MISSION MBBS

Date: 08/11/2022

Subject: BOTANY

Topic : MICROBES IN HUMAN WELFARE L2

Class: Standard XII

1. Match the microbial products from column I with their respective microorganisms from Column II.

Column I	Column II
a. Citric acid	1. *Trichoderma*
b. Cyclosporin A	2. *Clostridium*
c. Statins	3. *Aspergillus*
d. Butyric acid	4. *Monascus*

A. a-3, b-4, c-1, d-2

B. a-3, b-1, c-2, d-4

C. a-3, b-1, c-4, d-2

D. a-1, b-4, c-2, d-3

The following are some of the chemicals and acids produced by useful microbes for various commercial purposes:

- Citric acid is obtained from fungus, *Aspergillus niger.* Citric acid can be used in manufacturing of drugs, flavouring agents, disinfectants, etc.
- Butyric acid is produced by the bacterium *Clostridium butylicum.* It can be used in food as flavoring substance as well as in pharmaceuticals.
- Cyclosporin A is produced by *Trichoderma polysporum,* a fungus. It is a suppressor of the immune system, and used in the case of patients who have undergone organ transplant.
- Statins are produced by yeast *Monascus purpureus.* It helps in lowering the blood cholesterol levels by inhibiting the enzyme responsible for cholesterol synthesis in the body.

2. Assertion (A): Antibiotics are used to treat bacterial infections

Reason (R): Antibiotics are chemicals released by microbes that can kill or retard the growth of other microbes.

- ✓ **A.** Both assertion and reason are true and the reason correctly explains the assertion.
- ✗ **B.** Both assertion and reason are true but the reason does not correctly explain the assertion.
- ✗ **C.** Only assertion is true.
- ✗ **D.** Both assertion and reason are false.

Antibiotics are chemical compounds produced by microbes that can kill or inhibit the growth of other disease-causing microbes such as bacterial cells.

Hence, they are widely used in the medical field for the treatment of bacterial infections, without harming the infected host.

Thus, both assertion and reason are true and the reason correctly explains the assertion.

3. Which of the following beverages produced by fermentation of sugar by yeast are prepared without distillation of fermented broth?

i. Brandy
ii. Beer
iii. Whisky
iv. Wine
v. Rum

✔ **A.** ii, iv

✘ **B.** i, iii, v

✘ **C.** i, iii, iv

✘ **D.** i, ii , iii ,v

In the process of producing alcoholic beverages, different substrates can be used like grape juice, sugar cane, cereals, etc. Yeast (*Saccharomyces cerevisiae*) transforms or ferments the sugars present in them into alcohol and carbon dioxide anaerobically. This process is called alcoholic or ethanol fermentation.

Depending on the type of the raw material used for fermentation of alcoholic beverages and the type of processing i.e with or without distillation, various types of alcoholic drinks are obtained:
Wine and beer are produced without distillation
Whisky, brandy and rum are produced by distillation of the fermented broth.

4. Assertion: Lipase is used in detergent formulations.
Reason: Lipase removes oily stains from laundry.

- ✓ **A.** Both the assertion and reason are true and the reason is the correct explanation of the assertion
- ✗ **B.** Both the assertion and reason are true but the reason is not the correct explanation for the assertion
- ✗ **C.** The assertion is true but the reason is false
- ✗ **D.** Both assertion and the reason are false

Lipase enzyme is produced on an industrial scale which is used in detergent formulation. The enzyme breaks down oily stains on clothes. Surfactants in the detergent, then, attach to the remnants of the stain and remove it completely.
The use of lipases in detergents helps to minimise the use of phosphate-based chemicals in detergent formulations, and hence reduces environmental pollution along with enhancing the ability of the detergent to remove tough oil or grease stains.

5. Which microbial product is used for removing clots from the blood vessels of patients?

- ✗ **A.** Statins
- ✗ **B.** Pectinase
- ✗ **C.** Lipase
- ✓ **D.** Streptokinase

Streptococcus bacteria produce an enzyme called streptokinase. This enzyme is modified using genetic engineering and used as a clot-buster for removing clots from the blood vessels.
Lipases are enzymes used in detergents for the removal of oily stains from clothes.
Proteases and pectinases are used to clarify bottled juices. They digest the proteins and pectins (polysaccharide fibre) to make the juice appear more clear.
Statins are produced by a yeast *Monascus purpureus*. It helps in lowering the blood cholesterol levels by inhibiting the enzyme involved in cholesterol synthesis in the body.

6. The figure depicted below is of

A. lab scale bioreactors

B. industrial scale bioreactors

C. fermentors

D. both (b) & (c)

Fermentation is an enzyme catalysed process, where organisms convert sugar to alcohol or an acid anaerobically. It is widely used in the production of yogurt, biofuels, alcoholic beverages like beer, wine, whisky, etc.

In order to produce such products on an industrial scale, the process is carried out in fermentors and/or bioreactors. These are large sterilised vessels which maintain optimal conditions like temperature, pH, substrate concentration, presence or absence of oxygen, etc.

For trial purposes or in small laboratory scale, the processes are carried out in small jars or beakers.

7. Which was the first antibiotic to be discovered?

A. Cephalosporin

B. Bacitracin

C. Penicillin

D. Gentamicin

Antibiotics are chemical agents obtained from organisms such as fungi and bacteria, that work against other microbes by retarding their growth or killing them.

Penicillin was discovered by Sir Alexander Flemming and it was the first antibiotic to be discovered. It was a chance discovery. While working on *Staphylococci* bacteria, he observed mould growing in one of his unwashed culture plates, around which *Staphylococci* could not grow. He found that this was due to chemical produced by the mould. He named this chemical Penicillin after the mould *Penicillium notatum*.

8. Rahul was asked to conduct an experiment to prove microorganisms convert sugar present in grape juice into alcohol. Which among the given microorganisms should Rahul use for making alcohol?

✗ **A.** *Entamoeba*

✗ **B.** *Amoeba*

✗ **C.** *Spirogyra*

✓ **D.** *Saccharomyces*

Fermentation is an enzyme catalysed process, where organisms convert sugar to alcohol or an acid anaerobically. *Saccharomyces cerevisiae*, a unicellular fungi (yeast), is the most widely used organism in fermentation processes. It uses substrates such as grape juice, sugar cane, cereals, etc to produce alcoholic beverages like beer, wine, liquors, ethyl alcohol, etc.

Spirogyra is an alga that has many medicinal properties.

Entamoeba histolytica are pathogenic protozoans causing intestinal infections in human beings.

Amoeba is a unicellular protozoan that has an irregular shape and false feet called pseudopodia to capture food particles. They are usually found in water bodies.

9. Match the following:

Antibiotic	Source
p. Penicillin	i. *Streptomyces griseus*
q. Streptomycin	ii. *Streptomyces erythraeus*
r. Erythromycin	iii. *Penicillium notatum*

✗ **A.** p-i, q-iii, r-ii

✗ **B.** p-ii, q-i, r-iii

✓ **C.** p-iii, q-i, r-ii

✗ **D.** p-iii, q-ii, r-i

Antibiotics are chemical compounds produced by microbes that can kill or inhibit the growth of other microbes.
Some antibiotics and their sources are mentioned below:

Antibiotic	Source
Penicillin	*Penicillium notatum*
Streptomycin	*Streptomyces griseus*
Erythromycin	*Streptomyces erythaeus*

10. Assertion: Wine, bread and cakes are products of microbial activity

Reason: Yeast breaks down glucose into carbon dioxide and ethanol

✓ **A.** Both the assertion and reason are true and the reason is the correct explanation of the assertion

✗ **B.** Both the assertion and reason are true but the reason is not the correct explanation for the assertion

✗ **C.** The assertion is true but the reason is false

✗ **D.** Both assertion and the reason are false

Fermentation is an enzyme catalysed process, where organisms convert sugar to alcohol or an acid anaerobically. It is widely used in the production of yogurt, bread, alcoholic beverages like beer and wine, biofuels, etc.

Saccharomyces cerevisiae is a yeast which converts glucose into ethanol and carbon dioxide.

For the production of bakery products and bread, yeast consumes the sugar in the dough and releases carbon dioxide gas and ethanol. Carbon dioxide gets trapped inside the bread dough, thus making the dough rise. Alcohol, on the other hand, gets evaporated during baking.