# CHAPTER SEVENTEEN

## HUMAN AND MICROBES

Microbes are microscopic organisms that are found everywhere in nature.
Different kinds of microbes include viruses, bacteria and fungi.

### Biotechnology;

This is the development of techniques, which involves the application of biological processes to produce medical and industrial products?
For example, the production of antibiotics, cheese and wine rely on the activity of various fungi and bacteria.

### Useful Microbes:

i)Many microbes are used in various branches of industry.
ii) Penicilium which is a microbe is used in the production of antibiotics such as penicillin.
iii) Yeast, another microbe is used in alcohol production, brewing, and baking and kenkey production.
iv) Last bacteria are used in the production of cheese, yoghurt, butter and antibiotics as well as in the fixation of nitrogen

### Biogas:

(i) This is the type of gas produced when bacteria break down organic waste, such as cow dung, pig slurry and household waste.
ii) It consists of about 60% methane and 40% carbon dioxide.

### Production of biogas:

The organic waste such as the cow dung is seeded into a biogas unit.
Bacteria in the biogas unit Change the decaying organic waste into biogas under anaerobic conditions. For good production of biogas, the bacteria need to be warmed at about 35'C.

### Uses of biogas:

(1) As a fuel far cooking.
(2) As a fuel for heating.
(3) As a fuel for lighting

## Tissue culture:

This is the method of growing very small amounts of tissues (even one cell), in nutrients to make identical new plants in large numbers. It involves the vegetative propagation of shoot tips, tissues and organs of certain plants such as the salad crop and vegetable crops.

## Stages in plant tissue culture:

A tiny piece of plant tissue is cut and sterilized in a weak disinfectant. The tiny pieces of tissue are then grown in a culture or nutrients medium. In the nutrients medium, the pieces of tissue develop shoots and roots to give rise to new plants of the same kind. The process must occur under a temperature condition between 20'C and 25'C.

## Advantages of propagating plant using tissue culture;

(1) It brings about the propagation of new species and variations, which are diseases free.
(2) Large numbers of high quality plants are produced relatively quickly in reduced stock plant growing area.
(3) Tissue culture encourages plant export and import, since its products are free from diseases.

## Microbes of decay:

During the process of decay, certain microbes called decomposers obtain their nutrients from the dead remains of other organisms, by breaking down their complex substances into simple forms. The decomposers then easily absorb these simple materials, and some are broken down into inorganic molecules, which are absorbed by green plants.

## Conditions necessary for decay:

(1) The must be the presence of oxygen for the respiration of the microbes.
(2) The environment must be warm enough.
(3)There must be the presence of moisture for the microbes to grow, and for their spores to germinate.
(4) There must be the absence of chemicals which can kill the microbes.

## Harmful Microbes:

### Disease:

A disease is any disorder, which interferes with the normal function of the body of an organism.

## Causes of diseases in man:

(1) By micro organisms such as bacteria.
(2) Nutrition deficiency e.g. beriberi, scurvy and kwashiorkor.

(3) By metabolic and hormonal disorder such as. diabetes and goiter.
(4) Chemical causes e.g. food poising and drug abuse.
(5) Aging e.g. cataract. and arthritis.

## Groups of diseases:

**(1)Infectious diseases:** These are diseases which are caused by pathogens or disease causing organisms.

2) Non infectious diseases: These are those diseases which are not caused by pathogens, and cannot be transmitted from one individual to another. Examples are asthma, kwashiorkor and diabetes.

## Terms to note:

1) Symptoms: These are sign of a disease.

2) Vector: This is an animal usually an insect, that transmits disease causing micro organisms from one plant or animal to another.

**(3) Incubation period:** This is period between the entry of the pathogen and start of the disease.

**(4) Toxin:** This is a poisonous substance produced by disease causing bacteria and other organisms, which affects the body.

**(5) Intermediate host:** This is an organism such as the snail which habours a stage in the life cycle of a parasite, and does actively transmit the organism to the final host.

**(6) Pathogens:** These are disease causing organisms and include bacteria, viruses and fungi.

How pathogens are transmitted from one person to another:
(1) By direct contact with a sufferers e.g. veneral diseases.
(2) By indirect means through contaminated food e.g. cholera.
(3) Through the air by droplet inflection e.g. tuberculosis.
(4) By insect vector such as the mosquito..

## How to prevent diseases:

(1) By washing your hands before eating.
(2) Through vaccination and immunization.

(3) By drinking safe water.
(4) By the proper disposal of waste and sewage.
(5) By keeping a clean environment.
(6) By preventing flies from coming in contact with food.

## Air and water borne diseases:

Air borne diseases are those diseases, which are spread through the air and examples are tuberculosis, chicken pox, measles, flu and whopping cough. Water borne diseases are those spread through water, and examples are cholera, dysentery and typhoid.

## Diseases prevented by immunization:

1) Diphtheria. (2) Polio.
3) Tuberculosis. (4) Cholera.
5) Tetanus. 6) Measles.

**Personal hygiene:** This is the practice of keeping one's self or body and environment clean.

## Maintenance of personal hygiene:

(1) Drink good or treated water.
(2) Wash your hands before eating.
(3) Wash your clothes regularly.
(4) Clean your teeth daily.
(5) Cut your finger nails regularly.
(6) Keep a clean surrounding.

**Immunity:** This is the ability of the body to resist infection by producing antibodies?

## Kinds of immunity:

(1) Natural immunity:
This occurs when an immune state is produced by natural means.

(2)Acquired immunity: This can due to:
i) Having the disease.
ii) Introduction of weakened micro organism into the person to produce antibodies.
iii) By injecting antibodies from another person or animal into a person.

## Terms to note;

Antibody: This is an organic substance which is protein in nature and produced by the body's defense mechanism, that destroys antigens or harmful substances found in the body.

## Antiseptic:

This is any substance that kills or stops the growth of pathogens, but is not poisonous to the body's cells.

## Vaccine;

This is a preparation of weakened or dead causative organisms, which is also introduced into the body of an organism to stimulate the production of antibodies, for protection against infection.

## Food poisoning:

This is an acute illness caused by food that may be naturally poisonous, or contaminated by certain types of pathogenic organisms. It may be caused by:

a) Natural food such as poisonous mushroom.

b) Food contaminated by bacteria such as salmonella. These bacteria produce toxin which heat cannot destroy.(

c) Food contaminated by chemicals such as mercury and insecticides.

## Symptoms of food poisoning:

(1) Upset stomach.
(2) Abdominal pain.
(3) Diarrhoea.

### Food Contamination:

This occurs when food is infected with chemical, germs or any substance that can be injurious to the body.

## Ways of preventing food poisoning:

(1) By covering food.
(2) By the proper washing of items.
(3) By maintaining hygienic environment.
(4) By washing your hands before eating.

**Human body's defenses against disease causing organisms(ways of fighting disease causing organisms);**

(1) The skin prevents germs from entering the body.
(2) The hydrochloric acid in the stomach kills any germ found in the food.
(3) The sebaceous glands of the skin secrets a substance called sebum, which is mildly antiseptic and can kill disease causing organisms.
(4) The white blood cells in the body destroy the bacteria that enter the body.
(5) The body produces antibodies which destroy disease causing pathogens.