Role of Bacteria in Industries

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Objective

- The main objective of the present power point presentation is to cover the topic of economic importance of bacteria and make it easy to understand this basic concept.
- Includes about various applications of bacteria in different fields.
- Future applications in upcoming fields.

Role of Bacteria in Industries

- In dairy Industry lactic acid bacteria (LAB) play an important role in the fermentation process in the dairy industry.
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- Some lactic acid bacteria (LAB) such as *Streptococcus lactis, S. thermopile, Lactococcus lactis, Lactobacillus plantarum, Lactobacillus casei, Lactobacillus acidophilus, Lactobacillus helveticus, Lactobacillus bulgaricus,* etc. are used to produce butter, cheese, curd, etc.
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- These bacteria convert lactose in the milk to produce lactic acid, which helps in curd coagulation and texture formation during the cheese production.

Role of Bacteria in Industries

- In the Production of Vitamins: *Lactococcus lactis, Lactobacillus gasseri, Lactobacillus reuteri.,*

- They are able to synthesize vitamin K and vitamins B such as biotin, nicotinic acid, cobal amine, panthotenic acid, folates, pyridoxine, riboflavin and thiamine, etc. Among these bacteria,

- In Fiber Retting: Microbiological processes are used for discharge of the fiber.

Role of Bacteria in Industries

- Butanol and Acetone Production: In this case, Clostridium acetobutylicum is the most well known and widely used species for the production of Butanol and acetone as a commercial basis.
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- It occurs due to the accidental releases of petroleum products from the petrochemical industry, oil tankers, ships, etc.
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- There are many indigenous microorganisms which live in water and soil, and they can eliminate hydrocarbon contaminants.

Role of Bacteria in Medical field

- Source of Antibiotics: Many bacteria are used in the pharmaceutical industry for the production of antibiotics, drugs, vaccines, starter cultures, insecticides, medically-useful enzymes, etc.

- Bacteria are also used in the manufacture of vaccines.

- These vaccines are used against infectious diseases such as whooping cough, diphtheria, typhoid fever, tetanus, and cholera.

Role of Bacteria in Medical field

- Preparation of Serum sand Vaccines: Serums are used in advance as the therapeutic measure of diseases such as diphtheria, lockjaw, pneumonia, etc.
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- Vaccines are commonly used to make people immune to diseases like typhoid, small-pox, cholera, Scarlet fever, etc.
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- In the preparation of serums, small doses of bacterial toxins are injected into the blood of animals.
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- To combat or neutralize the bacterial poisons, the body of the animal produces antibodies. The blood of the animal is then withdrawn.

Role of Bacteria in Biological Control of Insects

- It is the process for controlling different types of pests like insects, weeds, mites, and plant diseases by using other organisms.

- Thesemicrobialinsecticidesareessentiallynonpathogenicandnon-toxic to humans, wildlife, and other organisms.

- In this case, Bacillus thuringiensis secrete proteinaceous substances which are highly toxic to caterpillars and insects under the order Lepidoptera.

Role in Wastewater Treatment

- There are many well-known bacteria which play an essential role in keeping sewage clean.

- In this case, putrefying bacteria treat and purify the wastewater and make it less harmful too our surrounding environment.

- These bacteria work under the anaerobic condition to remove the solid and semi-solid constituent of sewage.

Role in Food Spoilage

- Some bacteria cause food Spoilage. *Micrococcus sp.* can cause vegetable spoilage, *Pseudomonas ,Clostridium* can cause deterioration of meat while *Enterobacter* causes decay of syrup, *Acetobacter* can decay of orange.

- *Streptococcus ,Micrococcus and Lactobacillus* also can cause decay of milk and different milk products.

- Sometimes foods are poisoned by the bacteria like *Clostridium botulinum.*

Role in Water Pollution

- Water is polluted by different bacteria makes the water unsuitable for drinking.

- Moist soil-inhabiting bacteria are capable of transforming soil nitrate into gaseous nitrogen.
- This process is called dentrification and those bacteria are called denitrifying bacteria.

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KEYPOINTS

- Bacteria are single-celled microscopic organisms which can live in different types of environment and survive in extreme conditions.
- Many of them are positively beneficial. Several others are neither harmful nor beneficial. Only a very small is harmful. The bacteria performs the two type of activities; Beneficial and harmful.
- Bacteriashowpositiveimpactonagriculturalpractices.
- They help to maintain and sustain the soil fertility.
- Some other bacteria can decompose dead leaves; release CO2andnutrients in the environment, which is essential for the plant's growth.
- Bacteria are the main decomposers and a valuable factor of various biogeochemical cycles.

KEYPOINTS

- Bacteria are also helpful in waste water treatment and biological control of insects.
- Many bacteria live in the stomach and mouth of a human.
- Some bacteria cause food Spoilage resulted food poisoning in human and animals..
- Waterpollutionbythedifferentbacteriamakesthewaterunsuitablefordrinking.
- Moistsoil-inhabitingbacteriaarecapableoftransformingsoilnitratesintogaseousnitrogen.
- Diseasescausebydifferenttypesofbacteriainplantsdecreasetheyieldofcrops.

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