

# Microbes in Human Welfare

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## Assertion & Reason Type Questions

consists of two statements, one is Assertion (A) and the other is Reason (R). Select the correct answer to these questions from the codes a, b, c and d as given below.

- a. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- b. Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.
- c. Assertion is true but Reason is false.
- d. Assertion is false but Reason is true.

**Q 1. Assertion (A):** Whisky develops colour during the ageing process.

**Reason (R):** Vodka is colourless.

**Answer :** (c) Assertion is true, but Reason is false.

**Q 2. Assertion (A):** Immobilised yeasts cause less fermentation.

**Reason (R):** Brewer's yeast produces beer not wine.

**Answer :** (c) Assertion is true, but Reason is false.

**Q 3. Assertion (A):** In ripening of cheese, insoluble proteins are cleaved to form soluble peptides.

**Reason (R):** Hard cheese and soft cheese, both are ripened by lactic acid bacteria.

**Answer :** (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

**Q 4. Assertion (A):** Enzymes application in industry is enhanced by its immobilisation.

**Reason (R):** Immobilisation provides protection to enzymes without affecting their activity.

**Answer :** (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion. An immobilized enzyme is physically entrapped or covalently bonded by chemical means to an inert and usually insoluble matrix, where it can act upon its natural substrate. The matrix is usually a high molecular weight polymer such as polyacrylamide, cellulose, starch, glass, beads, etc. Because of its binding with a matrix

the immobilized enzyme has better stability in many cases. Efficiency of immobilized enzyme is better. The enzyme can be recovered at the end of the reaction and can be used repeatedly.

**Q 5. Assertion (A):** Acetic acid is prepared by acetic acid bacteria.

**Reason (R):** Alcoholic fermentation and the conversion of alcohol to acetic acid are aerobic processes.

**Answer :** (a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion. Acetic acid production involves both aerobic and anaerobic processes, alcohol from glucose is aerobic process, and acetic acid production is an anaerobic process.

**Q 6. Assertion (A):** *Aspergillus niger* produces lactic acid.

**Reason (R):** *Rhizopus* produces citric acid.

**Answer :** (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

**Q 7. Assertion (A):** Intercropping checks the population of insects.

**Reason (R):** Plant pests can be controlled biologically by their natural parasites and pathogens.

**Answer :** (b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion. Intercropping keeps the population of insects at low level. In intercropping, the pest susceptible crop is grown along with other crops which are repellent to pests. Plant pests are controlled biologically through the means of their natural parasites and pathogens. For example, *Baculovirus heliothis* can control cotton bollworm, *Bacillus thuringiensis* can control the cabbage looper and *Entomophthora ignobilis* can control the green peach aphid of potato.

**Q 8. Assertion (A):** *Rhizobium* forms nodules on the roots of legume plants.

**Reason (R):** *Rhizobium* fixes atmospheric nitrogen into organic forms which is used by the plant as nutrients.

**Answer :** (b) Both Assertion and Reason are true, but Reason is not the correct explanation of Assertion.

**Q9. Assertion:** Besides curdling of milk, LAB also improve its nutritional quality by increasing vitamin-B12.

**Reason:** LAB, when present in human stomach, check disease causing microbes.

**Q10. Assertion:** Streptococcus thermophilus increases nutritional value of milk.

**Reason:** Milk has lesser vitamin content than curd and yoghurt.

**Q11. Assertion:** Vitamin B2 is found in cereals, green vegetables, brewer's yeast, egg white, milk and liver.

**Reason:** It can be commercially produced by some yeasts.

**Q12. Assertion:** Lichen is important for chemical industries.

**Reason:** Litmus and Orcein are formed from lichens. [AIIMS 2009]

**Q13. Assertion:** Yeasts such as Saccharomyces cerevisiae are used in baking industry.

**Reason:** Carbon dioxide produced during fermentation causes bread dough to rise by thermal expansion. [AIIMS 2003, 2011]

**Q14. Assertion:** Rennet and fruit extract of Withania somnifera have antagonistic functions.

**Reason:** Rennet is obtained from calf's liver and is used for curdling of milk.

**Q15. Assertion:** After 24 hours, toddy becomes unpalatable.

**Reason:** The fermentation of toddy is continued by naturally occurring yeasts.

**Q16. Assertion:** Beer and wine are called soft liquors while gin, rum, etc. are hard liquors.

**Reason:** Beer and wine are made without distillation.

**Q17. Assertion:** Griseofulvin extracted from P. griseofulvum is used for ringworm treatment.

**Reason:** Trichophyton, Epidermophyton, etc. cannot grow well in presence of Penicillium griseofulvum.

**Q18. Assertion:** Acetic acid production involves both aerobic and anaerobic processes.

**Reason:** Production of alcohol from glucose is an aerobic process and production of acetic acid from alcohol is an anaerobic process.

**Q19. Assertion:** An organ transplant patient if not provided with cyclosporin A may reject the transplanted organ.

**Reason:** Cyclosporin A inhibits activation of T-cells and interferes with destruction of non-self cells.

**Q20. Assertion:** The kneaded flour shows leavening, when yeast is added to it.

**Reason:** Enzymes secreted by yeast cause leavening.

**Q21. Assertion:** Saccharomyces species are utilized for making alcoholic beverages.

**Reason:** Yeast has an enzyme, zymase responsible for fermentations.

**Q22. Assertion:** Secondary treatment of sewage is also called biological treatment while primary treatment is called physical treatment.

**Reason:** Primary sewage treatment depends only upon sedimentation properties of materials present in sewage and filtration.

**Q23. Assertion:** Energy value of biogas is lower than that of organic matter.

**Reason:** Biogas minimises the chances of spread of fecal pathogens.

### **ANSWER KEY 9 to 23**

**Q9 :** (b) Curd is more nutritious than milk as it contains a number of organic acids and vitamins including B12. LAB present in curd also checks growth of disease causing microbes in stomach and other parts of digestive tract.

**Q10 :** (a) Microbes have been used for long time in production of dairy products like curd, yoghurt, cheese, etc. Yoghurt is produced by curdling milk with the help of Streptococcus thermophilus and Lactobacillus bulgaricus. Yoghurt has higher nutritional value than milk thus, it can be said that Streptococcus thermophilus increases nutritional value of milk.

**Q11 :** (b) Besides cereals, green vegetables, brewer's yeast, egg white, vitamin B2 is also produced by intestinal bacteria. The vitamin was first obtained in 1938 using wild strain of mould Ashbya gossypii. Vitamin B2 is essential for normal growth and reproduction in a number of laboratory animals.

**Q12 :** (a) Litmus is an important and widely used dye in chemical laboratories as an acid-base indicator. It is obtained from Rocella montaignei. Orcein, a biological stain, is obtained from Rocella tinctoria.

**Q13 :** (a) Yeast is a fermentation agent. It is a known fact that yeast raises bread dough to rise and hence, Yeast is also used to increase the volume, making the dough porous and the product soft. It is the yeast that helps the dough to rise.

**Q14 :** (d) Rennet is obtained from calf 's stomach and is a commercially available form of enzyme rennin. Rennet is used from curdling of milk to initiate the process of cheese formation. The same function can be carried out with the help of fruit extract of *Withania somnifera*. Thus, rennet and fruit extract of *Withania somnifera* have similar functions and are not antagonistic.

**Q15 :** (a) Toddy is a traditional drink of some parts of South India which is made by fermentation of sap of palms. Toddy left for few hours undergoes fermentation with the help of naturally occurring yeast to form beverage containing about 6% alcohol. But after about 24 hours, toddy becomes unpalatable because fermentation is carried on. At this time, it can be used for production of vinegar.

**Q16 :** (b) Beer, wine, gin, rum, vodka, etc. are fermentation products but beer and wine are formed without distillation. However, distillation of fermented broth is carried out in case rum, gin, etc. Distillation increases the alcohol concentration of the beverage. Thus, gin with 40% alcohol, rum with 40% alcohol and brandy with 60-70% alcohol are more alcoholic than beer (3-6% alcohol) and wine (9-12% alcohol).

**Q17 :** (a) Antibiotics are chemical substances produced by some microbes which in small concentration can kill or retard the growth of harmful microbes without adversely affecting the host. Griseofulvin is an antibiotic produced by *Penicillium griseofulvum* and is antifungal in nature, especially effective against ringworm. Ringworm is caused by dermatophytic fungi like *Epidermophyton*, *Trichophyton*, *Microsporium*, etc. which cannot grow in presence of *P. griseofulvum* because of the antagonistic effect of antibiotic griseofulvin secreted by it.

**Q18 :** (c)

**Q19 :** (a)

**Q20 :** (a) A small quantity of yeast is added to wheat flour and is kneaded. The kneaded flour is kept at a warm temperature for few hours. It swell up. This phenomenon is called leavening. Leavening is caused by secretion of three types of enzymes by yeast. These are amylase, maltase and zymase.

**Q21 :** (a) *Sacharomyces cerevisiae* produces an enzyme called zymase which can cause fermentation to produce alcohol.

**Q22 :** (a) Sewage treatment is divided into primary treatment and secondary treatment. Primary treatment involves filtration of the sewage and then sedimentation of the debris present on filtrate. No microbes are used.

The sediment of primary treatment, called primary sludge, is treated by aerobic microbes and then by anaerobic microbes to reduce its organic components during secondary treatment. Secondary treatment involves microbes, thus it is also called biological treatment.

**Q23 :** (b)