

Class 12 Biology Microbes in Human Welfare Important Questions **Answers at the Bottom**

Ch-8 Microbes in Human Welfare

1. Colostrum is rich in
 1. IgA
 2. IgZ
 3. IgF
 4. IgD
2. Semi-conservative replication of DNA was first demonstrated in
 1. Salmonella typhimurium
 2. Streptococcus pneumoniae
 3. Drosophila melanogaster
 4. Escherichia coli
3. The part of the plant used for somatic hybridization is
 1. Genome
 2. Meristem
 3. Protoplast
 4. Nucleus
4. Two microbes found to be very useful in genetic engineering are
 1. Vibrio cholerae and a tailed Bacteriophage
 2. Diplococcus sp. and Pseudomonas sp.
 3. Escherichia coli and Agrobacterium tumefaciens
 4. Crown gall bacterium and Caenorhabditis elegans
5. Physical removal of large and small particle from the sewage through filtration and sedimentation is called
 1. Primary treatment
 2. Secondary treatment
 3. Tertiary treatment
 4. Quaternary treatment
6. Which of the following group of diseases are treated using antibiotics?
 1. Plague, diphtheria, whooping cough
 2. Diphtheria, leprosy, common cold
 3. Leprosy, common cold, plague
 4. Common cold, malaria, plague
7. In which food would you find lactic acid bacteria? Mention some of their useful applications.
8. Name some Indian traditional foods made of wheat, rice and Bengal gram (or their products) which involve use of microbes.
9. Large holes are found in Swiss cheese. (give reason)

10. Microbes can be used to decrease the use of chemical fertilizers and pesticides. Explain how this can be accomplished?
11. What is the difference in production of wine and whisky?
12. 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.
13. Common yeast is known as Baker's yeast and also as Brewer's yeast. Justify.
14. BOD of two samples of water A and B were 120 mg/L and 400 mg/L respectively. Which sample is more polluted?
15. Explain the different steps involved in sewage treatment before it can be released into natural water bodies.

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Answer

1.
 - a. IgA, **Explanation:** Colostrum (also known as beestings or first milk) is a form of milk produced by the mammary glands in late pregnancy and the few days after giving birth. Human and bovine colostrums are thick, sticky and yellowish.
Colostrum is known to contain immune cells (as lymphocytes) and many antibodies such as IgA, IgG, and IgM.
2.
 - d. Escherichia coli, **Explanation:** Semi-conservative replication of DNA was first demonstrated in bacterium Escherichia coli as it contain single chromosome within the cell without nuclear membrane.
3.
 - c. Protoplast, **Explanation:** The process by which protoplasts of two different plant species fuse together to form hybrids is known as somatic hybridisation and the hybrids so produced is known as somatic hybrids.
The technique of somatic hybridisation involves the following steps.
 1. Isolation of protoplasts
 2. Fusion of different protoplasts:
4.
 - c. Escherichia coli and Agrobacterium tumefaciens, **Explanation:** Microbes are used in genetic engineering technology to alter the gene for getting desired traits. E.coli and Agrobacterium tumefaciens are most widely used bacteria for genetic engineering.

5.
 - a. Primary treatment, **Explanation:** Primary treatment of sewage treatment involves physical removal of large and small particles like paper, plastic, pebble by passing through screen.
6.
 - a. Plague, diphtheria, whooping cough, **Explanation:** Antibiotics are strong medicines that treat bacterial infections. Antibiotics won't treat viral infections because they can't kill viruses.
Antibiotics can treat bacterial infections by killing the bacteria that causes them.
Antibiotics have improved our capacity to treat deadly disease like Plague, diphtheria (gal ghotu), whooping cough (kali khansi), leprosy etc.
7. Lactic acid bacteria are found in curd and yoghurt.
This bacteria increases the nutritional quality of curd by increasing the content of Vitamin B₁₂. In our stomach it plays very beneficial role in checking disease causing microbes.
8.
 - Wheat: Product: Bread, cake, etc.
 - Rice: Product: Idli, dosa
 - Bengal gram: Product: Dhokla, Khandvi
9. Large holes are due to production of large amount of CO₂ by a bacterium propionibacterium sharmanii.
10. By the use of biofertilizers and biological pest control method, the use of chemical fertilizers and pesticides can be reduced. The fertility of the soil depends not only on its chemical composition but also on the presence of useful microbes in it, which enrich the nutrient quality of the soil. The main source of biofertilizers are bacteria, fungi and cyanobacteria.

11. Wine is produced without distillation while whisky is produced by distillation.

	Wine	Whisky
Definition	Wine is an alcoholic beverage made from fermented grapes or other fruits.	Whisky or whiskey is a type of distilled alcoholic beverage made from fermented grain mash.
Ingredients	Made from grapes	Can be made from barley, malted barley, rye, malted rye, wheat, buckwheat and corn.
Production Process	Grapes are crushed into a machine, fermented and then stored for a period of time.	Barley (or other base product) is first malted
Alcohol Content	Natural wines may exhibit a broad range of alcohol content, from below 9% to above 16% ABV, with most wines being in the 12.5%–14.5% range. Fortified wines (usually with brandy) may contain 20% alcohol or more.	Usually contains between 40-50% alcohol, however, it can be made to contain up to 96% alcohol.
Types	Red Wine, White Wine, Champagne, etc.	Single malt whisky, Blended malt whisky, Blended whiskies, Cask strength, Single cask, etc.
Produced in	Italy, France, Spain, America, Argentina, Chile, China, India, etc.	Scotland, England, Ireland, America, Canada, Australia, India, Denmark, Germany, etc

12. 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 lacto bacillus bacteria on milk.

13. Common yeast is employed in the fermentation of –
- (i) dough, used for making bread, cakes in bakeries.
 - (ii) Fruit juices and malt in breweries for the production of alcoholic beverages, hence it is known as both as baker's and brewer's yeast.
14. Biochemical oxygen demand (BOD) is a measure of how much organic pollution is in water. The BOD test measures the amount of dissolved oxygen in water that is used up due to the breakdown of organic pollutants, such as sewage, in a certain number of days. More the value of BOD, more the water is polluted. Hence sample B is more polluted.
15. The treatment involves two steps:
- (i) Primary treatment
 - (ii) Secondary treatment

(i) Primary treatment

– It is a physical process of removing small and large particles through filtration and sedimentation.

Firstly, the sewage is passed through the wire mesh of screens of sequentially smaller pore sizes to remove floating.

– Then the grit is sedimented by passing the sewage into a grit chamber.

The sewage is then kept in settling tanks, where the suspended materials settle down to form the primary sludge.

– The effluent is then taken for secondary treatment.

(ii) Secondary treatment

– It is a biological process by the heterotrophic bacteria naturally present in the sewage.

The primary effluent is passed into large aeration tanks where it is constantly agitated and air is pumped out.

This causes the rapid growth of aerobic microbes into 'flocs' which consume the organic matter of sewage leading to the reduction in biochemical oxygen demand (BOD).

After the significant reduction in BOD of sewage, the effluent is passed into settling tanks where flocs are sedimented leading to the formation of activated sludge.

– A part of this activated sludge is used as inoculum which is pumped back into the aeration tanks. The major part of this sludge is pumped into anaerobic sludge digesters, where its digestion occurs by the anaerobic bacteria producing methane, hydrogen sulphide and carbon dioxide. These gases form biogas.

– After secondary treatment the effluent is released into natural water bodies like streams and rivers. The ministry of environment and forests has initiated the programmes like Ganga Action Plan and Yamuna Action Plan for the treatment of sewage before it is released into the rivers.