**Chapter 6: Milk Technology**

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**Refresher Points:**

1. In India, market milk industry was started in 1950-51 i.e., Central dairy of Aarey milk colony Mumbai.
2. 1951- Pandit Jawaharlal Nehru had inaugurated the central dairy of Aarey milk colony Mumbai.
3. Oldest military dairy farms in India-Allahabad,1889
4. Oldest co-operative milk union in India- Allahabad,1913.
5. NDDB was established in the year 1965.
6. Pasteurization milk will not clot with rennet.
7. Consumers judge the quality of milk on the basis of cream line.
8. Phosphatase test is used to detect inadequate pasteurization.
9. Milk is heavier than water (specific gravity of milk is more than water)
10. Common types of lactometers are Zeal, Quevenne, etc.
11. Most common types of microbial growth occurs in milk within the PH range of 5.6-7.5
12. Milk and milk products order (MMPO) was founded in the year 1992
13. ICMR recommendation for percapita availability of milk in India is 250 grams
14. The major lipid component of bovine milk is Triglycerides
15. Sweet curdling in UHT milk is caused by *Bacillus cereus*
16. Ropiness in raw milk is caused by *Alkaligenes viscolactis*
17. Dr.Verghese Kurien is known as milk man of India
18. Operation flood was launched during 1970
19. Operation flood I implemented in the year 1970-1980
20. Operation flood II implemented in the year 1981-1985
21. Operation flood III implemented in the year 1985-1996
22. Amul was established in the year 1846
23. The first dairy co-operative was started in the year 1913 at Allahabad
24. Hehner’s test is used to check adulteration of milk with Formalin
25. Galacto toxin in milk are produced due to contact of milk with copper vessels

**Tables :**

According to Prevention of food adulteration rules, 1976 for standards for different milk

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Class of milk** | **Fat (%)** | **SNF** |
| 1 | Buffalo milk | 6.0 | 9.0 |
| 2 | Cow milk | 3.5-4 | 8.5 |
| 3 | Goat milk | 3.5 | 9.0 |
| 4 | Sheep milk | 3.5 | 9.0 |
| 5 | Standard milk | 4.5 | 8.5 |
| 6 | Recombined milk | 3.0 | 8.5 |
| 7 | Toned milk | 3.0 | 8.5 |
| 8 | Double toned milk | 1.5 | 9.0 |
| 9 | Skim milk | 0.5 | 8.7 |

Chemical composition of milk of different species

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S.No** | **Name of the species** | **Percentage composition** | | | | |
| **Water** | **Fat** | **Protein** | **Lactose** | **Ash** |
| 1 | Buffalo | 84.2 | 6.6 | 3.9 | 5.2 | 0.8 |
| 2 | Cow | 86.6 | 4.6 | 3.4 | 4.9 | 0.7 |
| 3 | Ewe | 79.4 | 8.6 | 6.7 | 4.3 | 1.0 |
| 4 | Goat | 86.5 | 4.5 | 3.5 | 4.7 | 0.8 |
| 5 | Human | 87.7 | 3.6 | 1.8 | 6.8 | 0.1 |
| 6 | Mare | 89.1 | 1.6 | 2.7 | 6.1 | 0.5 |
| 7 | Sow | 89.6 | 4.8 | 1.3 | 3.4 | 0.9 |
| 8 | Dog | 75.4 | 9.6 | 11.2 | 3.1 | 0.7 |
| 9 | Cat | 84.6 | 3.8 | 9.1 | 4.9 | 0.6 |

Energy values of milk

|  |  |  |
| --- | --- | --- |
| **S.No** | **Milk constiuent** | **Energy value** |
| 1 | Milk fat | 9.3 C/g |
| 2 | Milk Protein | 4.1 C/g |
| 3 | Milk Sugar | 4.1 C/g |
| 4 | Cow milk | 75 C/100g |
| 5 | Buffalo milk | 100 C/100g |

Physico-chemical properties of milk

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Character** | **Species** | **Value** |
| 1 | Total acidity (%) | Cow milk | 0.13-0.14 |
| Buffalo milk | 0.14-0.15 |
| 2 | PH | Cow milk | 6.4-6.6 |
| Buffalo milk | 6.7-6.8 |
| 3 | Specific Gravity | Cow milk | 1.028-1.030 |
| Buffalo milk | 1.030-1.032 |
| Skim milk | 1.035-1.037 |
| Water | 1.000 |
| Solid not fat | 1.616 |
| Fat | 0.93 |
| Protein | 1.346 |
| Lactose | 1.666 |
| Salt | 4.12 |
| 4 | Freezing Point | Cow milk | 0.547 0C |
| Buffalo milk | 0.549 0C |
| Bulk milk samples | 0.530 0C |
| Meat | -1.547 |
| 5 | β-carotein content | Cow milk | 30 μg/g |
| Buffalo milk | 0.25-0.48 μg/g |

Different types of bacteria classified on the basis of optimum growth temperature are as follow:

|  |  |  |
| --- | --- | --- |
| **S.No** | **Class** | **Temperature 0C** |
| 1 | Psychrotropic | 5-7 0C |
| 2 | Mesophilic | 20-40 0C |
| 3 | Thermophilic | 50 0C |
| 4 | Thermoduric | 55-70 0C |

Bacteriological standards of raw milk

|  |  |  |
| --- | --- | --- |
| **S.No** | **Standard plate count (SPC/ml)** | **Grade** |
| 1 | 2,00,000 | Very good |
| 2 | 2,00,000-10,00,000 | Good |
| 3 | 10,00,000-50,00,000 | Fair |
| 4 | >50,00,000 | Poor |

Quality control tests for milk and Significance

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Test Name** | **Significance** | **Type** |
| 1 | Acidity | To determine final acceptance/ rejection | Platform test |
| 2 | Ethanol/  Alcohol test | To determine heat- stability of milk | Platform test |
| 3 | Clot on boiling | To determine heat- stability of milk | Platform test |
| 4 | Alcohol- Alizarin test | To determine Heat stability and PH | Platform test |
| 5 | Lactometer | To detect adulteration of milk with water | Platform test |
| 6 | Resazurin reduction test | To determine the extent of bacterial contamination and growth in milk | Platform test |
| 7 | Dye reduction test | Extent of bacterial contamination and growth of milk | Laboratory test |
| 8 | Methylene blue reduction test | Extent of bacterial contamination and growth of milk | - |
| 9 | Standard plate count | Extent of bacterial contamination and growth of milk | Laboratory test |
| 10 | Freezing point | To detect adulteration of milk with water | Laboratory test |
| 11 | Fat/ SNF | To make payment for milk received | Laboratory test |

Pasteurization requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Particulars** | **30 min.** | **15 sec** |
| 1 | To kill T.B. germs | 138 0F/58.9 0C | 158 0F/70 0C |
| 2 | To inactivate phosphotase | 142 0F/61.1 0C | 160 0F/71.1 0C |
| 3 | Pasteurization requirements | 143 0F/61.7 0C | 161 0F/71.1 0C |
| 4 | Cream line reduced | 144 0F/62.2 0C | 162 0F/72.2 0C |

Different Methods of pasteurization temperature

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Particulars** | **30 min.** | **15 sec** |
| 1 | In- Bottle pasteurization | 63-66 0C/ 145-150 0F | - |
| 2 | Batch/ Holding pasteurization | 63 0C/ 145 0F | - |
| 3 | Low temperature long time | 63 0C/ 145 0F | - |
| 4 | High temperature short time | - | 72 0C/161 0F |
| 5 | Stassanization | 74 0C/7 sec or 165 0F | |
| 6 | Ultra High temperature | 135-150 0C/ no hold  275-302 0F/ no hold | |
| 7 | Uperization/  ultra- pasteurization | 150 0C/fraction of sec  302 0F/fraction of sec | |

**Multiple choice Questions**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | | Purpose of the Hansa Test | | | | | | | | ( ) |
|  | | A) | | To determine mixing of cow & buffalo milk | B) | | | To determine mixing of cow & sheep milk | | |
|  | | C) | | To determine mixing of goat & sheep milk | D) | | | None | | |
| 2 | | Temperature and time protocol for HTST pasteurization | | | | | | | | ( ) |
|  | | A) | | 630C/30minutes | B) | | | 720C/15 sec | | |
|  | | C) | | 740C/7 sec | D) | | | 130-1350C/fraction of sec | | |
| 3 | | Temperature and time protocol for LTLT pasteurization | | | | | | | | ( ) |
|  | | A) | | 630C/30minutes | B) | | | 720C/15 sec | | |
|  | | C) | | 740C/7 sec | D) | | | 130-1350C/fraction of sec | | |
| 4 | | Temperature and time protocol for Stassanization pasteurization | | | | | | | | ( ) |
|  | | A) | | 630C/30minutes | B) | | | 720C/15 sec | | |
|  | | C) | | 740C/7 sec | D) | | | 130-1350C/fraction of sec | | |
| 5 | | Temperature and time protocol for UHT pasteurization | | | | | | | | ( ) |
|  | | A) | | 630C/30minutes | B) | | | 720C/15 sec | | |
|  | | C) | | 740C/7 sec | D) | | | 130-1350C/fraction of sec | | |
| 6 | | Temperature and time protocol for Uperization | | | | | | | | ( ) |
|  | | A) | | 630C/30minutes | B) | | | 720C/15 sec | | |
|  | | C) | | 740C/7 sec | D) | | | 1500C/fraction of sec | | |
| 7 | | Purpose of COB test | | | | | | | | ( ) |
|  | | A) | | Heat stability of milk | B) | | | Faecal contamination | | |
|  | | C) | | Acidity of milk | D) | | | PH of the milk | | |
| 8 | | Purpose of coliform count test | | | | | | | | ( ) |
|  | | A) | | Heat stability of milk | B) | | | Faecal contamination | | |
|  | | C) | | Acidity of milk | D) | | | PH of the milk | | |
| 9 | | Purpose of alcohol precipitation test | | | | | | | | ( ) |
|  | | A) | | Heat stability of milk | B) | | | Faecal contamination | | |
|  | | C) | | Acidity of milk | D) | | | PH of the milk | | |
| 10 | | Purpose of organoleptic test | | | | | | | ( ) | |
|  | | A) | | Colour | B) | | | Flavor | | |
|  | | C) | | Taste | D) | | | All | | |
| 11. | Most variable components of milk | | | | | | | | ( ) | |
|  | A) | | Fat | | | B) | SNF | | | |
|  | C) | | Temperature | | | D) | All | | | |
| 12. | Normal PH of the milk---- | | | | | | | | ( ) | |
|  | A) | | 5-6 to 5-8 | | | B) | 6.0 to 6.2 | | | |
|  | C) | | 6.4 to 6.6 | | | D) | 6.8 to 7.0 | | | |
| 13. | For removal of milk stones on vessels dairymen use--- | | | | | | | | ( ) | |
|  | A) | | Teepol | | | B) | Soap | | | |
|  | C) | | Mild acids | | | D) | Hot water | | | |
| 14. | Babcock method of testing of milk helps in finding— | | | | | | | | ( ) | |
|  | A) | | Sickness in cow | | | B) | Fat in milk | | | |
|  | C) | | SNF in milk | | | D) | Protein in milk | | | |
| 15. | Sandy ice cream due to-- | | | | | | | | ( ) | |
|  | A) | | Deposit of milk protein | | | B) | Deposit of minerals | | | |
|  | C) | | Presence of acidity in Ice cream | | | D) | Crystalization of alpha lactose | | | |
| 16. | Casein can be removed from fresh milk by----- | | | | | | | | ( ) | |
|  | A) | | Heating | | | B) | Freezing | | | |
|  | C) | | Filtering through | | | D) | Vigorous shaking | | | |
| 17. | Term total solids in milk refers to----- | | | | | | | | ( ) | |
|  | A) | | Fat and Protein | | | B) | Fat and Sugar | | | |
|  | C) | | Total dry matter | | | D) | Fat, Protein and sugar | | | |
| 18. | Para casein is formed when casein is precipitated with---- | | | | | | | | ( ) | |
|  | A) | | High fat | | | B) | High protein | | | |
|  | C) | | Rennin | | | D) | High minerals | | | |
| 19. | Stripping contains------- | | | | | | | | ( ) | |
|  | A) | | Less fat | | | B) | Higher fat | | | |
|  | C) | | Less SNF | | | D) | High SNF | | | |
| 20. | Human milk contains------- | | | | | | | | ( ) | |
|  | A) | | High fat | | | B) | High protein | | | |
|  | C) | | High lactose | | | D) | High minerals | | | |
| 21. | The efficiency of pasteurization is determined by------ | | | | | | | | ( ) | |
|  | A) | | Lipase | | | B) | Phosphatase | | | |
|  | C) | | Protease | | | D) | Peroxides | | | |
| 22. | A milli liter of milk at 600F Weighs--- | | | | | | | | ( ) | |
|  | A) | | 1.032 gm | | | B) | 0.5 gm | | | |
|  | C) | | 1 gm | | | D) | 1.5 gm | | | |
| 23. | Index organism for pasteurization | | | | | | | | ( ) | |
|  | A) | | Coxiella | | | B) | Mycobacterium | | | |
|  | C) | | Leptospira | | | D) | Listeria | | | |
| 24. | Gerber‘s acid is used to estimate | | | | | | | | ( ) | |
|  | A) | | Fat percentage of milk | | | B) | SNF percentage of milk | | | |
|  | C) | | Protein percentage of milk | | | D) | None | | | |
| 25. | Average density of milk fat--- | | | | | | | | ( ) | |
|  | A) | | 0.39 | | | B) | 0.93 | | | |
|  | C) | | 0.59 | | | D) | 0.69 | | | |
| 26. | Father of white revolution | | | | | | | | ( ) | |
|  | A) | | Sardhar vallabhai Patel | | | B) | M.K.Gandhi | | | |
|  | C) | | Lal bahadur sastri | | | D) | Verghese kurien | | | |
| 27. | Milk from Zebu Cattle | | | | | | | | ( ) | |
|  | A) | | A2 milk | | | B) | A4 milk | | | |
|  | C) | | A3 milk | | | D) | A1 milk | | | |
| 28. | Natural acidity of milk is due to | | | | | | | | ( ) | |
|  | A) | | Casein and phosphates | | | B) | Chlorides | | | |
|  | C) | | Temperature | | | D) | Drugs | | | |
| 29. | Least variable factor | | | | | | | | ( ) | |
|  | A) | | Fat | | | B) | SNF | | | |
|  | C) | | Cream | | | D) | Lactose | | | |
| 30. | In processed milk Cooked flavor is due to-- | | | | | | | | ( ) | |
|  | A) | | Acidity | | | B) | Lactose | | | |
|  | C) | | Sulphydrl group | | | D) | Casein | | | |
| 31. | Specific gravity of cow milk-- | | | | | | | | ( ) | |
|  | A) | | 1.022-1.032 | | | B) | 1.028-1.032 | | | |
|  | C) | | 1.028-1.030 | | | D) | 1.020-1.030 | | | |
| 32. | Specific gravity of buffalo milk-- | | | | | | | | ( ) | |
|  | A) | | 1.022-1.032 | | | B) | 1.028-1.032 | | | |
|  | C) | | 1.030-1.034 | | | D) | 1.020-1.030 | | | |
| 33. | Boiling point of milk-- | | | | | | | | ( ) | |
|  | A) | | 1000C to 1020C | | | B) | 100.170C to 1010C | | | |
|  | C) | | 1000C to 1050C | | | D) | None | | | |
| 34. | -----used as coolant in HTST. | | | | | | | | ( ) | |
|  | A) | | Glycol | | | B) | Lysine | | | |
|  | C) | | Acids | | | D) | None | | | |
| 35. | Milk saltiness is due to--- | | | | | | | | ( ) | |
|  | A) | | Lactose | | | B) | Lactoalbimun | | | |
|  | C) | | Chloride content | | | D) | All | | | |
| 36. | Thickening agents used in milk --- | | | | | | | | ( ) | |
|  | A) | | Cane Sugar | | | B) | Starch | | | |
|  | C) | | Gelatin | | | D) | All | | | |
| 37. | ------is responsible for milk fat synthesis | | | | | | | | ( ) | |
|  | A) | | Acetate | | | B) | Glycol | | | |
|  | C) | | Butyric | | | D) | Propionic | | | |
| 38. | Which is known as milk sugar | | | | | | | | ( ) | |
|  | A) | | Lactose | | | B) | Glucose | | | |
|  | C) | | Glucose | | | D) | Sucrose | | | |
| 39. | Specific gravity of skim milk--- | | | | | | | | ( ) | |
|  | A) | | 1.030-1.032 | | | B) | 1.035-1.037 | | | |
|  | C) | | 1.025-1.035 | | | D) | 1.023-1.035 | | | |
| 40. | NDDB head quarters | | | | | | | | ( ) | |
|  | A) | | Hyderabad, Telangana | | | B) | Anand, maharastra | | | |
|  | C) | | Anand, Gujarat | | | D) | New delhi | | | |
| 41. | NDRI located | | | | | | | | ( ) | |
|  | A) | | Hyderabad, Telangana | | | B) | Karnal, Haryana | | | |
|  | C) | | Anand, Gujarat | | | D) | None | | | |
| 42. | Common milk micro organisms grow best between---0C | | | | | | | | ( ) | |
|  | A) | | 20 and 60 | | | B) | 20 and 40 | | | |
|  | C) | | 40 and 80 | | | D) | 10 and 20 | | | |
| 43. | Specific gravity of milk is lowered by | | | | | | | | ( ) | |
|  | A) | | Removal of water and cream | | | B) | Addition of fat and cream | | | |
|  | C) | | Removal of fat and cream | | | D) | Addition of water and cream | | | |
| 44. | HACCP means | | | | | | | | ( ) | |
|  | A) | | Hazard analysis of critical control point | | | B) | Hazard analysis of critical point | | | |
|  | C) | | Hazard analysis of control point | | | D) | None | | | |
| 45. | SNF of milk composed of -- | | | | | | | | ( ) | |
|  | A) | | Protein | | | B) | Lactose | | | |
|  | C) | | Ash | | | D) | All of the above | | | |
| 46. | Specific gravity of milk is increased by | | | | | | | | ( ) | |
|  | A) | | addition of skim milk | | | B) | Removal of fat | | | |
|  | **C)** | | A,B correct | | | D) | None | | | |
| 47. | For machine milking, minimum herd size should be -- | | | | | | | | ( ) | |
|  | A) | | 10 | | | B) | 30 | | | |
|  | C) | | 25 | | | D) | 20 | | | |
| 48. | Dairy cooperatives in India follows-- | | | | | | | | ( ) | |
|  | A) | | Two- tier system | | | B) | Three- tier system | | | |
|  | C) | | One- tier system | | | D) | None | | | |
| 49. | Energy value of milk fat-- | | | | | | | | ( ) | |
|  | A) | | 9.3 Calorie /g | | | B) | 5.5 Calorie /g | | | |
|  | C) | | 6.5 Calorie /g | | | D) | 11.0 Calorie /g | | | |
| 50. | Energy value of milk protein-- | | | | | | | | ( ) | |
|  | A) | | 7.5 Calorie /g | | | B) | 4.1 Calorie /g | | | |
|  | C) | | 8.5 Calorie /g | | | D) | 6.0 Calorie /g | | | |
| 51. | Green colour of whey is attributed to--- | | | | | | | | ( ) | |
|  | A) | | Folicacid | | | B) | Niacin | | | |
|  | C) | | Riboflavin | | | D) | Thiamin | | | |
| 52. | Storage site of milk in animals | | | | | | | | ( ) | |
|  | A) | | Alveoli | | | B) | Glands | | | |
|  | C) | | Cisternae | | | D) | All | | | |
| 53. | Higher PH values for fresh milk indicates-- | | | | | | | | ( ) | |
|  | A) | | Udder infection | | | B) | Bacteria action | | | |
|  | C) | | Mastitis | | | D) | All correct | | | |
| 54. | Boiling point of milk ranges from-- | | | | | | | | ( ) | |
|  | A) | | 103 | | | B) | 100-101.70C | | | |
|  | C) | | 102 | | | D) | 105 | | | |
| 55. | The correct method of milking dairy animal is-- | | | | | | | | ( ) | |
|  | A) | | Fisting | | | B) | Knuckling | | | |
|  | C) | | Full hand milking | | | D) | Stripping | | | |
| 56. | Psychotropic bacteria can grow at ----0Ctemp. | | | | | | | | ( ) | |
|  | A) | | 7-8 | | | B) | 10-11 | | | |
|  | C) | | 5-7 | | | D) | 12-18 | | | |
| 57. | Mesophilic bacteria can grow at ----0Ctemp. | | | | | | | | ( ) | |
|  | A) | | 20-40 | | | B) | 25-60 | | | |
|  | C) | | 60-80 | | | D) | 70-80 | | | |
| 58. | As per the PFA ,skim milk contain minimum of ----% fat and -----% SNF | | | | | | | | ( ) | |
|  | A) | | 0.5 and 8.7 | | | B) | 3.0 and 9.5 | | | |
|  | C) | | 3.0 and 8.5 | | | D) | 6.0 and 8.5 | | | |
| 59. | The energy value of cow milk furnishes--- /100 g. | | | | | | | | ( ) | |
|  | A) | | 55 | | | B) | 25 | | | |
|  | C) | | 65 | | | D) | 75 | | | |
| 60. | Themophilic bacteria can grow at ----0C temp. | | | | | | | | ( ) | |
|  | A) | | 20 | | | B) | 30 | | | |
|  | C) | | 50 | | | D) | 40 | | | |
| 61. | Long threads of milk are formed while pouring | | | | | | | | ( ) | |
|  | A) | | Sandiness | | | B) | Ropiness | | | |
|  | C) | | Foaminess | | | D) | None | | | |
| 62. | Pasteurized milk have -----SPC/ml | | | | | | | | ( ) | |
|  | A) | | 30,000 | | | B) | 3,00,000 | | | |
|  | C) | | 20,000 | | | D) | None | | | |
| 63. | Suitable packaging material for Liquid milk-- | | | | | | | | ( ) | |
|  | A) | | HDPE | | | B) | LDPE | | | |
|  | C) | | PEG | | | D) | None | | | |
| 64. | As per the PFA ,Recombined milk contain minimum of ----% fat and -----% SNF | | | | | | | | ( ) | |
|  | A) | | 3.0 and 8.5 | | | B) | 3.0 and 9.5 | | | |
|  | C) | | 4.0 and 7.5 | | | D) | 6.0 and 8.5 | | | |
| 65. | Normal acidity of Cow milk --- | | | | | | | | ( ) | |
|  | A) | | 0.13-0.14 | | | B) | 1.13-0.14 | | | |
|  | C) | | 0.13-1.14 | | | D) | 0.13-1.04 | | | |
| 66. | Richness of flavor of milk due to--- | | | | | | | | ( ) | |
|  | A) | | Casein | | | B) | Lactose | | | |
|  | C) | | Fructose | | | D) | Lecithin | | | |
| 67. | Milk sugar is -- | | | | | | | | ( ) | |
|  | A) | | Casein | | | B) | Fructose | | | |
|  | C) | | Lactose | | | D) | Lecithin | | | |
| 68. | The energy value of buffalo milk furnishes--- C /100g | | | | | | | | ( ) | |
|  | A) | | 25 | | | B) | 75 | | | |
|  | C) | | 35 | | | D) | 100 | | | |
| 69. | Milk protein is --- | | | | | | | | ( ) | |
|  | A) | | Fructose | | | B) | Casein | | | |
|  | C) | | Lecithin | | | D) | None | | | |
| 70. | Acidity of buffalo milk --- | | | | | | | | ( ) | |
|  | A) | | 1.14-0.15 | | | B) | 0.14-1.15 | | | |
|  | C) | | 0.14-0.15 | | | D) | 1.14-1.15 | | | |
| 71. | As per the PFA , Standardized milk contain minimum of ----% fat and -----% SNF | | | | | | | | ( ) | |
|  | A) | | 4.5 and 8.5 | | | B) | 3.5 and 8.5 | | | |
|  | C) | | 7.5 and 8.5 | | | D) | 8.5 and 8.5 | | | |
| 72. | MBRT conducted for- | | | | | | | | ( ) | |
|  | A) | | To check quality | | | B) | To check quantity | | | |
|  | C) | | To check bacterial count | | | D) | None | | | |
| 73. | Titrable acidity is usually expressed as-- | | | | | | | | ( ) | |
|  | A) | | % of Citric acid | | | B) | % of Butyric acid | | | |
|  | C) | | % of acetic acid | | | D) | % of lactic acid | | | |
| 74. | Specific gravity of cow milk | | | | | | | | ( ) | |
|  | A) | | 1.028-1.029 | | | B) | 1.027-1.029 | | | |
|  | C) | | 1.028-1.030 | | | D) | 1.026-1.030 | | | |
| 75. | Specific gravity of buffalo milk | | | | | | | | ( ) | |
|  | A) | | 1.023-1.032 | | | B) | 1.030-1.032 | | | |
|  | C) | | 1.030-1.035 | | | D) | None | | | |
| 76. | Oldest dairy farm in India | | | | | | | | ( ) | |
|  | A) | | Allahabad, 1889 | | | B) | Allahabad, 1898 | | | |
|  | C) | | Allahabad, 1913 | | | D) | Allahabad, 1885 | | | |
| 77. | Oldest co-operative milk union in India | | | | | | | | ( ) | |
|  | A) | | Allahabad, 1889 | | | B) | Allahabad, 1898 | | | |
|  | C) | | Allahabad, 1913 | | | D) | Allahabad, 1885 | | | |
| 78. | National milk day celebrated every year on | | | | | | | | ( ) | |
|  | A) | | 1st June | | | B) | 26th November | | | |
|  | C) | | 1st December | | | D) | None | | | |
| 79 | International milk day celebrated every year on | | | | | | | | ( ) | |
|  | A) | | 1st June | | | B) | 26th November | | | |
|  | C) | | 1st December | | | D) | None | | | |
| 80. | Fat splitting enzyme | | | | | | | | ( ) | |
|  | A) | | Analase | | | B) | Peroxidase | | | |
|  | C) | | Phosphate | | | D) | Lipase | | | |
| 81. | Milk is heavier than | | | | | | | | ( ) | |
|  | A) | | Fat | | | B) | Butter | | | |
|  | C) | | Water | | | D) | Milk solids | | | |
| 82. | Copper +Alloy= | | | | | | | | ( ) | |
|  | A) | | Verdigris | | | B) | Rust | | | |
|  | C) | | Taint | | | D) | Vergris | | | |
| 83. | PMO means | | | | | | | | ( ) | |
|  | A) | | Pasteurized milk ordinance | | | B) | Packet milk ordinance | | | |
|  | C) | | Paneer maintenance ordinance | | | D) | None | | | |
| 84. | ----is a technique that permits concentration and separation without heat | | | | | | | | ( ) | |
|  | A) | | Cold sterilization | | | B) | Membrane processing | | | |
|  | C) | | Irradiation | | | D) | None | | | |
| 85. | ---- is a membrane separation process, driven by a pressure gradient in which the membrane separates the solvent from other component of a solution. | | | | | | | | ( ) | |
|  | A) | | Hyper-filtration | | | B) | Concentration process | | | |
|  | C) | | Reverse osmosis | | | D) | None | | | |
| 86. | ---- is a membrane separation process, driven by a pressure gradient in which the membrane fractionates dissolved and dispersed components of a liquid. | | | | | | | | ( ) | |
|  | A) | | Hyper-filtration | | | B) | Concentration process | | | |
|  | C) | | Reverse osmosis | | | D) | Ultra filtration | | | |
| 87. | ----- play important role in physic-chemical properties of milk fat | | | | | | | | ( ) | |
|  | A) | | FA | | | B) | UNFA | | | |
|  | C) | | SFA | | | D) | None | | | |
| 88. | ---- used for demineralization of milk products and whey for infant formula and special dietary products. | | | | | | | | ( ) | |
|  | A) | | Ultra filtration | | | B) | Reverse osmosis | | | |
|  | C) | | Hyper-filtration | | | D) | Electrodialysis | | | |
| 89. | Fat control process is called --- | | | | | | | | ( ) | |
|  | A) | | Hyper-filtration | | | B) | Ultra filtration | | | |
|  | C) | | Standardization | | | D) | Sterilization | | | |
| 90. | ---can be used for milk fat fractionation, bacteria and spore removal , casein production, whey fat reduction | | | | | | | | ( ) | |
|  | A) | | Micro-filtration | | | B) | Ultra filtration | | | |
|  | C) | | Hyper-filtration | | | D) | Electrodialysis | | | |
| 91. | Most suitable packaging material for liquid milk | | | | | | | | ( ) | |
|  | A) | | LDPE | | | B) | HDPE | | | |
|  | C) | | PE | | | D) | Vegetable parchment paper | | | |
| 92. | Which type of milk is considered as safe for human consumption | | | | | | | | ( ) | |
|  | A) | | A1 | | | B) | A2 | | | |
|  | C) | | B1 | | | D) | B2 | | | |
| 93. | Milk sourness due to | | | | | | | | ( ) | |
|  | A) | | Lactic acids | | | B) | Annatto | | | |
|  | C) | | Volatile acids | | | D) | Coal tar dye | | | |
| 94. | Fishy odour due to | | | | | | | | ( ) | |
|  | A) | | LAB | | | B) | Gums | | | |
|  | C) | | Ketonic | | | D) | Kephalin | | | |
| 95. | Textbook of outlines of Dairy technology written by | | | | | | | | ( ) | |
|  | A) | | V .K. Tanja | | | B) | M. M. Razivuddin | | | |
|  | C) | | Sukumar De | | | D) | G.C.Banerjee | | | |
| 96. | No. of teat canal present in asian buffalo | | | | | | | | ( ) | |
|  | A) | | 4 | | | B) | 1 | | | |
|  | C) | | 3 | | | D) | 2 | | | |
| 97. | Freezing point measured by | | | | | | | | ( ) | |
|  | A) | | Gerbers butyrometer | | | B) | Quevenne lactometer | | | |
|  | C) | | A and B correct | | | D) | Hortvet cryoscope | | | |
| 98. | Main objective of SPC of raw milk | | | | | | | | ( ) | |
|  | A) | | To estimate dead bacteria in curd | | | B) | To estimate live bacteria in curd | | | |
|  | C) | | To estimate viable bacteria in milk | | | D) | A and B correct | | | |
| 99. | ------is one of the premier institute in the dairy sector | | | | | | | | ( ) | |
|  | A) | | IVRI | | | B) | CIRB | | | |
|  | C) | | NDRI | | | D) | CIDK | | | |
| 100. | Rainbow revolution | | | | | | | | ( ) | |
|  | A) | | Agriculture & Fishery | | | B) | Forestry & animal husbandry | | | |
|  | C) | | Horticulture & poultry | | | D) | All of the above | | | |

**Fill in the blanks**

1. PFA-prevention of Food Adulteration rules,--------
2. As per ICMR recommendations, an average daily intake of milk --------
3. Percapita availability/consumption of milk in India--------
4. Percapita availability of milk is highest in --------------- India
5. Overall livestock population is highest in ------------in India
6. ------------is performed to judge the cleanliness of milk
7. Average milk produced by India is ------
8. India’s rank, in world total milk production is -------
9. Second largest share in total milk production is by ----------
10. National milk day is celebrated on ---------
11. International milk day is celebrated every year on ------
12. Chloride concentration in excess of ------in effluent discharged to streams can

result in chlorine toxicity to sensitive water insects such as Daphania Magna

113. Taste of milk depends on it ------------concentration

114. Lactose is also known as ----------

115. Average size of milk fat globule is --------

116. Fat globule membrane is made up of ----------

117. ------------contribute richness to the flavor of milk

118. Precursors of vitamin-A is ---------

119. Total acidity = --------------

120. Most common microbial growth in milk occurs within the PH range of --------

121. Ropiness in milk is due to ---------

122. Critical temperature of milk is -------

123. Rheology is derived from -------verb

124. -----------is defined as the science of deformation and flow of matter

125. Standing up property / resistance to deformation under its own weight is an essential quality

of -------

126. Rheology means--------

127. In Grading of several dairy products, considerable importance is given to -----------

128**. -----------**of butter are both influenced by the composition of milk fat and condition

under which the cream is processed before churning.

129. the plastic bowl and ------------are the method employed for measuring firmness of

the cheese coagulum before cutting.

130.Luotocapillary agglutination test in milk is used for the diagnosis of ----

131. World milk day is celebrated on----------every year

132. The pasteurization process was introduced by the scientist name--------

133. AMUL system of milk marketing follows the principle of --------

134. Presence of neutralizers in milk is identified by using --------

135.------ is the immediate test to judge the quality of milk

136. The essential amino acid present in the milk which gets converted to niacin is-------

137. Artificially prepared milk is referred as ------------

138. ------is used as coolent in HTST pasteurization.

139. when the milk is adulterated with water, the specific gravity of milk -----

140. If the temperature is increases, the specific gravity of milk was ------

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | I | **Matching** |  |  |
|  | 141 | In bottle pasteurization | ( ) | A)720C/ 15 Sec. OR 161 0F |
|  | 142 | Low Temperature Long Time | ( ) | B)Butter making |
|  | 143 | High Temperature Short Time | ( ) | C)63-660C /30 min. OR 145-150 0F |
|  | 144 | Vacreation | ( ) | D)740C / 7sec. OR 165 0F |
|  | 145 | Stassanization | ( ) | E)630C /30 min. OR 145 0F |
|  | II | **Matching** |  |  |
|  | 146 | Ultra High temperature | ( ) | A)150 0C / fraction of sec OR 302 0F |
|  | 147 | Uperization | ( ) | B)Swedan |
|  | 148 | Pure pak | ( ) | C)135-1500C /No Hold |
|  | 149 | Tetra pack | ( ) | D)U.K |
|  | 150 | Perga | ( ) | E)U.S.A |
|  | III | **Matching** |  |  |
|  | 151 | To kill T.B. germs | ( ) | A)138 0F /30 min. |
|  | 152 | To inactivate Phosphatase | ( ) | B)61.1 0C /30 min. |
|  | 153 | Pasteurization | ( ) | C)161 0F /15 sec. |
|  | 154 | Cream-line reduction | ( ) | D)72.2 0C / 15 sec. |
|  | 155 | To kill T.B. germs | ( ) | E)70 0C/ 15 Sec. |
|  | IV | **Matching** |  |  |
|  | 156 | Surface active agents | ( ) | A)Dissolve protein |
|  | 157 | Strong alkali | ( ) | B)Removal of Milk stone |
|  | 158 | Nitric acids | ( ) | C)Acinol- N |
|  | 159 | Mild acids | ( ) | D)Stainless steel surface |
|  | 160 | Week alkali | ( ) | E)Saponify fat |
|  | V | **Matching** |  |  |
|  | 161 | NaOH | ( ) | A)Washing Soda |
|  | 162 | Na2CO3 | ( ) | B)Idet-10 |
|  | 163 | Wetting agents | ( ) | C)Caustic soda |
|  | 164 | Acid rinse | ( ) | D)Sulphidril compounds |
|  | 165 | Cooked flavor | ( ) | E)Phosphoric acid |
|  | VI | **Matching** |  |  |
|  | 166 | Disinfectant | ( ) | A)Freedom from extraneous matters |
|  | 167 | Cleanliness | ( ) | B)Kill harmful bacteria and viruses from surface |
|  | 168 | Safety | ( ) | C)Kill all pathogenic organisms only |
|  | 169 | Pasteurization | ( ) | D)Kill all micro organism from surface |
|  | 170 | Sterilizing | ( ) | E)Freedom from pathogenic micro-organism |

**Chapter 6: Milk Technology Answers**

**Multiple choice Questions**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | A | 21 | B | 41 | B | 61 | B | 81 | C |
| 2 | B | 22 | A | 42 | B | 62 | A | 82 | A |
| 3 | A | 23 | A | 43 | D | 63 | B | 83 | A |
| 4 | C | 24 | A | 44 | A | 64 | A | 84 | B |
| 5 | D | 25 | B | 45 | D | 65 | A | 85 | C |
| 6 | D | 26 | D | 46 | C | 66 | D | 86 | D |
| 7 | A | 27 | A | 47 | D | 67 | C | 87 | B |
| 8 | B | 28 | A | 48 | B | 68 | D | 88 | D |
| 9 | C | 29 | D | 49 | A | 69 | B | 89 | C |
| 10 | D | 30 | C | 50 | B | 70 | C | 90 | A |
| 11 | A | 31 | B | 51 | C | 71 | A | 91 | A |
| 12 | C | 32 | C | 52 | A | 72 | A | 92 | B |
| 13 | C | 33 | B | 53 | D | 73 | D | 93 | C |
| 14 | B | 34 | A | 54 | B | 74 | C | 94 | D |
| 15 | D | 35 | C | 55 | A | 75 | B | 95 | C |
| 16 | C | 36 | D | 56 | C | 76 | A | 96 | B |
| 17 | C | 37 | A | 57 | A | 77 | C | 97 | D |
| 18 | C | 38 | A | 58 | A | 78 | B | 98 | C |
| 19 | B | 39 | B | 59 | D | 79 | A | 99 | C |
| 20 | C | 40 | C | 60 | C | 80 | D | 100 | D |

**Fill in the blanks**

|  |  |
| --- | --- |
| **S.No** | **Answers** |
| 101 | 1976. |
| 102 | 280-300 gram/day |
| 103 | 427 gram/person |
| 104 | Punjab |
| 105 | Uttar Pradesh |
| 106 | Sediment test or off the bottom test |
| 107 | 187MT/year |
| 108 | 1st rank |
| 109 | Tamil Nadu |
| 110 | 26th November |
| 111 | 1st June |
| 112 | 400mg/Lit |
| 113 | milk fat |
| 114 | milk sugar |
| 115 | 2-5 micron |
| 116 | Phospholipids and proteins |
| 117 | Lecithin |
| 118 | Carotene |
| 119 | Natural acidity + Developed acidity |
| 120 | 5.6-7.5 |
| 121 | *Alkaligenes viscolactis* and *Enterobacter aerogenes* |
| 122 | 100C |
| 123 | Greek |
| 124 | Rheology |
| 125 | Butter |
| 126 | to flow |
| 127 | Body and texture |
| 128 | body and texture |
| 129 | Torsiometer |
| 130 | Q-fever |
| 131 | June-1st |
| 132 | Louis Pasteur |
| 133 | Co-operative |
| 134 | Rosalic acid test |
| 135 | Organoleptic test |
| 136 | Tryptophan |
| 137 | Synthetic milk |
| 138 | Glycol |
| 139 | Decreases |
| 140 | Decreases |

**Matching**

|  |  |
| --- | --- |
| **S.No** | **Answer** |
| **I** | 141)C, 142)E ,143)A, 144)B, 145)D |
| **II** | 146)C,147)A,148)E,149)B,150)D |
| **III** | 151)A,152)B,153)C,154)D,155)E |
| **IV** | 156)C,157)E,158)D,159)B,160)A |
| **V** | 161)C,162)A,163)B,164)D,165)E |
| **VI** | 166)B,167)A,168)E,169)C,170)D |

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