DIPLOMA IN ENGINEERING
PROBIDHAN-2016

FOOD TECHNOLOGY (669)

4th SEMESTER

Presentation and Introduction of Food Microbiology

Presented by

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Introduction of Food Microbiology

Food microbiology is the study of the microorganisms that inhabit, create, or contaminate food, including the study of microorganisms causing food spoilage. "Good" bacteria, however, such as probiotics, are becoming increasingly important in food science.

Industrial microbiology is a branch of applied microbiology in which microorganisms are used in industrial processes; for example, in the production of high-value products such as drugs, chemicals, fuels and electricity.

There are various industrial products that are derived from microbes such as beverages, food additives, products for human and animal health, and biofuels.

Types of Microorganism.

A microorganism is a living thing that is too small to be seen with the naked eye. Examples of microorganisms include bacteria, archaea, algae, protozoa, and microscopic animals such as the dust mite.

There are different types of microbes:

- bacteria
- fungi
- algae
- protozoa
- viruses

They affect every aspect of life on earth. They are amazingly diverse and can exist in a wide range of habitats from hot springs to the icy wastes of Antarctica. Many of them live in or on the bodies of animals and plants.

Microbial activity to mankind..

- Microbial activity is exploited for the benefit of humankind in many ways, such as:
- Production of medicines
- Production of food
- Production of enzymes
- The clean-up of sewage and other wastes
- Toxiciting advances resulting from developments in molecular biology techniques.

List of microorganisms used in food and beverage preparation

Microorganism	Type Of Microorganism	Food or Beverage
Lactobacillus acidophilus	**bacterium**	yogurt
Lactobacillus alimentarius	**bacterium**	fish
Lactobacillus alimentarius	**bacterium**	meat
Lactobacillus brevis	**bacterium**	Canestrato Pugliese chees

Role of MO in food processing:

- Microorganisms are essential for the production of foods such as cheese, yogurt, bread, beer, wine and other fermented foods.
- Fermentation is one of the methods to preserve food and alter its quality. Yeast, especially Saccharomyces cerevisiae, is used to leaven bread, brew beer and make wine
- Bacteria, molds and yeast are the most important microorganisms that cause food spoilage and also find the maximum exploitation in production of food and food products.
- Different strains of bacteria and fungus are used for fermentation of dairy products for production of a wide variety of cultured milk products

Chapter 2

Microbiology of Milk

Milk is a nutrient-rich, white liquid food produced by the mammary glands of mammals. It is the primary source of nutrition for infant mammals (including humans who are breastfed) before they are able to digest other types of food.

Physical and chemical properties of milk

- Density
- Non-fat Dry Matter
- pH
- Acidity
- Freezing point
- Boiling point Surface tension
- Viscosity
- Electrical conductivity
- Optical properties
- Flavour

Difference between cow and buffalo milk

Comparison of human milk with cow's & buffalo's milk(values per 100g)

Nutrient	Human milk	Cow's milk	Buffalo's milk
Water(g)	88	87.5	81
Energy (kcal)	65	67	117
Protein(g)	1.1	3.2	4.3
Carbohydrate(g)	7.4	4.4	5
Fat(g)	3.4	4.1	6.5
Calcium(mg)	28	120	210
Phosphorus(mg)	11	90	130
Iron(mg)	-	0.2	0.2
Carotene(mcg)	137	174	160
Thiamine(mcg)	0.02	0.05	0.04
Riboflavin(mcg)	0.02	0.19	0.1
Vitamin C(mg)	3	2	1
Caseinogen/ Lactalbumin	1:2	3:1	-

Composition of cows Milk

Cow milk component	Approximate percentage (%)
Water	86.5
Milk sugar (lactose)	4.8
Fat	4.5
Proteins	3.5
Vitamins and minerals	0.7

Sources of Contamination of Milk.

The sources of contamination of milk

(A) Internal factors

e.g., (*a*) Mastitis udder.
(*b*) Fore milk.

(B) External factors

1. Cow : (*a*) Udder
   (*b*) Cows skin, flank region.
2. Milker.
3. Utensils.
4. Barn.
5. Method of milking.
6. Feed and Water.
7. Handling and cooling of milk.

Microorganism Present in Milk

The following bacterial pathogens are still of concern today in raw milk and other dairy products:

- Bacillus cereus.
- Listeria monocytogenes.
- Yersinia enterocolitica.
- Salmonella spp.
- Escherichia coli
- Campylobacter jejuni.

Common psychotropic bacteria in **milk** are species of Micrococci, Bacilli, Staphylococci, Lactobacilli, Pseudomonas, and coliforms. Pseudomonas species are the most common and typically have the most impact on quality.

Thanks