও মনুষ্যকৃত। তবে সাধারনভাবে বলা যায়। এটি সর্বোচ্চ প্রাকৃতিক ও মানবিক প্রক্রিয়া যার সঙ্গে ক্ষয়ক্ষতি যুক্ত থাকে না। ভূমিরূপতাবিদ Prof. Savindra singh (2001) Hazard-এর সংজ্ঞা দিয়েছেন যে, 'Hazards

are generally taken to be the process (causal factor) and the responses (Results) of extreme events, both natural and anthroo-pgenic, which cause an accident / extreme events / or danger.

Prof. S.R. Basu (2004), মতে 'Hazard' হলে একটি ভূতাত্ত্বিক / ভূমিরূপগত পদ্ধতির আভ্যন্তরীন বা বাহ্যিক প্রকাশ যার মধ্যে নানান প্রাকৃতিক উপাদান ও প্রক্রিয়া অঙ্গাঙ্গিকভাবে জড়িত। Hazard-এর সঙ্গে ব্যাপক ভাবে না হলেও অল্পবিস্তর ক্ষয়ক্ষতি যুক্ত থাকে, যদিও মনুষ্য জনজীবনকে স্তব্ধ করতে পারে না। এটি একটি পরিস্থিতি বিশেষ তবে তা চূড়ান্ত ঘটনা (extreme events) নয়।

পরিবেশ বলা যায় দুর্যোগ (Hazard) প্রাকৃতিক, মানুষ্যসৃষ্ট বা কারনেই হতে পারে এবং যার মধ্যে ভূ-তাত্ত্বিক ভূমিরূপগত এবং সাংস্কৃতি উপাদান অন্তর্ভুক্ত অল্প সময়ের জন্য হলেও মানুষের স্বাভাবিক জীবন যাত্রাকে বিঘ্নিত করে থাকে। নীচে Hazard-এর কিছু স্বাভাবিক বৈশিষ্ট্য তুলে ধরা হল -

(১) এটি প্রাকৃতিক, ভূমিরূপগত, ভূতাত্ত্বিক এবং সাংস্কৃতিক উপাদানের সংযুক্ত ক্রিয়া।

(২) তা সাধারনত ক্ষুদ্র স্কেলে সংঘটিত হয়।

(৩) মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যাহত না করলে অল্প বিস্তর জীবনযাত্রার গতিকে রুদ্ধ করে দেয়।

(৪) ক্ষয়ক্ষতির প্রভাব ব্যাপক মাত্রায় না থাকলেও সামাজিক প্রাকৃতিক ও অর্থনৈতিক সম্পদের অল্প বিস্তর ক্ষতি হয়।

(৫) দুর্যোগ উপযুক্ত আধুনিক পরিকল্পনা মাধ্যমে নিয়ন্ত্রন করা যায়।

বাংলাদেশের দুর্যোগ প্রবনতা :-

বাংলাদেশের মানুষের জীবন ঝড়, ঘনিঝড়, জলোচ্ছ্বাস ধরা নদীভাঙ্গন ইত্যাদি প্রাকৃতিক দুর্যোগ নিয়মিত ঘটনা। ভৌগলিক ভাবেই পৃথিবীর অন্যতম প্রাকৃতিক সম্পদের বিপুল ক্ষতি সাধন করে। ভৌগালিক অবস্থানগত বাস্তবতাই এর প্রধান কারন। নদী বিধৌত বাংলাদেশের উত্তরে হিমালয় পর্বতমালা, দক্ষিনে বঙ্গোপসাগর। এদেশের পশ্চিমাঞ্চলের কিছু পার্বত্য অঞ্চল ও বিস্তর্নী সমতলভূমি জুড়ে রয়েছে সাত শতাধিক নদী। তাই হিমালয়ের বরফ গলা পানিতে যেমন বন্যা সৃষ্টি হয় তেমনি অতিবৃষ্টি। আমাদের দেশের অবস্থান উত্তমন্ডলীয় অঞ্চল এবং দক্ষিনের বঙ্গোসাগরের সমুদ্রপৃষ্ঠের উষ্ণতা ২৭ ডিগ্রী সেলসিয়াস (২৭° সে.) ফলে সমুদ্র ঘনিঝড়ের সৃষ্টি হয়। সাম্প্রতিকালে বৈশ্বিক উষ্ণতা বৃদ্ধি ও পরিবেশ বিপর্যয়ের কারনে এসব ঘনিঝড় মারাত্মক আকার ধারন করেছে। অন্যদিকে নদীমাতৃক বাংলাদেশের প্রধান ও গুরুত্বপূর্ন নদীগুলির উৎস ভারত ও নেপাল। পার্শ্ববর্তী দেশের নদী শাসনের কারনে এদেশে বন্যা ও ধরার মত দুর্যোগের সম্মুখীন হতে হয়।

প্রাকৃতিক দুর্যোগ :-

প্রাকৃতিকভাবে সৃষ্টি আকস্মিক ও চরম পরিবেশগত অবস্থাকে দুর্যোগ বলা হয়। প্রাকৃতিক দুর্যোগ যে কোনো দেশেই মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যাহত, বিপর্যস্ত ও দুর্বিসহ করে তোলে। বিশ্বের সর্বত্রই প্রাকৃতিক দুর্যোগ কম-বেশি আঘাত হানে। প্রাকৃতিক তাণ্ডবের মুখোমুখি দাঁড়িয়ে করনীয় প্রায় কিছুই থাকে না। তাই দুর্যোগ ব্যবস্থাপনা অত্যন্ত গুরুত্বপূর্ণ দুর্যোগ ব্যবস্থাপনা বলতে বোঝায় এমন একটি সমন্বিত ব্যবস্থা যাতে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগ পরবর্তী সময়ে বিভিন্ন পরিকল্পনা, সংগঠন সমন্বয়, নিয়ন্ত্রনসহ যাবতীয় কার্যক্রম গ্রহন ও বাস্তবায়নের মাধ্যমে দুর্যোগের ক্ষয়ক্ষতি হ্রাস করা যায়। আমাদের দেশের মানুষ বিশ্বের অনেক দেশের তুলনায় প্রাকৃতিক দুর্যোগ মোকাবেলা করে বেশি অভ্যস্ত। যেমন - বাংলাদেশের দক্ষিনাঞ্চল সমুদ্র থাকায় সৃষ্ট ঘনিঝড়, জলোচ্ছ্বাস বারবার দক্ষিনাঞ্চলে আঘাত হানে।

দুর্যোগ ব্যবস্থাপনার প্রধান উদ্দেশ্য :-

(ক) দুর্যোগকালীন মানবজীবন, জবাদি ও বন্য প্রানি এবং পরিবেশগত ক্ষতি হ্রাস করা।

(খ) ক্ষতিগ্রস্থ মানুষের কাছে অগ্রাধিকার ভিত্তিতে দ্রুত ত্রানসামগ্রী পৌঁছানো।

(গ) দুর্যোগ পরবর্তী উদ্ধার, পুনর্গঠন ও পুনর্বাসন নিশ্চিত করা।

উপরোক্ত উদ্দেশ্য সমূহ বিবেচনায় রেখেই দুর্যোগ ব্যবস্থাপনা কার্যক্রম পরিকল্পনা ও পরিচালনা করা হয়।

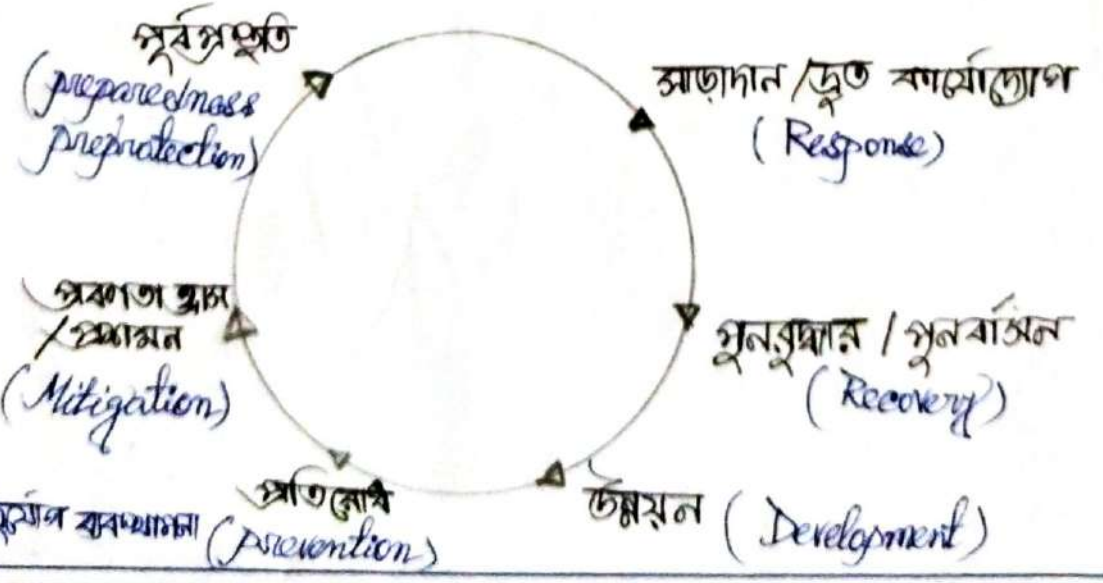
দুর্যোগ ব্যবস্থাপনা :-

আগেই বলা হয়েছে যে, দুর্যোগ ব্যবস্থাপনা হল একটি সমন্বিত দুর্যোগ মোকাবেলা ব্যবস্থাপনা। দুর্যোগ ব্যবস্থাপনাকে তিনটি ভাগে বা দিক থেকে একটি সমন্বিত ব্যবস্থা বলা যেতে পারে। যথা :-

(১) দুর্যোগপূর্ব প্রস্তুতি
(২) দুর্যোগকালীন তৎপরতা
(৩) দুর্যোগ পরবর্তী পুনরুদ্ধার।

অর্থাৎ দুর্যোগের ভয়াবহতা মোকাবেলায় সম্ভাব্য ক্ষয়ক্ষতি হ্রাসের লক্ষ্যে দুর্যোগপূর্ব, দুর্যোগকালীন ও দুর্যোগপরবর্তী এই সুচিন্তিত পদক্ষেপ ও কার্যক্রমকেই এক কথায় দুর্যোগ ব্যবস্থাপনা বলে।

দুর্যোগ ব্যবস্থাপনা কার্যক্রমের উপাদান সমূহ কী কী এবং কাজ কী তা নিচে একটি চক্রের সাহায্যে দেখানো হল-



চিত্র ১০.১ : দুর্যোগ ব্যবস্থাপনা চক্র

দুর্যোগ ব্যবস্থাপনা কার্যক্রম সুষ্ঠুভাবে সম্পন্ন উদ্দেশ্যে সরকারিভাবে জাতীয় ও স্থানীয় পর্যায়ে বিভিন্ন কমিটি গঠন করা হয়েছে। কমিটিগুলো প্রাকৃতিক দুর্যোগ সংক্রান্ত বিভিন্ন সাংগঠনিক কার্যক্রম সম্পন্ন করার সাথে দুর্যোগের বিভিন্ন পর্যায়ে সক্রিয় অংশগ্রহণ করে থাকে। আসুন, এবার আমরা সব কমিটিগুলোর কয়েকটি নামের সাথে পরিচিত হই।

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TEHATTA GOVERNMENT COLLEGE



TEHATTA * NADIA

UNIVERSITY OF KALYANI

BA HONS 1st SEMESTER EXAMINATION : 20200-2023

B.A HONS

1st SEMESTER

DIPARTMENT - PHILOSOPHY HONS

SUB: ENVIRONMRNTL STUDIES

NAME - SUROVI MANDAL

(11)

COLLEGE ROLL -

09/03/2023

SESSION : 2022-2023

* BIOLOGICAL HAZARDS :-

What is biological hazard?

Biological hazards are organisms, or substance produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Biological health hazards include bacteria, viruses, parasites and moulds or fungi

Risk :-

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens and easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spore forming bacteria include Bacillus cereus, clostridm batulium and clostridium perfringes

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These survive normal cooking temperatures and even temperatures higher than 80° [176°C]

The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include: Clostridium botulinum, Bacillus cereus, and Staphyloccus aureus.

Major biological hazards:-

- Batteria ex: Salmonella spp, Enterohaemorrhagic Escherichia coil, compylobaltar jejuni, yersinia enterolitica, Listeria monocytogenes, Bacillus, anthracis, Bacillus cereus, staphlococcus aureus clostridium botulinum, clostridium perfringens, vibrio vumficus, vibrio parahaemalyticus.

Virus:- ex:- heaptitis A virus, ~~Non~~ Norwalk viruses, Rotavirus.

parasites:- ex:- Toxoplasma gandii, cryptosporidia, Giandia spp, Trichinella spinals, Taenia solium, Anisakis spp.

Sources:-

The major sources of biological contaminals in food are:

- Animal guts: faecal contamination.
- Soil and water contaminated by non-treated manure.

• cross contamination:

-human contamination due to poor personal hygiene. faecal contamination, failure in infection control. (illness not reported).

cross contamination of food products spread from processing environment due to poor / improper sanitation.

Factors affecting the growth of microorganisms in food:—

• The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature [4°C or 39°F], while thermatrophs can grow at higher temperatures. [45°C-113°F]

• The ph of a product is related to the acidity or alkalinity of the product. The ph of products affects the growth of bacteria. Most bacteria grow in a ph range between 5 and 9.

• The water Activity (aw) refers to the water available in the product. The more water available the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

aw of product	Bacteria Spoilage	Examples
> 0.90	Spoils easily	fresh vegetables, fresh meat, processed meat, milk, fish.
0.78 – 0.90	Susceptible to Spoilage	dry cheeses, flour, cakes, beans, cereals.
< 0.78	little bacteria Spoilage but mould may grow	rolls acts, dried, fruits, caramels, dehydrated foods

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of microorganism.

control and prevention:-

The most effective way to control biological hazards is by prevention. The implemention of good manufacturing practices (GMPs) and hazard Analysis and critical control point (HACCP) will help prevent biological hazards in your ~~point~~ factlity.

GMPs ensure hazards associated with personal and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging metarials and also those that occur during food

processing. packaging and storage.

processing strategies to control biological hazards:

- Effective thermal processing used as a kill step (ex- cooking, pasteurization)

- use of appropiate process controls:-
  - storage temperatures (ex- cooler, freezer)
  - processing parameters (ex- temperature and time for cooking, water activity during dehydration)
  - Adequate cooking system.

- Effective cleaning and sanitizing procedures (ex- SSOPs)

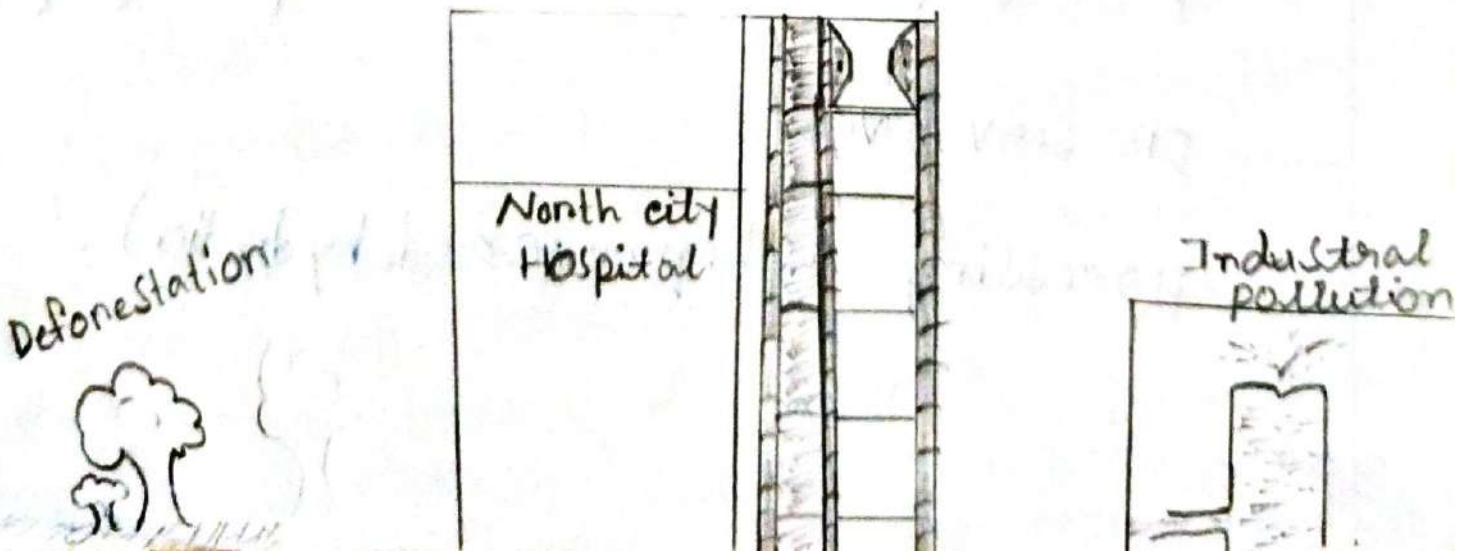
- use of food technologies to prevent the growth of bacteria or other biological hazards:-
  - packaging techniques (ex- use of vacuum)
  - packaging modified atmosphere packaging.
  - preservatives.
  - processing techiques (ex- dehydration)

which is common effect of biological hazard and chemical hazard?

chemical and biological hazard in the workplace have the potential to cause adverse health effects such as breathing ~~potential to cause adverse~~ burns. skin disease and cancer.

Example of these effects are :- erythema (skin reddening), cataracts to lens of the eye, sterility (temporary, permanent) and epilation (loss of hair)

Enviroment Effects consists of five basic type of pollution air, water, soil, noise, and ~~soiling~~ slight. Environment pollution is the contamination of the physical and biological components of the earth to such an extent the normal environment processes are adversely affected.



TEHATTA GOVERNMENT COLLEGE



UNIVERSITY OF KALYANI

TEHATTA ,NADIA

SUBJECT- Environmental Science

(Bioligical Hazard)

DEPARTMENT- BENGALI HONOURS 1ST SEMESTER

NAME- TANMOY DAS

SESSION- 2022-2023

(12)

09/03/2023

বর্তমানে সংবাদপত্র, টেলিভিশন এবং বিভিন্ন মহলে Hazard ও Disater সম্পর্কে প্রায়ই শোনা যায়। এ সম্পর্কে পরিবেশ বিজ্ঞানী, সমাজবিজ্ঞানী, ভূ-তত্ত্ববিদ এবং ভৌগোলিকেরা নানান সংজ্ঞা ও ব্যাখ্যা দিয়েছেন। তবে সবাই একমত নন। পরিবেশ বিজ্ঞানী Hazard-কে Natural hazard বলতেই বেশি আগ্রহী আবার এই বিষয়ে ভূ-তত্ত্ববিদ ও ভৌগোলিকের মধ্যে সামান্য মতভেদ রয়েছে। ভূ-তত্ত্ববিদরা Hazard আলোচনায় Natural Geological factors আর ভৌগোলিকেরা Anthropogenic factors-এর উপর বেশী গুরুত্ব আরোপ করেছেন।

প্রকৃত পক্ষে 'Hazard' এবং 'Disaster'-এর মধ্যে বিষয়গত ও প্রয়োগগত ব্যবধান রয়েছে। ভৌগোলিকেরা Hazard-এর ব্যাখ্যা দিয়েছেন যে, এটি হল ভূমিরূপগত বা প্রাকৃতিক প্রক্রিয়া আর মধ্যে নানা প্রাকৃতিক ও ভূমিরূপগত উপাদান অন্তর্ভুক্ত এবং এটি প্রাকৃতিক ও মনুষ্যকৃত। তবে সাধারনভাবে বলা যায় এটি সর্বোচ্চ প্রাকৃতিক ও মানবিক প্রক্রিয়া আর সঙ্গে সময়াতি যুক্ত থাকে না। ভূমিরূপবিদ Prof. Savindra Singh (2001) Hazard-এর সংজ্ঞা দিয়েছেন যে, 'Hazards are generally taken to be the process (causal factor) and the responses (Results) of extreme events,

both natural and anthropogenic, which cause an accident/extreme events/on danger.

prof. S. R. Basu (2004), মতে 'Hazard' হল একটি ভূতাত্ত্বিক / ভূমিরূপগত পদ্ধতির আভ্যন্তরীন বা বাহ্যিক প্রকাশ যার মধ্যে নানান প্রাকৃতিক উপাদান ও প্রক্রিয়া অঙ্গাঙ্গিভাবে জড়িত। Hazard - এর মাত্রা ব্যাপকভাবে না হলেও অল্পবিস্তর ক্ষয়ক্ষতি যুক্ত থাকে, যদিও এ মনুষ্য জনজীবনকে স্তব্ধ করতে পারে না। প্রতি একটি পরিস্থিতি বিশেষ তবে তা চূড়ান্ত ঘটনা (extreme events) নয়।'

পরিশেষে বলা যায় দুর্যোগ (Hazard) প্রাকৃতিক, মনুষ্যসৃষ্ট বা উভয় কারণেই হতে পারে এবং যার মধ্যে ভূ-তাত্ত্বিক ভূমিরূপগত এবং সাংস্কৃতিক উপাদান অন্তর্ভুক্ত। অল্প সময়ের জন্য হলেও মানুষের স্বাভাবিক জীবনযাত্রাকে বিঘ্নিত করে থাকে। নীম্নে Hazard -এর কিছু স্বাভাবিক বৈশিষ্ট্য তুলে ধরা হল —

(১) প্রতি প্রাকৃতিক, ভূমিরূপগত, ভূতাত্ত্বিক এবং সাংস্কৃতিক উপাদানের সংযুক্ত ক্রিয়া।

(2) তা সাধারণ সূত্র থেকে সংঘটিত হয়।

(৩) মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যাহত না করলেও অল্প বিস্তার জীবনযাত্রার গতিকে কম করে দেয়।

(৪) ক্ষয়ক্ষতির প্রভাব ব্যাপক মাত্রায় না থাকলেও সামাজিক, প্রাকৃতিক ও অর্থনৈতিক সম্পদের অল্প বিস্তর ক্ষতি হয়।

(৫) দুর্যোগের উপযুক্ত আধুনিক পরিকল্পনার মাধ্যমে নিয়ন্ত্রন করা যায়।

□ বাংলাদেশের দুর্যোগ প্রবনতা :-

বাংলাদেশের মানুষের জীবনে ঝড়, ঘূর্ণিঝড় জলোচ্ছ্বাস খরা, বন্যা, নদীভাঙ্গন ইত্যাদি প্রাকৃতিক দুর্যোগ নিয়মিত ঘটনা। ভৌগলিক ভাবেই পৃথিবীর অন্যতম প্রাকৃতিক দুর্যোগপ্রবন দেশ বাংলাদেশের প্রায় দুর্যোগ প্রায় প্রতি বছর মানব সম্পদসহ অবকাঠামোগত, অর্থনৈতিক ও প্রাকৃতিক সম্পদের বিপুল ক্ষতি সাধন করে। ভৌগলিক অবস্থানগত বাস্তবতাই এর প্রধান কারন। নদীবিধৌত বাংলাদেশের উত্তরে হিমালয় পর্বতমালা, দক্ষিনে বঙ্গোপসাগর। দেশের পশ্চিমাঞ্চলে কিছু পার্বত্য অঞ্চল ও বিস্তীর্ন সমতলভূমি জুড়ে রয়েছে সাত আন্তর্জাতিক নদী। তাই হিমালয়ের বরফ গলা পানিতে যেমন বন্যা সৃষ্টি হয় তেমনি হিমবাহ হ্রদ ফেটে অতি বৃষ্টি। আমাদের দেশের অবস্থান

উষ্ণমন্ডলীয় অঞ্চলে এবং ক্রান্তিরেখার বঙ্গোপসাগরের সমুদ্রপৃষ্ঠের উষ্ণতা বৃদ্ধি ও পরিবেশ ২৭ ডিগ্রী সেলসিয়াস (২৭° সে.) হলে সমুদ্র ঘূর্ণিঝড়ের সৃষ্টি হয়। সাম্প্রতিককালে বৈশ্বিক উষ্ণতা বৃদ্ধি ও পরিবেশের বিপর্যয়ের কারণে এসব ঘূর্ণিঝড় মারাত্মক আকার ধারণ করেছে। অন্যদিকে নদীমাতৃক বাংলাদেশের প্রধান প্রধান ও গুরুত্বপূর্ণ নদী গুলোর উৎসস্থল ভারত ও নেপাল। পার্শ্ববর্তী দেশের নদী শাসনের কারণে এদেশের বন্যা ও খরার মত দুর্যোগের সম্মুখীন হতে হয়। এছাড়া অতিবর্ষণে বন্যা ও নদীভাঙ্গন প্রায় নিয়মিত ঘটনা। তাছাড়া ভৌগলিক অবস্থান, জলবায়ু, ভূমির গঠন, নদীমাতৃক ভূমিরূপ, সমুদ্রের অবস্থান ইত্যাদি কারণে ঝড়, বন্যা, খরা, নদীভাঙ্গন, জলোচ্ছ্বাস ইত্যাদি দুর্যোগের সাথে বসবাস করেই আমাদের জীবন ধারণ করতে হয়।

□ প্রাকৃতিক দুর্যোগ:-

প্রাকৃতিকভাবে সৃষ্টি আকস্মিক ও চরম প্রতিকূল পরিবেশগত অবস্থাকে প্রাকৃতিক দুর্যোগ বলা হয়। প্রাকৃতিক দুর্যোগ যে, কোনো দেশেই মানুষের স্বাভাবিক জীবনযাত্রাকে ব্যহত, বিপর্যস্ত ও দুর্বিসহ করে তোলে। বিশ্বের সবত্রই প্রাকৃতিক

দুর্যোগ কম- বেশি আঘাত হানে। প্রাকৃতিক তান্ডবের মুখোমুখি দাঁড়িয়ে করণীয় এমন কিছুই থাকে না। তাই দুর্যোগ ব্যবস্থাপনা অত্যন্ত গুরুত্ব পূর্ণ। দুর্যোগ ব্যবস্থাপনা বলতে বোঝায় এমন একটি সমন্বিত ব্যবস্থা যাতে দুর্যোগ পূর্ব, দুর্যোগকালীন ও দুর্যোগ পরবর্তী সময়ের বিভিন্ন পরিকল্পনা, সংগঠন, সমন্বয়, নিয়ন্ত্রনসহ যাবতীয় কার্যক্রম গ্রহণ ও বাস্তবায়নের মাধ্যমে দুর্যোগের ক্ষয়ক্ষতি হ্রাস করা যায়। আমাদের দেশের মানুষ বিশ্বের অনেক দেশের তুলনায় প্রাকৃতিক দুর্যোগ মোকাবেলা করে বেশি অভ্যস্ত। যেমন ঝড়, বন্যা, খরা, ভূমিধ্বস ইত্যাদি দুর্যোগে এদেশের মানুষ চিরায়তভাবেই সংগ্রাম করে বেঁচে থাকার চেষ্টা করে। নিয়মতান্ত্রিক ও বৈজ্ঞানিকভাবে, শৃংখলার সাথে দুর্যোগ মোকাবেলা করা স্বাভাবিক-ভাবেই অধিক কার্যকরী হয়। যেমন- বাংলাদেশের দক্ষিনাঞ্চলে সমুদ্র থাকায় সমুদ্র সৃষ্ট ঘূর্ণিঝড়, জলোচ্ছ্বাস বারবার দক্ষিনাঞ্চলে আঘাত হানে। এতে মানবসম্পদসহ বহু ক্ষয়ক্ষতি সাধিত হয়। এসব ক্ষতি হ্রাস করতে ও বিপর্যয় কাটাতে প্রয়োজন সমন্বিত দুর্যোগ ব্যবস্থাপনা।

□ দুর্যোগ ব্যবস্থাপনার প্রধান উদ্দেশ্য:-

ক) দুর্যোগকালীন মানবজীবন, গবাদি ও বন্য প্রাণি এবং পরিবেশগত ক্ষতি হ্রাস করা।

ঘ) ক্ষতিগ্রস্থ মানুষের কাছে অগ্রাধিকারভিত্তিতে দ্রুত ত্রাণ-সামগ্রী পৌঁছানো।

ঙ) দুর্যোগ পরবর্তী উদ্ধার, পুনর্গঠন ও পুনর্বাসন নিশ্চিত করা।

উপরোক্ত উদ্দেশ্যসমূহ বিবেচনায় রেখেই দুর্যোগ ব্যবস্থাপনা কার্যক্রম পরিকল্পনা ও পরিচালনা করা হয়।

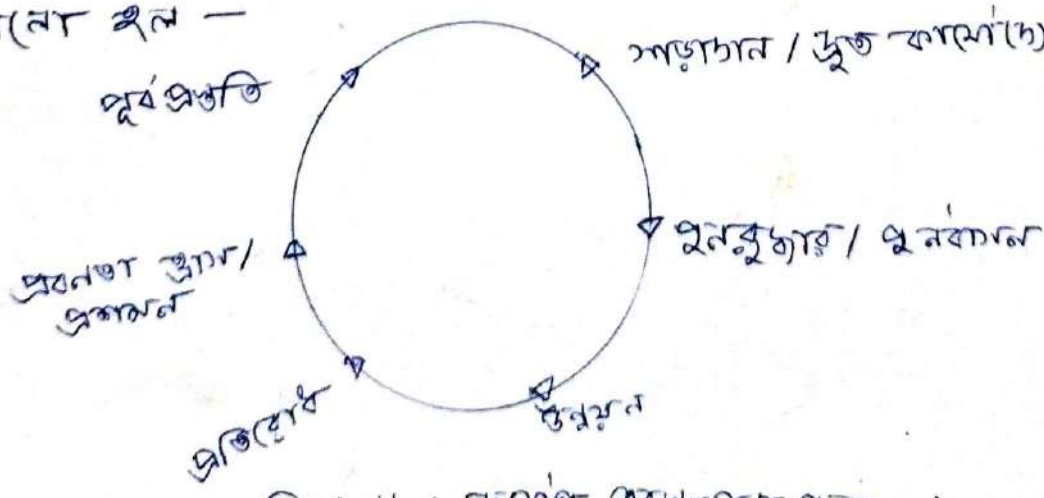
□ দুর্যোগ ব্যবস্থাপনা:-

আগেই বলা হয়েছে যে, দুর্যোগ ব্যবস্থাপনা হল একটি সমন্বিত দুর্যোগ মোকাবেলা ব্যবস্থাপনা। দুর্যোগ ব্যবস্থাপনাকে তিনটি স্তরের বা ধাপের একটি সমন্বিত ব্যবস্থাও বলা যেতে পারে। যথা:

১) দুর্যোগ পূর্ব প্রস্তুতি
2) দুর্যোগকালীন সতর্কতা
৩) দুর্যোগ পরবর্তী পুনরুদ্ধার

অর্থাৎ দুর্যোগের ভয়াবহতা মোকাবেলায় যথাযথ, ত্রাসের লক্ষ্যে দুর্যোগ পূর্ব, দুর্যোগকালীন ও দুর্যোগ পরবর্তী স্তরে গৃহিত পদক্ষেপ ও কার্যক্রমকেই এক কথায় দুর্যোগ ব্যবস্থাপনা বলে।

দুর্যোগ ব্যবস্থাপনা কার্যক্রমের উপাদানসমূহ কী কী এবং কাজ করে তা নিচে একটি চক্রের সাহায্যে দেখানো হল —



চিত্র ১০.১ : দুর্যোগ ব্যবস্থাপনা চক্র

ASSIGNMENT

TEHATTA GENERAL DEGREE COLLEGE

Subject : Environmental Studies

Topic : Biological hazards

(14)

Submitted by :

09/03/2023

Name : Tanusree Biswas
Semester : 1st semester
Department : Philosophy
Academic year : 2022-23

Submitted to : Susmita Chowdhury

Submission Date : 1st March, 2023



Biological hazard

Introduction

Biological hazards, also known as biohazards, refer to biological substances that pose a threat to the health of living organism, especially that of humans. These hazards cab be encounted anywhere in the environment, including home, school or work. The biohazard symbal was developed in 1966 by Chrles Baldwin, an environmental health engineer.
Biological hazards are organisms, or substances praducted by organisms, that pose a threat to human helth. They are a mejor concern in food processing because they cause most food borne illness outbreaks.

Risk

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invades the host and multiply in the body. Intoxication occours when bacteria produce toxins that affect the body.

Infection can be prevented by properly proecessing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spores-forming food borne pathogens, but only bacteria include Bacilus cereus, Clostridium bacteria botulinum and Clostridium perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins. These toxins are very difficult to eliminate. They survive normal cooking temperatures and temperatures higher than 80°C (176°F).

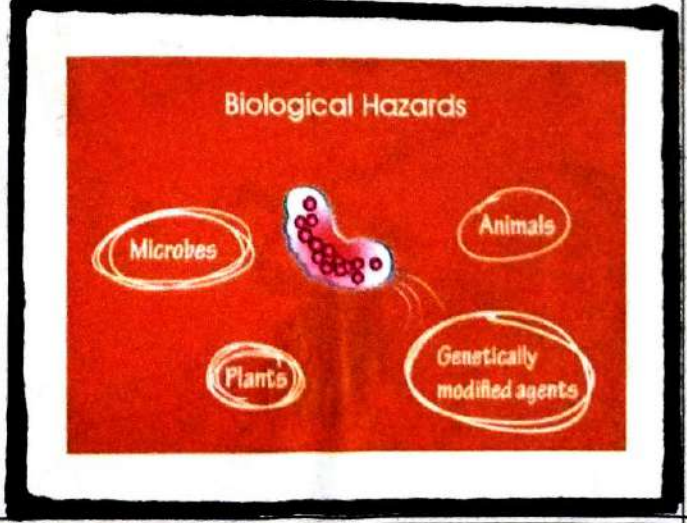
The risk of intoxication is prevented by controlling the growth of toxin producing bacteria. These include: clostridium botulinum, Bacilus cereus, and Staphylococcus aureus.

Major biological hazards

- Bacteria ex: Salmonella spp., Enterohaemorrhagic Escherichia coli, Compylobacter jejuni, Yersinia enterocalitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botulinum, Clostridium perfringens, Vibrio vulnificus, Vibrio parchaemolyticus.

- virus ex: hepatitis A virus, Norwalk viruses, Rotavirus.

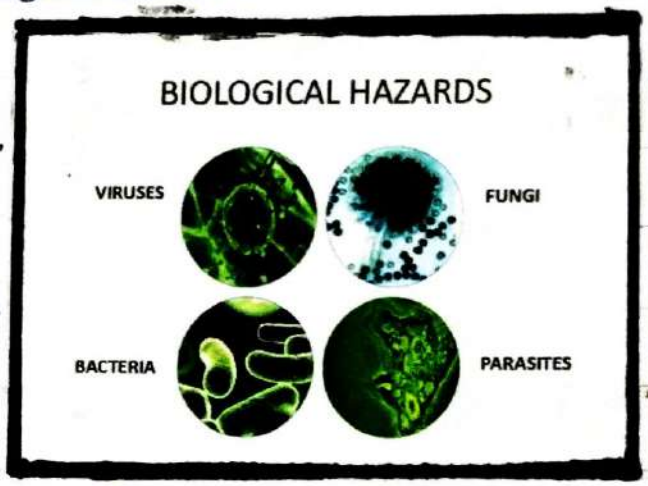
- Paresites ex: Toxoplasma gondii, Cryptosporiadia, Giardia spp., Trichinella spiralis, Taenia salium, Anisakis spp.



Sources

The major sources of biological contaminants in food are :

- Animal guts : faecal contamination.
- Soil and water contaminated by non-treated manure.
- Cross contamination :
  - human contamination due to poor personal hygine, faecal contamination, failure in infection control.



  - Cross-contamination of food products spread from processing environment due to poor/ improper sanitation.

Factor affecting the growth of microorganisms in food.

The temperature values for microbial growth depend on the tyes of microorganism. For example, psychrotrophs

such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F).

The pH of a product is related to the acidity or alkalinity of the product. The pH of products affects the growth of bacteria. Most bacteria grow in a pH range between 5 and 9.

The Water Activity (aw) refers to the water available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

aw of product	Bacterial Spoilage	Examples
>0.90	Spoil easily	fresh vegetables, fresh meat, processed meat, milk, fish.
0.78 - 0.90	susceptible to spoilage	dry cheeses, flour, cake, beans, cereals.
<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of micro-organisms.

Control and prevention

The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing Practices (GMPs) and Hazard Analysis and Critical Control Paint (HACCP) will help prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

Processing strategies to control biological hazard:

- effective thermal processing used as a kill step (ex: cooking, pasteurization)
- Use of appropriate process controls:
  - Storage temperatures (ex: cooler, freezer)

— processing parameters (ex: temperature and time for cooking, water activity during dehydration)

— adequate cooling system

- effective cleaning and sanitizing procedures (ex: SSOPs)
- use of food technologies to prevent the growth of bacteria or other biological hazzards:

— packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)

— preservatives

— processing techniques (ex: dehydration)

UNIVERSITY OF KALYANI

TEHATTA GOVERNMENT COLLEGE

NAME :— TANU SHRI HALDER

CLASS :— B.A 1ST YEAR PHILOSOPHY HONS

SUBJECT :— ENVIRONMENTAL SCIENCE

REGISTRATION NO :—

(14)

ACADEMIC YEAR :— 2022—23

By
09/03/2023

DATE OF SUBMISSION :— 01/03/23

Biological Hazards

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Major biological hazards

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- Virus ex: hepatitis A virus Norwalk viruses Rotcruicus

- Parasites ex: Toxoplasma gandil, cryplasparidia, Giarda spp, Trichinella spiralis, Toenia solium, Anisakis spp.

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Factors affecting the growth of microorganisms in foods

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- - Storage temperature times [ex: cooler, freezer]

- Processing Parameters [ex: temperature and time for cooking water activity during dehydration]

- effective cleaning and sanitizing Procedures [ex: SSOPs]

- Use of food technologies to prevent the growth of bacteria or other biological hazards.

- Packinging technologies to prevent the growth of bacteria or other biological hazards.

- Packinging techniques [ex: use of vacuum Packinging modified atmasphere pakinaging]

- Preservatives:

- Processing techiques [ex: dehydration]

GOVERNMENT GENERAL DEGREE COLLEGE TEHATTA

2023

Biological Hazards

SUb: ENVS

Name: TANUSHRI MONDAL

Sem: 1st (BA HONOURS BENGALI)

ROLL: 26

Student ID: 1570023

(13)

By 09/03/2023

Food Safety Program
for Processors and Distributors

Biological Hazards

Biological hazards are organisms, or substances produced by organisms, that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.







Risk

These organisms can affect human health, including infection, intoxication and even death. Infection occurs when organisms invade the host and multiply in the body. Intoxication occurs when bacteria produce toxins that affect the body.

infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

For example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only bacteria include Bacillus cereus, Clostridium botulinum and Clostridium Perfringens.

Toxins are Produced when toxin Producing bacteria are Present in high numbers. Bacteria must first grow in the food before Producing toxins. These toxins are very difficult to eliminate. They Survive normal cooking temperatures and even temperatures highers than 80°c (176°F).

The risk of intoxication is Prevented by controlling the Growth of toxin Producing bacteria. These include: Clostridum botulinum, Bacillus cereus and staphylococcus aureus.

Major biological hazards

- Bacteria ex: Salmonella spp, Enterohaemorrhagic Escheriehia coli, compylobacter ieiuni, Yersinia enterocolitiea, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botulinum, Clostridium Perfringens, Vibrio vulnificus, vibrio Parahaemolyticus.
- Virus ex: hepatitis A virus, Norwalk viruses Rotavirus
- Parasites ex: Toxoplasma gondii; cryptosporidia, Giardia spp, Trichinella spiralis, Taenia solium, Anisakis spp.







Sources.

The major sources of biological contaminants in food are:



- animal guts: faecal contamination
- soil and water contaminated by non-treated manure.



- cross contamination:

– human contamination due to poor Personal hygiene, faecal contamination, failure in infection control (illness not reported)

– cross-contamination of food products spread from processin environment due to poor/improper sanitation.

Factors affecting the growth of microorganisms in foods

- The temperature values for microbial growth depend on the type of microorganism. For example, psychrotrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F), while thermotrophs can grow at higher temperatures (45°C or 113°F)



- The PH of a product is related to the acidity or alkalinity of the product. The PH of products affects the growth of baeteria. most baeteria grow in PH range between 5 and 9.



- The Water Activity (aw) refers to the water

available in the product. The more water available, the better bacteria will grow. Table 1 shows the impact of water activity an bacterial spoilage.

aw of product	Bacterial spoilage	Examples
>0.90	Spoils easily	fresh vegetables, fresh meat, Processed meat, milk fish
0.78.0.90	susceptible to spoilage	dry cheeses, flour, cakes, beans, cereals
<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods.

Each of these factors is important for the control of microbial growth. It is the interaction among these factors that determines the growth or control of micro-organisms.

Control and Prevention

The most effective way to control biological hazards is by Prevention. The implementation of Good Manufacturing Practices (GMPs) and Hazard Analysis and Critical Control Point (HACCP) will help Prevent biological hazards in your facility.

GMPs ensure hazards associated with Personnel

and environment are controlled during food production. HACCP controls hazards that may be present in ingredients and packaging materials and also those that occur during food processing, packaging and storage.

Processing strategies to control biological hazards

- effective thermal processing used as a kill step (ex: cooking, pasteurization)



- use of appropriate process controls:
  - storage temperatures (ex: cooler, freezer)
  - processing parameters (ex: temperature and time for cooking; water activity during dehydration)
  - adequate cooling system



- effective cleaning and sanitizing procedures (ex: SSOPs)
- use of food technologies to prevent the growth of bacteria or other biological hazards:



  - Packaging techniques (ex: use of vacuum packaging, modified atmosphere packaging)
  - Preservatives
  - Processing techniques (ex: dehydration)

TEHATTA GOVERMENT COLLGE

BIOLOGICAL HAZARDS

NAME :- Tarit Pal
SUB :- ENVS
DEPARTMENT :- Political science hons
SEASON :- 2022-23
SEM :- 1st sem
ROLL No :-
Date :- 01/03/2023

(13)

09/03/2023

KEA
KW - 310A

Introduction

Biological Hazards:

A biological Hazard, or bio-hazard, is a biolo-gical subtence that poses a thread to the health of living organisms, primarily humans. This could include a sample of a micro organism. virus or toxin that can adverely affect human health. A biohazard could also be a subtance. harmful to other living bings.

The term and its associated symbol are generally used as a warning, so that those potentially exeposed to the subtances will know to takes precautions. The biohazard symbol was developed in 1966 by charless Baldwin, an environmental-health engineer working for the Dow chemical company on the containment products.

It is used in the labeling of biological materials that carry a significationt health risk including viral samples and used hypodermic needles.

ANSI Z535/OSHA/ISO regulation :-

Biohazardous safety issus are identified with specified labels, signs and paragraphs established by the American National Standards Institute (ANSI). Today, ANSI Z535 Standards for biohazards are used world wide and sould always be used appropriately within ANSI Z535 Hazardous communications (Hazcom) signag. labeling and paragraphes. The goal is to help workers repedly identify the severity of a biozard from a distance and through colour are design standardization.

◻ Biological hazard's symbol design :-

● A red on white or white coloured background is used behind a black biohazard symbol when intergratted with a "DANGER" sign. Label or paragraph.



● An orenge on black or white-coloured background is used behind a back biohazard symbol when intergated with a "WARNING" sing, table or paragraphy.



● A yellow on black or white-coloured background is used behind a black biohazard symbol when intergrated with a "CAUTION" sing, load or paragraph.



● A green or white or white coloured background is used behind a back biohazard symbol when integrated with a "NOTICE" sing table or paragraph.



'DANGER' is used to identify a biohazard that will couse death. 'WARNING' is used to identify a biohazard that may couse death. 'CAUTION' is used to identify a biohazard that will cause injury, but not death. 'NOTICE' is used to identify a noninjury biohazard massage.

OSHA requires the use of proper ANSI Hascom where appliable in American workplaces, state and local goverments also use those standards as codes and laws within their own jurisdicions. Proper use of ANSI Z535 signs labels and paragraphs are written into many of OSHA's standards for Hascom and crafted to intergrate with ISO Symbols.

Reference ANSI Z535 for a complete description on how to use 'DANGER', 'WARNING', 'CAUTION', 'NOTICE', signs, lables, paragraphs.

UN/ISO Classification:-

Biohazards agents are classification for transportation by UN number.

- Catagory A. UN 2814 - Infectious substance, affecting humans: An infactious substance in a form capable of causing permanent disability on life threatening or fatal disease in other-wise healthy humans or animals when exposure to it occurs.

- Catagory A. UN 2900 - Infectious substance affecting animals (only): An infectious substance that is not a form generally capable of causing permanent disability or life threatening or fatal disease in otherwise healthy humans and exposure to themselves occurs.

- Category B, UN 3373 - Biological substance transported for diagnostic or investigative purposes.

- **Regulated Medical Waste, UN3291** - Waste or reusable material derived from medical treatment of an animal or human or from biomedical research, which includes the production and testing.

BIOSAFETY LEVEL: The united states centers for Disease control and Prevention (CDC) categorise various diseases in levels of biohazard, Level 1 being minimum risk and Level 4 being extreme risk. laboratories and other facilities are categorized as BSL 1-4 or as P1 through P4 for short (Pathogen or Protection Level.)

- **Biohazard level 1:-** Bacteria and viruses including Bacillus subtilis, canine hepatatis, Escherichia coli and varicella (chickenpox), as well as some cell culterials in question are minimal, most likely involving glover and some sort of facial protection.

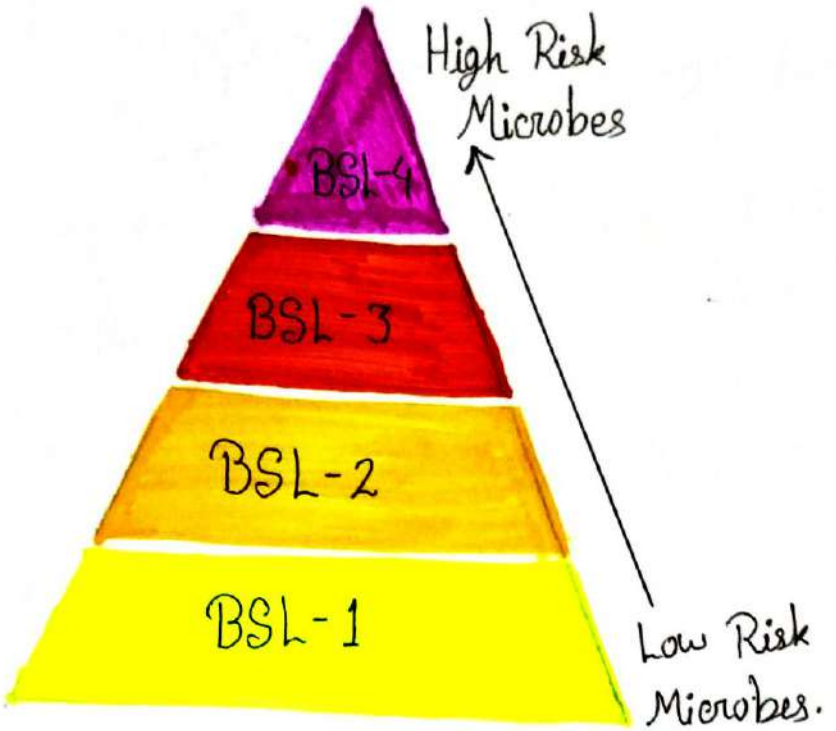
● Biohazard level 2 :- Bacteria and viruses that cause only mild disease to humans or are difficult to contract via aerosal in a lab setting, such as hepatiles A, B, C some influenza A stains, Humans respiratory syncytial virus, lyme diagonstic work with clinical specimens can be done safely at Biosafty Level 2, using Biosafty Level 2 practices and procedures. Reserch work can be done in a BSL-2 (P2) facility using BSL-3 Practices and Procedures.

● Biohazard Level 3 :- Bacteria and viruses that can cause severe to fated disease in humans but for which vaccines or other in humans but for which vaccines or other treatments exist, such, as anthrax, west Nile virus, venezulin, equine enciphalitis, SARS coronavirus, MERS coronavirus, SARS COV-2, Influence A H5N1 hantavirus, tuberculosis typhus, Rift valley fever, Rocky Mountain spotted fever, yellow fever and malaria.

● Biohazard Level 4 :- Viruses that cause severe to fatal disease in humans, and for which vaccines or ther treabments are not available, such as Belivian

hemorrhagic fever, marburg virus, Ebolavirus Lassa fever virus, crimean - cango hemorrhagic fever and other hemorrhagic disease, as well as Nipan virus, variola virus (smallpox) is an agent that is worked with at BSL-4 despite the existence of a vaccine as it has been eradicated and thus the general population is no longer routinely vaccinated. When dealing with biological hazards at this Level, the use of a positive pressure personal suit with a segregated air supply is mandatory. The entrance and exit of a Level 4 biolab will contain multiple showers a vaccum room, an ultraviolet light room, automous detection system and other safety precaution designed to destroy all traces of the biohazard. multiple air locks are employed and are electronically secured to prevent doors from both opening at the same time All air and water service going to and coming from a Biosafety Level 4 (P4) lab will undergo similar de contamination procedures to elminate the possibility of an accidental release currently there are no bacteria classified at this Level.

Biohazard Safety Levels.



- Anthropogenic hazard - Hazard caused by human action or inaction.
- Biocontainment - Physical containment of pathogenic organisms or agents in microbiology (laboratories).
- Biological agent - Pathogen that can be weaponized.
- Biosafety Level - Level of the biocontainment precautions required to isolate dangerous biological agents.

- Chemical hazard - Non biological substance that has the potential to cause harm to life or health.
- Hazard - Situation or object that can cause damage or human.
- Interplanetary contamination - Biological contamination of a planetary body by a space probe or spacecraft.

List of Laboratory biosecurity incidents :-

- Mechanical Hazard - Hazard with a Mechanical energy source.
- Occupationed Hazard - Hazard expricenced in the workplace.
- Physical Hazard - Hazard due to a physical agent.
- Planetary protection - Guiding principle of a space mission.
- Psychosocial Hazard - Occupational hazard to one's psychological well being.
- Public health - Promoting health through organized efforts and informed choices of society and individuals

TEHATTGOVERMENTCOLLEGE

NAME: TITHI GHOSH

SUBJECT: ENVS 1ST SEM
PHILOSOPHY (H)

TOPIC: BIOLOGICAL
HAZARDS

YEAR: 2022 - 2023

(11)

10/03/2023

BIOLOGICAL HAZARDS

Biological hazards are, the substances produced by organisms that pose a threat to human health. They are a major concern in food processing because they cause most food borne illness outbreaks.

Risk These organisms can affect human health inolding infection, intoxication and even death, infection occurs when organisms invade the host and molitply in the body. Intoxication occons when bacteria produce toxins that affect the body.

Infection can be prevented by properly processing and handling food products because pathogens are easily destroyed by heat. However, some bacteria that produce spores can survive cooking temperatures.

for example, steam cooking significantly reduces non-spore-forming food borne pathogens, but only inactivates spores. Examples of spare forming bacteria include Bacillus cereu, clastdium botulinum and clasthdium Perfringens.

Toxins are produced when toxin producing bacteria are present in high numbers. Bacteria must first grow in the food before producing toxins, these toxins are very difficult to eliminate. They survive normal cooking temperatures and even tempebotones higher than 80°C (176°F)

The risk of intoxication is prevented by controling the growth of toxin producing bacteria. These include castridium Bacillus cereus, and staphyfococcus aureus.

Major biological hazards

Bactaria ex: Saimonella spp, Entero haemomagic Escherichia coll, campylobacter leluni, yersinia entero cotitica, listeria monocytogenes, Bacillus anthracis, Baciffus cereus staphiococcus aureus, clostridium Per fringens vibrio vulnificus, vibrio Parahaemolyticus

Virus ex: hepatitis A virus, Norwalk viruses, Rotovirus.

Parasites ex: Toxoofasma gondii, Cryotosporidia Giordia spp, Trichinella spiralis, Tacnia salium, Anisokis spp.

Sources The molar sources of biologiccol contominants in food are:

- animal guts: faecol contomination.
- soill and water contaminated by non-treated Monure
- cross contamination:
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  - cross-contomination of food Products spread from processing enviroment due to Poor / improper sonitation.

Factors affecting the growth of microorganisms in foods

The temperature values for microbial growth depend on the type of microorganism for example, Psychrophs such as Listeria monocytogenes grow at refrigeration temperature (4°C or 39°F) while thermophs can grow at higher temperatures (45°C or 113°F).

The pH of a product is related to the acidity or alkalinity of the Product The pH of Products affects the growth of bacteria. most bacteria grow in a pH range between 5 and 9.

The water Activity low refers to the wather available in the product. the more water available the better bacteria will grow. Table 1 shows the impact of water activity on bacterial spoilage.

a_w of Product	Bacterial spoilage	Examples
>0.90	spoils easily	fresh vegetables, fresh meat, Processed meat, milk, fish
0.78-0.90	susceptible to spoilage	dry cheeses, flour cakes, beans, cereals
<0.78	little bacterial spoilage but mould may grow	rolled oats, dried fruits, caramels, dehydrated foods.

Each of these factors is important for the control of Microbial growth. It is the interaction among these factors that determines the growth or control of microorganisms.

The Control and Prevention:
The most effective way to control biological hazards is by prevention. The implementation of Good Manufacturing Practices and Hazard Analysis and critical control Point will help Prevent biological hazards in your facility.

GMPs ensure hazards associated with personnel and environment are controlled during food Production HACCP controls hazards that may be Present in ingredients and Packaging materials and also those that occur during food Processing, Packaging and Storage.
Processing strategies to control biological hazards

- effective thermal Processing used as a kill step [ex Cooking, Pasteurization]
- use of appropriate Process controls:
  - storage temperatures [ex: cooler, freezer]
  - Processing Parameters [ex: temperature and time for cooking, water activity during dehydration]
  - adequate cooling system
- effective cleaning and sanitizing procedures [ex SSOPs]

- use of food technologies to prevent the growth of bacteria or other biological hazards.

- Packaging techniques [ex. use of vacuum Packaging, modified atmosphere Packaging

- Preservatives
- Processing techniques [ex: dehydration]



GOVERNMENT GENERAL DEGREE COLLEGE, TEHATTA

2023

SUb: ENVS

Name : Trisha Mandal

Sem : 1st (B.A HONOURS BENGLI

Roll : 16

Student : 1570024

(14)

By
09/03/2023

Food Safety Program
for Processors and Distributors

Biological Hazards :

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Majorbiological hazards :

- Bacteria : ex: Salmonella Spp, Enterohaemorrhagic Escherichia coli, Campylobacter jejuni, yersinia enterocolitica, Listeria monocytogenes, Bacillus anthracis, Bacillus cereus, Staphlococcus aureus, Clostridium botuillum, Clostridum perfringens, Vibrio vulficus, Vibrio Parahaemolyticus.

- Virus : ex: hepatitis A virus, Norwalk Viruses, Rotavirus.

- Parasites : ex: Toxoplagma gondii, Cryptoporidia Giardia spp, Trichinella Spiralis, Taenia Solium, Anisakis spp.

Sources :

The major sources of biological contaminants in food are :

- animal guts: faecal contamination
- Soil and water contaminated by non-treated manure
- Cross contamination:

- human Contamination due to poor personal hygiene, faecal contamination, failure in infection control (illness not reported)

- Cross-Contamination of food Products environment due to Poor / improper Sanitation

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Processing Strategies to control biological hazards :

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  - Processig parameters (ex: temperature and time for cooking, water activity during dehydration)
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- effective cleaning and sanitizing proceduces (ex: SSOPs)

- use of food technologies to prevent the growth of bacteria or other biological hazards :
  - Packaging techniques (ex: use of vacuum packagig, modified atmosphere packaging)
  - preservatives
  - Processing thehniques (ex: dehydration)

UNIVERSITY OF KALYANI

TEHATTA GOVERNMENT COLLEGE



TEHATTA, NADIA

BIOLOGICAL HAZARDS

(14)

SUB : ENVS

By 09/03/2023

Submitted By : TUHIN DAS

B.A Bengali Hons 1st Semester Exam,2023

Registration No. :

Session : 2022-23

Introduction

A biological hazard, or bio-hazard, is a biological substance that poses a threat to the health of living organisms, primarily humans. This could include a sample of a micro-organism, virus or toxin that can adversely affect human harmful to other living beings.

The term and its associated symbol are generally used as a warning, so that those potentially exposed to the substances will know to take precautions. The biohazard symbol was develop in 1966 by charles Baldwin, an environmental-health engineer working for the Dow chemical company on the containment products.

It is used in the labeing of biological materials that carry a significant health risk including viral samples and used hypodermic needls.

ANSI Z535/OSHA/ISO regulation :⇒

Biohazardous safety issus are identified with speecified labels, signs and paragraphs established by the American National-

- Standards Institute (ANSI). Today ; ANST Z535 Standards for biohazards are used would wide and should always be used appropriately within ANSI Z535 Hazardous are use Communicately. Hazardous communications (Hazcom) signage, labeiling and Paragraphs. The goal is to help workers rapidly identify the severity of a biohazard from a distance and through colour are design standardization.

Biological Hazard's symbol design :→

- A red on white or white coloured background is a used behind a black biohazard symbol when integrated with a "Danger" sign. Label or Paragraph.



- An orange on black or white - coloured background is used behind a black biohazard symbol when integrated with a "WARNING" sign, lable or Paragraph.



- A yellow on black or white - coloured baekgrou -nd is used behind ablaek biohazard symbol when integrated with a 'CAUTION' sign, lable or paragraph.



- A green on white or coloured back ground is -used behind abbaek biohazard symbol when integrated with a "NOTICE' sign lable or Paragraph.

UN/ISO Classification :⇒

Biohazards agents are classification for transportation by UN number.

- **Catagary A. UN 2814 :⇒**

Infections substances, affection humans: An infections substans in a from capable of causing permanent disability or life. Healthy humans or animals when exposure to it occurs.

- **Catagary A. UN 2900 :⇒**

Infectious substance affecting animals (only): infectious substance that is not a from generally capable of causing permanent disability in otherwise healthy humans and exposure to thems selves occurs.

- **Catagary B. UN 3373 :⇒**

Biological substance transported for diagnostic or investigative purposes.

- **Regulated Medical waste, UN 3291 :⇒**

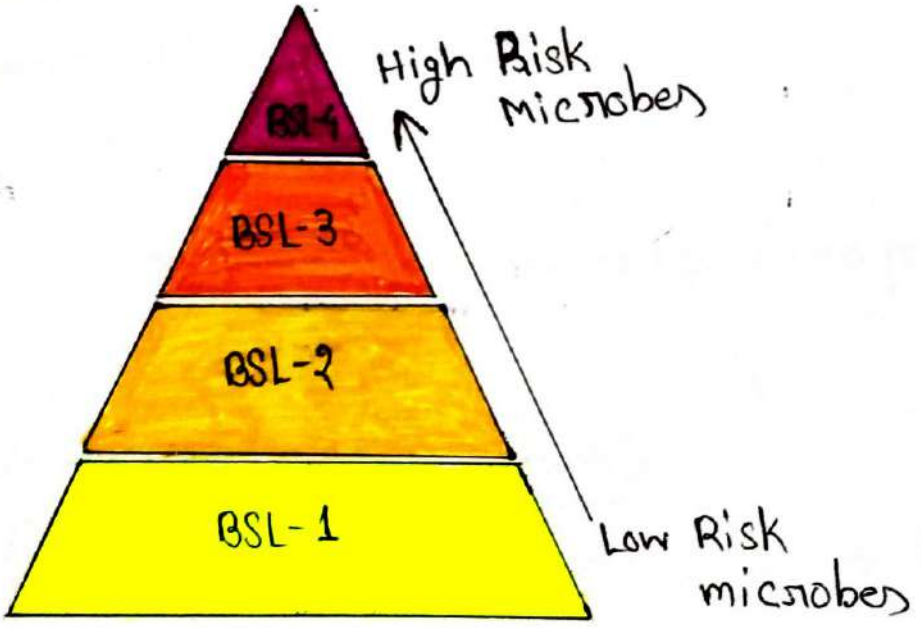
waste or regusable meterial derived from madical treatment of an animal or humans or from biomadical

Research, which includes the production and test-ing.

BIOSAFETY LEVEL :⇒

The united states Centers for Disease control and Prevention (CDC) categorise various diseases in levels of biohazard, Level 1 being minimum risk and level 4 being extreme risk. laboratories and other facilites are catagorized as BSL 1-4 or as P1 through P4 for short (Pathogen or Protection Level).

Biohazard Safety Levels :⇒



- **Anthropogenic hazard** –

Hazard caused by human action or inaction.

- **Biocontainment:-**

Physical containment of pathogenic organisms or agents in microbiology (laboratories).

- **Biological agent :-**

Pathogen that can be weaponized.

- **Biosafety level:-**

Level of the biocontainment precautions required to isolate dangerous biological agents.

- **Chemical hazard :-**

Non - biological sub-tance that has the potential to cause harm to life or healths.

- **Hazard :-**

Situation or object that can cause damage or harm.

- **Interplanetary contamination:-**

Biological contamination of a planetary body by a space probe or spacecraft.

List of Laboratory biosecurity incidents :-

- **Menchanical Hazard –**

Hazard with a mechaniacal energy source.

- **Occupationed Hazard –**

Hazard experienced energy source.

- **Physical Hazard :-**

Hazard due to a physical agent.

- **Planetary protection –**

Guiding principle of a space mission.

- **Psychosocial Hazard –**

Occupational hazard to one's psychological well being.

- **Public helth –**

Promoting healt thorough organized efforts and informed choices of socidy and indisi dals