

A single cell protein is a protein obtained from certain microbes, which forms an alternate source of proteins in animal feeds. The microbes involved in the preparation of single cell proteins are algae, yeast, or bacteria. These microbes are grown on an industrial scale to obtain the desired protein. For example, *Spirulina* can be grown on waste materials obtained from molasses, sewage, and animal manures. It serves as a rich supplement of dietary nutrients such as proteins, carbohydrate, fats, minerals, and vitamins. Similarly, micro-organisms such as *Methylophilus* and *methylophilus* have a large rate of biomass production. Their growth can produce a large amount of proteins.

(b) Soil

Microbes play an important role in maintaining soil fertility. They help in the formation of nutrient-rich humus by the process of decomposition. Many species of bacteria and cyanobacteria have the ability to fix atmospheric nitrogen into usable form. *Rhizobium* is a symbiotic bacteria found in the root nodules of *leguminous* plants. *Azospirillum* and *Azotobacter* are free living nitrogen-fixing bacteria, whereas *Anabena*, *Nostoc*, and *Oscillatoria* are examples of nitrogen-fixing cyanobacteria.

Question 14:

Arrange the following in the decreasing order (most important first) of their importance, for the welfare of human society. Give reasons for your answer.

Biogas, Citric acid, Penicillin and Curd

Answer

The order of arrangement of products according to their decreasing importance is:

Penicillin- Biogas – Citric acid – Curd

Penicillin is the most important product for the welfare of human society. It is an antibiotic, which is used for controlling various bacterial diseases. The second most important product is biogas. It is an eco-friendly source of energy. The next important product is citric acid, which is used as a food preservative. The least important product is curd, a food item obtained by the action of *lactobacillus* bacteria on milk

Hence, the products in the decreasing order of their importance are as follows:

Penicillin- Biogas – Citric acid – Curd

Question 15:

How do biofertilisers enrich the fertility of the soil?

Answer

Bio-fertilizers are living organisms which help in increasing the fertility of soil. It involves the selection of beneficial micro-organisms that help in improving plant growth through the supply of plant nutrients. These are introduced to seeds, roots, or soil to mobilize the availability of nutrients by their biological activity. Thus, they are extremely beneficial in enriching the soil with organic nutrients. Many species of bacteria and cyanobacteria have the ability to fix free atmospheric nitrogen. *Rhizobium* is a symbiotic bacteria found in the root nodules of *leguminous* plants. *Azospirillum* and *Azotobacter* are free living nitrogen-fixing bacteria, whereas *Anabena*, *Nostoc*, and *Oscillatoria* are examples of nitrogen-fixing cyanobacteria. Bio-fertilizers are cost effective and eco-friendly.