CHAPTER 10

Microbes in Human Welfare

10.1 Microbes in Household Products

1. Conversion of milk to curd improves its nutritional value by increasing the amount of
(a) vitamin D (b) vitamin A
(c) vitamin B_{12} (d) vitamin E.
(NEET 2018)

2. Dough kept overnight in warm weather becomes soft and spongy because of
(a) absorption of carbon dioxide from atmosphere
(b) fermentation
(c) cohesion
(d) osmosis. *(2004)*

3. During the formation of bread it becomes porous due to release of CO_2 by the action of
(a) yeast (b) bacteria
(c) virus (d) protozoans.
(2002)

4. In cheese manufacture, the microorganisms are important for
(a) the ripening only
(b) the souring of milk only
(c) the development of resistance to spoilage only
(d) both the souring and the ripening processes.
(1994)

10.2 Microbes in Industrial Products

5. Match the following columns and select the correct option.

Column-I		Column-II	
(A)	*Clostridium butylicum*	(i)	Cyclosporin-A
(B)	*Trichoderma polysporum*	(ii)	Butyric acid
(C)	*Monascus purpureus*	(iii)	Citric acid
(D)	*Aspergillus niger*	(iv)	Blood cholesterol lowering agent

	(A)	(B)	(C)	(D)
(a)	(iii)	(iv)	(ii)	(i)
(b)	(ii)	(i)	(iv)	(iii)
(c)	(i)	(ii)	(iv)	(iii)
(d)	(iv)	(iii)	(ii)	(i)

(NEET 2020)

6. Which of the following is a commercial blood cholesterol lowering agent?
(a) Lipases (b) Cyclosporin A
(c) Statin (d) Streptokinase
(NEET 2019)

7. Match the following organisms with the products they produce.

(A)	*Lactobacillus*	(i)	Cheese
(B)	*Saccharomyces cerevisiae*	(ii)	Curd
(C)	*Aspergillus niger*	(iii)	Citric acid
(D)	*Acetobacter aceti*	(iv)	Bread
		(v)	Acetic acid

Select the correct option.

	(A)	(B)	(C)	(D)
(a)	(ii)	(i)	(iii)	(v)
(b)	(ii)	(iv)	(v)	(iii)
(c)	(ii)	(iv)	(iii)	(v)
(d)	(iii)	(iv)	(v)	(i)

(NEET 2019)

8. Which of the following is correctly matched for the product produced by them?
(a) *Methanobacterium* : Lactic acid
(b) *Penicillium notatum* : Acetic acid
(c) *Sacchromyces cerevisiae* : Ethanol
(d) *Acetobacter aceti* : Antibiotics *(NEET 2017)*

9. Match column I with column II and select the correct option using the codes given below.

Column I	Column II
A. Citric acid	(i) *Trichoderma*
B. Cyclosporin A	(ii) *Clostridium*
C. Statins	(iii) *Aspergillus*
D. Butyric acid	(iv) *Monascus*

(a) A-(iii), B-(i), C-(ii), D-(iv)
(b) A-(iii), B-(i), C-(iv), D-(ii)
(c) A-(i), B-(iv), C-(ii), D-(iii)
(d) A-(iii), B-(iv), C-(i), D-(ii) *(NEET-II 2016)*

10. Which of the following is wrongly matched in the given table?

	Microbe	Product	Application
(a)	*Streptococcus*	Streptokinase	Removal of clot from blood vessel
(b)	*Clostridium butylicum*	Lipase	Removal of oil stains
(c)	*Trichoderma polysporum*	Cyclosporin A	Immuno-suppressive drug
(d)	*Monascus purpureus*	Statins	Lowering of blood cholesterol

(NEET-I 2016)

11. Match the following list of microbes and their importance.

Column I	Column II
A. *Saccharomyces cerevisiae*	(i) Production of immuno- suppressive agent
B. *Monascus purpureus*	(ii) Ripening of Swiss cheese
C. *Trichoderma polysporum*	(iii) Commercial production of ethanol
D. *Propionibacterium shermanii*	(iv) Production of blood-cholesterol lowering agents

(a) A-(iv), B-(ii), C-(i), D-(iii)
(b) A-(iii), B-(i), C-(iv), D-(ii)
(c) A-(iii), B-(iv), C-(i), D-(ii)
(d) A-(iv), B-(iii), C-(ii),D-(i) *(2015)*

12. A good producer of citric acid is
(a) *Clostridium* (b) *Saccharomyces*
(c) *Aspergillus* (d) *Pseudomonas.*
(NEET 2013)

13. *Monascus purpureus* is a yeast used commercially in the production of
(a) ethanol
(b) streptokinase for removing clots from the blood vessels
(c) citric acid
(d) blood cholesterol lowering statins. *(2012)*

14. A patient brought to a hospital with myocardial infarction is normally immediately given
(a) penicillin (b) streptokinase
(c) cyclosporin-A (d) statins. *(2012)*

15. Read the following four statements (A-D).
(A) Colostrum is recommended for the new born because it is rich in antigens.
(B) Chikungunya is caused by a Gram negative bacterium.
(C) Tissue culture has proved useful in obtaining virus-free plants.
(D) Beer is manufactured by distillation of fermented grape juice.
How many of the above statements are wrong?
(a) Two (b) Three
(c) Four (d) One *(Mains 2012)*

16. The most common substrate used in distilleries for the production of ethanol is
(a) corn meal (b) soya meal
(c) ground gram (d) molasses. *(2011)*

17. Ethanol is commercially produced through a particular species of
(a) *Saccharomyces* (b) *Clostridium*
(c) *Trichoderma* (d) *Aspergillus.* *(2011)*

18. Continuous addition of sugars in 'fed batch' fermentation is done to
(a) produce methane (b) obtain antibiotics
(c) purify enzymes (d) degrade sewage.
(2011)

19. Read the following statement having two blanks (A and B).
A drug used for __A__ patients is obtained from a species of the organism __B__.
The one correct option for the two blanks is

	A	B
(a)	heart	*Penicillium*
(b)	organ-transplant	*Trichoderma*
(c)	swine flu	*Monascus*
(d)	AIDS	*Pseudomonas.*

(Mains 2011)

20. Which one of the following is a wrong matching of a microbe and its industrial product, while the remaining three are correct?
(a) Yeast – Statins
(b) *Acetobacter aceti* – Acetic acid
(c) *Clostridium butylicum* – Lactic acid
(d) *Aspergillus niger* – Citric acid *(Mains 2011)*

21. Which one of the following pairs is wrongly matched?
(a) Alcohol - Nitrogenase
(b) Fruit juice - Pectinase
(c) Textile - Amylase
(d) Detergents - Lipase *(2009)*

22. Probiotics are
(a) cancer inducing microbes
(b) new kind of food allergens
(c) live microbial food supplement
(d) safe antibiotics. *(2007)*

23. Which of the following is used to manufacture ethanol from starch?
(a) *Penicillium* (b) *Saccharomyces*
(c) *Azotobacter* (d) *Lactobacillus* *(2000)*

24. Yeast (*Saccharomyces cerevisiae*) is used in the industrial production of
(a) tetracyline (b) ethanol
(c) butanol (d) citric acid. *(1998)*

25. Which of the following microorganisms is used for production of citric acid in industries?
(a) *Aspergillus niger*
(b) *Rhizopus nigricans*
(c) *Lactobacillus bulgaris*
(d) *Penicillium citrinum* *(1998)*

26. Which of the following is the false statement about antibiotics?
(a) Some persons have allergy from antibiotics.
(b) Antibiotics are capable of curing any disease.
(c) This term was given by Waksman in 1942.
(d) Antibiotics is produced by microorganisms. *(1996)*

27. The citric acid is produced by
(a) *Candida utilis*
(b) *Azotobacter suboxydans*
(c) *Aspergillus niger*
(d) *Streptococcus lactis*. *(1995)*

28. The organism, used for alcohol fermentation, is
(a) *Aspergillus* (b) *Saccharomyces*
(c) *Pseudomonas* (d) *Penicillium*. *(1995)*

29. The main reason why antibodies could not solve all the problems of bacteria mediated disease is
(a) decreased efficiency of the immune system
(b) insensitivity of the individual following prolonged exposure to antibiotics
(c) development of mutant strains resistant to antibodies
(d) inactivation of antibiotics by bacterial enzymes. *(1994)*

10.3 Microbes in Sewage Treatment

30. Which of the following is put into anaerobic sludge digester for further sewage treatment?
(a) Primary sludge
(b) Floating debris
(c) Effluents of primary treatment
(d) Activated sludge *(NEET 2020)*

31. Which of the following in sewage treatment removes suspended solids?
(a) Secondary treatment (b) Primary treatment
(c) Sludge treatment (d) Tertiary treatment *(NEET 2017)*

32. What gases are produced in anaerobic sludge digesters?
(a) Methane and CO_2 only
(b) Methane, Hydrogen sulphide and CO_2
(c) Methane, Hydrogen sulphide and O_2
(d) Hydrogen sulphide and CO_2 *(2014)*

33. The domestic sewage in large cities
(a) has a high BOD as it contains both aerobic and anaerobic bacteria
(b) is processed by aerobic and then anaerobic bacteria in the secondary treatment in Sewage Treatment Plants (STPs)
(c) when treated in STPs does not really require the aeration step as the sewage contains adequate oxygen
(d) has very high amount of suspended solids and dissolved salts. *(Mains 2012)*

34. Secondary sewage treatment is mainly a
(a) physical process (b) mechanical process
(c) chemical process (d) biological process. *(2011)*

35. Which of the following is mainly produced by the activity of anaerobic bacteria on sewage?
(a) Laughing gas (b) Propane
(c) Mustard gas (d) Marsh gas *(2011)*

10.4 Microbes in Production of Biogas

36. The guts of cow and buffalo possess
(a) methanogens (b) cyanobacteria
(c) *Fucus* sp. (d) *Chlorella* sp. *(2015 Cancelled)*

37. In gobar gas, the maximum amount is that of
(a) butane (b) methane
(c) propane (d) carbon dioxide. *(Mains 2012)*

38. Organisms called methanogens are most abundant in a
(a) sulphur rock (b) cattle yard
(c) polluted stream (d) hot spring. *(2011)*

39. Select the correct statement from the following.
(a) Biogas is produced by the activity of aerobic bacteria on animal waste.
(b) *Methanobacterium* is an aerobic bacterium found in rumen of cattle.
(c) Biogas, commonly called gobar gas, is pure methane.
(d) Activated sludge-sediment in settlement tanks of sewage treatment plant is a rich source of aerobic bacteria. *(2010)*

40. Which one of the following pairs is wrongly matched?
(a) Yeast - Ethanol
(b) *Streptomycetes* - Antibiotic
(c) Coliforms - Vinegar
(d) Methanogens - Gobar gas *(2007)*

41. A major component of gobar gas is
(a) ammonia (b) methane
(c) ethane (d) butane. *(2004)*

42. During anaerobic digestion of organic waste, such as in producing biogas, which one of the following is left undegraded?
(a) Lipids (b) Lignin
(c) Hemi-cellulose (d) Cellulose *(2003)*

43. Which bacteria is utilized in gobar gas plant?
(a) Methanogens
(b) Nitrifying bacteria
(c) Ammonifying bacteria
(d) Denitrifying bacteria *(2002)*

44. Gobar gas contains mainly
(a) $CO_2 + H_2$ (b) $CO_2 + H_2O$
(c) CH_4 only (d) $CH_4 + CO_2$. *(1997)*

10.5 Microbes as Biocontrol Agents

45. Which of the following can be used as a biocontrol agent in the treatment of plant disease?
(a) *Lactobacillus* (b) *Trichoderma*
(c) *Chlorella* (d) *Anabaena* *(NEET 2019)*

46. Select the correct group of biocontrol agents.
(a) *Nostoc*, *Azospirillium*, *Nucleopolyhedrovirus*
(b) *Bacillus thuringiensis*, Tobacco mosaic virus, Aphids
(c) *Trichoderma*, Baculovirus, *Bacillus thuringiensis*
(d) *Oscillatoria*, *Rhizobium*, *Trichoderma* *(NEET 2019)*

47. A biocontrol agent to be a part of an integrated pest management should be
(a) species-specific and symbiotic
(b) free living and broad spectrum
(c) narrow spectrum and symbiotic
(d) species-specific and inactive on non-target organisms. *(Odisha NEET 2019)*

48. Microbe used for biocontrol of pest butterfly caterpillars is
(a) *Saccharomyces cerevisiae*
(b) *Bacillus thuringiensis*
(c) *Streptococcus* sp.
(d) *Trichoderma* sp. *(Karnataka NEET 2013)*

49. Which one of the following is an example of carrying out biological control of pests/diseases using microbes?
(a) *Trichoderma* sp. against certain plant pathogens.
(b) *Nucleopolyhedrovirus* against white rust in *Brassica*.
(c) Bt-cotton to increase cotton yield.
(d) Lady bird beetle against aphids in mustard. *(2012)*

50. A common biocontrol agent for the control of plant diseases is
(a) baculovirus
(b) *Bacillus thuringiensis*
(c) *Glomus*
(d) *Trichoderma*. *(2010)*

51. Which of the following is not used as a biopesticide?
(a) *Trichoderma harzianum*
(b) *Nucleopolyhedrovirus* (NPV)
(c) *Xanthomonas campestris*
(d) *Bacillus thuringiensis* *(2009)*

52. *Trichoderma harzianum* has proved a useful microorganism for
(a) gene transfer in higher plants
(b) biological control of soil-borne plant pathogens
(c) bioremediation of contaminated soils
(d) reclamation of wastelands. *(2008)*

53. Which one of the following proved effective for biological control of nematodal diseases in plants?
(a) *Gliocladium virens*
(b) *Paecilomyces lilacinus*
(c) *Pisolithus tinctorius*
(d) *Pseudomonas cepacia* *(2008)*

54. A genetically engineered microorganism used successfully in bioremediation of oil spills is a species of
(a) *Trichoderma* (b) *Xanthomonas*
(c) *Bacillus* (d) *Pseudomonas*. *(2007)*

55. Biological control component is central to advanced agricultural production. Which of the following is used as a third generation pesticide?
(a) Insect repellants
(b) Organophosphate and carbamates
(c) Pathogens
(d) Pheromones *(1998)*

56. Cochineal insects have proved very useful for
(a) cactus prevention (b) *Eichhornia* prevention
(c) weeds control (d) *Parthenium* control. *(1996)*

57. When a natural predator (living being) is applied on the other pathogen organism to control them, this process is called
(a) artificial control (b) confusion technique
(c) biological control (d) genetic engineering. *(1996)*

58. The rotenone is
(a) a natural herbicide (b) a natural insecticide
(c) an insect hormone (d) a bioherbicide. *(1995)*

59. One of the major difficulties in the biological control of insect pest is that
(a) the method is less effective as compared with the use of insecticides
(b) the practical difficulty of introducing the predator to specific areas
(c) the predator develops a preference to other diets and may itself become a pest
(d) the predator does not always survive when transferred to a new environment. *(1995)*

60. Biological control of agricultural pests, unlike chemical control, is
(a) self perpetuating (b) polluting
(c) very expensive (d) toxic. *(1994)*

10.6 Microbes as Biofertilisers

61. Select the mismatch.
(a) *Rhodospirillum* – Mycorrhiza
(b) *Anabaena* – Nitrogen fixer
(c) *Rhizobium* – Alfalfa
(d) *Frankia* – *Alnus* *(NEET 2017)*

62. A nitrogen-fixing microbe associated with *Azolla* in rice fields is
(a) *Spirulina* (b) *Anabaena*
(c) *Frankia* (d) *Tolypothrix.* *(2012)*

63. Which one of the following microbes forms symbiotic association with plants and helps them in their nutrition?
(a) *Azotobacter* (b) *Aspergillus*
(c) *Glomus* (d) *Trichoderma* *(2012)*

64. A prokaryotic autotrophic nitrogen fixing symbiont is found in
(a) *Alnus* (b) *Cycas*
(c) *Cicer* (d) *Pisum.* *(2011)*

65. Which one of the following helps in absorption of phosphorus from soil by plants?
(a) *Glomus* (b) *Rhizobium*
(c) *Frankia* (d) *Anabaena* *(2011)*

66. Which one of the following is not a biofertiliser?
(a) *Agrobacterium* (b) *Rhizobium*
(c) *Nostoc* (d) Mycorrhiza *(2011)*

67. An organism used as a biofertilizer for raising soybean crop is
(a) *Azotobacter* (b) *Azospirillum*
(c) *Rhizobium* (d) *Nostoc.* *(2011)*

68. Consider the following statements (A–D) about organic farming.
(A) Utilizes genetically modified crops like Bt cotton
(B) Uses only naturally produced inputs like compost
(C) Does not use pesticides and urea
(D) Produces vegetables rich in vitamins and minerals
Which of the above statements are correct?
(a) B, C and D (b) C and D only
(c) B and C only (d) A and B only *(Mains 2011)*

69. The common nitrogen-fixer in paddy fields is
(a) *Rhizobium* (b) *Azospirillum*
(c) *Oscillatoria* (d) *Frankia.* *(2010)*

70. Which one of the following is not used in organic farming?
(a) *Glomus* (b) Earthworm
(c) *Oscillatoria* (d) Snail *(2010)*

71. An example of endomycorrhiza is
(a) *Nostoc* (b) *Glomus*
(c) *Agaricus* (d) *Rhizobium.* *(Mains 2010)*

72. Nitrogen fixation in root nodules of *Alnus* is brought about by
(a) *Frankia* (b) *Azorhizobium*
(c) *Bradyrhizobium* (d) *Clostridium.* *(2008)*

73. Which one of the following pairs is not correctly matched?
(a) *Streptomyces* - Antibiotic
(b) *Serratia* - Drug addiction
(c) *Spirulina* - Single cell protein
(d) *Rhizobium* - Biofertilizer *(2004)*

74. A free living nitrogen-fixing cyanobacterium which can also form symbiotic association with the water fern *Azolla* is
(a) *Tolypothrix* (b) *Chlorella*
(c) *Nostoc* (d) *Anabaena.* *(2004)*

75. Which one of the following plants are used as green manure in crop fields and in sandy soils?
(a) *Crotalaria juncea* and *Alhagi camelorum*
(b) *Calotropis procera* and *Phyllanthus niruri*
(c) *Saccharum munja* and *Lantana camara*
(d) *Dichanthium annulatum* and *Azolla nilotica* *(2003)*

76. Which of the following is the pair of biofertilizers?
(a) *Azolla* and BGA
(b) *Nostoc* and legume
(c) *Rhizobium* and grasses
(d) *Salmonella* and *E.coli* *(2001)*

77. Which aquatic fern is used to increase the yield in paddy crop?
(a) *Azolla* (b) *Salvinia*
(c) *Marsilea* (d) *Isoetes* *(2000)*

78. Which of the following fern is an excellent biofertilizer?
(a) *Marsilea* (b) *Pteridium*
(c) *Azolla* (d) *Salvinia* *(1999)*

79. Due to which of the following organism, yield of rice is increased?
(a) *Sesbania* (b) *Bacillus popilliae*
(c) *Anabaena* (d) *Bacillus subtilis*
(1999)

80. Which of the following is non-symbiotic biofertilizer?
(a) *Anabaena* (b) *Rhizobium*
(c) VAM (d) *Azotobacter* *(1998)*

81. Farmers have reported over 50% higher yields of rice by using which of the following biofertilizer?
(a) *Cyanobacteria*
(b) legume-*Rhizobium* symbiosis
(c) *Mycorrhiza*
(d) *Azolla pinnata* *(1998)*

82. The biofertilizers are
(a) *Anabaena* and *Azolla*
(b) cow dung, manure and farmyard waste
(c) quick growing crop ploughed under soil
(d) none of these. *(1997)*

83. Which of the following species does not have the ability to fix atmospheric nitrogen?
(a) *Azotobactor* (b) *Anabaena*
(c) *Nostoc* (d) *Spirogyra* *(1994)*

84. Which one of the following statements is correct?
(a) Legumes fix nitrogen only through the specialized bacteria that live in their roots.
(b) Legumes fix nitrogen independently of the specialized bacteria that live in their roots.
(c) Legumes fix nitrogen only through specialized bacteria that live in their leaves.
(d) Legumes are incapable of fixing nitrogen. *(1994)*

ANSWER KEY

1.	(c)	**2.**	(b)	**3.**	(a)	**4.**	(d)	**5.**	(b)	**6.**	(c)	**7.**	(c)	**8.**	(c)	**9.**	(b)	**10.**	(b)
11.	(c)	**12.**	(c)	**13.**	(d)	**14.**	(b)	**15.**	(b)	**16.**	(d)	**17.**	(a)	**18.**	(c)	**19.**	(b)	**20.**	(c)
21.	(a)	**22.**	(c)	**23.**	(b)	**24.**	(b)	**25.**	(a)	**26.**	(b)	**27.**	(c)	**28.**	(b)	**29.**	(c)	**30.**	(d)
31.	(b)	**32.**	(b)	**33.**	(b)	**34.**	(d)	**35.**	(d)	**36.**	(a)	**37.**	(b)	**38.**	(b)	**39.**	(d)	**40.**	(c)
41.	(b)	**42.**	(b)	**43.**	(a)	**44.**	(d)	**45.**	(b)	**46.**	(c)	**47.**	(d)	**48.**	(b)	**49.**	(a)	**50.**	(d)
51.	(c)	**52.**	(b)	**53.**	(b)	**54.**	(d)	**55.**	(d)	**56.**	(a)	**57.**	(c)	**58.**	(b)	**59.**	(d)	**60.**	(a)
61.	(a)	**62.**	(b)	**63.**	(c)	**64.**	(b)	**65.**	(a)	**66.**	(a)	**67.**	(c)	**68.**	(c)	**69.**	(b)	**70.**	(d)
71.	(b)	**72.**	(a)	**73.**	(b)	**74.**	(d)	**75.**	(a)	**76.**	(a)	**77.**	(a)	**78.**	(c)	**79.**	(c)	**80.**	(d)
81.	(d)	**82.**	(a)	**83.**	(d)	**84.**	(a)												