LIVESTOCK PRODUCTS TECHNOLOGY (LPT)

CHAPTER 7: MILK PRODUCTS TECHNOLOGY

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Refresher Points

CREAM

- Principally cream separation from milk, is based on the fact that **milk fat is lighter than the skim milk portion**.
- Cream is obtained from milk through either **gravity** or **centrifugal methods**.
- In Stoke's law, 'G' refers to **acceleration due to gravity**.
- Warm milk gives **close skimming**.
- Altering the position of the **cream screw** changes the ratio of skim milk to cream.
- The percentage of total fat recovered from milk in cream is termed as **skimming efficiency**.
- The **fat test of skim milk** is the best index for finding skimming efficiency.
- For efficient separation the temperature of milk should be **above the melting point of fat**.
- Satisfactory temperature for separation is around **40°C**.
- Separator slime consists of **water, fat protein, lactose** and **minerals**.
- Partial reduction in cream acidity for butter making is known as **neutralization**.
- Using of both lime and soda is done in **double-neutralization**.
- Pasteurization of cream by holder method is done at **71°C for 20 minutes** and by HTST at **95-100°C for 15 seconds**.
- Using of vacuum for pasteurization is called **vacreation**.
- Frozen cream is stored at **-12°C**.
- Frozen cream tends to **oil off** on thawing.
- Feathering in hot coffee is due to **excessive homogenization**.

BUTTER

- High cooling and ageing temperatures of butter produce **large fat losses** in buttermilk.
- Fats with low melting points are known as **soft fats**.
- **Annatto** and **carotene** are examples of vegetable colour added to butter.
- The stage where fat in skim milk emulsion breaks is known as the **breaking stage**.
- Water added to reduce the temperature of the churn contents is known as **breakwater**.
- Salting is done by **wet** and **dry** methods.
- Kneading of butter is known as **working**.
- **Shrinkage** of stored butter is due to evaporation of moisture.
- Overrun in butter is due to the presence of **moisture, salt** and **curd**.
- Maximum obtainable theoretical overrun in butter is 25%.
- Under Indian conditions, the average percentage of overrun obtainable is 20-22%.

- Theories of churning are Fisher and Hooker's phase reversal theory, Rahn's foam theory, King's modern theory
- Over-working of butter leads to **greasy defect**.
- Underworking of butter leads to **leaky defect**.
- Undissolved salt grains cause **gritty defect**.
- Inadequate washing and improper incorporation of salt in butter leads to **mottling defect**.

ICE CREAM

- **Ices** contain no dairy products.
- Ice cream sold without hardening, as drawn from freezers is known as **softy ice cream**.
- In ice cream, the **percentage of fat** is the most variable constituent.
- **Emulsifier**s help in the production of drier ice-creams with smooth body and texture.
- High total solids can cause **heavy** or **soggy** or **pasty** ice cream.
- The viscosity of the ice cream mix is chiefly affected by **fat** and **stabilizer**.
- Two types of viscosity found in ice cream mix are **apparent** and **basic viscosity**.
- Freezers may be classified as **batch, continuous,** and **soft-serve** freezers.
- The batch freezer consists mainly of a **freezing chamber** and **dasher**.
- Too much air will produce **snowy** or **fluffy ice cream**.
- Too little air incorporation will result in **soggy** or **heavy ice cream**.
- Sandiness in ice cream is due to **high MSNF/lactose** or **temperature fluctuations** or **long storage periods**.
- Excessive overrun causes **shrinkage defect** in ice cream.

CHEESE

- Microbiologically cheese can be classified as **ripened** and **un-ripened** varieties.
- Two principal enzymes of rennet are **rennin** and **pepsin**.
- **Alkalis** retard the clotting activity of rennet.
- Microbial rennet is prepared from ***Bacillus subtilis*** and ***Mucor mehei***.
- Expulsion of whey and contraction of the curd is termed as **syneresis**.
- Combined operations of packing, turning, piling and repiling of the curd cubes is termed as **cheddaring**.
- The term **green cheese** applies to hard-pressed cheese before ripening.
- Paraffining is done by maintaining the temperature of liquid paraffin at **104-121°C**.
- Pungent odour in very old cheese is due to **ammonia** and **hydrogen sulphide**.
- Well-aged cheese has pleasant odours due to a blend of **butyric** and **caproic acids**.
- The rate of ripening is measured by the **ripening index**.
- **Processed cheese** refers to a product obtained by heating cheese with emulsifiers.
- **Laminates** are the common packaging materials used for cheese packing.
- Incorrect filling and pressing of curd cubes result in **lopside defect**.

CONDENSED MILKS

- Full-cream sweetened condensed milk is otherwise known as **condensed milk**.
- Full cream unsweetened condensed milk is also known as **evaporated milk**.
- The ratio of concentration of milk solids for full-cream products is **1:2.5**.

- The ratio of concentration of milk solids for sweetened condensed skim milk is **1:3**.
- Unsweetened condensed milk should contain not less than **8.0% fat** and **26% milk solids**.
- Sweetened condensed milk should contain not less than **9% fat**, **31% milk solids** and **40% sugar**.
- Unsweetened condensed skim milk should contain not less than **20% milk solids** and less than **0.5 % fat**.
- Loss of vitamin B_1 in evaporated milk ranges from **30-50**.
- In the manufacture of condensed milk their composition is controlled by checking their specific gravity/density periodically using a **Baume hydrometer**.
- Browning discolouration defect in evaporated milk results from the interaction between **casein** and **lactose**.
- Cooked flavour is caused by due formation of **sulfhydryl compounds** during heat treatments.
- Non-amino browning in milk products is known as **caramelization**.
- Caramelization occurs due **heat-decomposition of sugars** in the absence of amino sugars.
- The size of the lactose crystals determines the **smoothness of condensed milk**.
- Calcium and magnesium together with **citrates** and **phosphates** control the salt balance and heat stability of milk.
- The two important platform tests done to accept the milk for condensed milk manufacture are **alcohol** and **clot-on-boiling tests**.
- An alcohol index of **7** is indicative of **good stable milk**.
- An alcohol index of less than **3** is **fit for rejection**.
- **Alcohol-alizarin test** not only determines the heat-stability but also the pH.
- The desired fat/SNF ratio of raw milk used for condensed milk is usually **1:2.44**.
- **Sugar** is added for the purpose of preserving the condensed milk without resorting to sterilization.
- Sweetening agents like corn syrup solids, glucose etc., have the disadvantages of **colour changes** and **thickening** on storage.
- Optimal sugar ratio suggested is **62.5 - 64.5%**.
- Amount of sugar required ranges from **40-45%**.
- On milk basis the required amount of sugar for sweetened condensed milk is **18-20%**.
- Condensing is carried out in an **evaporator** or **vacuum pan**.
- The portion of the body extending above the level of milk in the body of the pan is known as **vapour space**.
- **Entrainment separator** reclaims milk particles lost during condensing of milk.
- Condensers may either be of **surface** or **spray** types.
- In tropics, about **20 kgs of cool water** is required to remove **1 kg of water** from milk.
- **Sampler** is one of the important condensed accessories.
- **Striking the batch** indicates the reaching of the required concentration by the milk.
- The standard testing temperature of condensed milk is **49°C**.
- Hot condensed milk is **invariably homogenized** before crystallization.
- Prolonged exposure to heat results in discolouration and age-thickening of the condensed milk product.
- Size of the lactose crystals determine the **smoothness of condensed milk**.

- Normally, for condensed milk the temperature at which **rapid crystallization** takes place is at **30°C**.
- During the manufacture of condensed milk, the introduction of fine lactose powder to provide nuclei for crystallization is referred to as **seeding**.
- Seeding is done at the rate of **0.1-0.3%** of the condensed milk.
- Very low storage temperature causes **sandiness** and **sugar separation** in condensed milk.
- Optimal storage temperature of condensed milk is **10°C**.
- The sterilizing temperature used in the manufacture of evaporated milk is **116-118°C** for **15 minutes**.
- Snapping of the cans during packing of evaporated milk is known as **flipping**.
- Heat-coagulation of milk is caused chiefly by destabilization of the **milk proteins**.
- Salt balance ratio for cow milk is **0.37**.
- Salt balance for buffalo milk is **0.39**.
- Low sugar ratio results in **age-thickening defect**.

DRIED MILKS

- Amorphous state of the lactose causes **caking**.
- Keeping quality of **drum dried milk** is better than **roller dried milk**.
- Scorching of milk particles is due presence of **pits** in the drum surfaces
- Atomizing is done in spray drying by **nozzle, pneumatic** and **centrifugal discs**.
- Pressure nozzles are nowadays made of **tungsten-carbide alloy**.
- Highly concentrated milks are dried using **centrifugal discs**.
- In spray drying, normally the temperature of inlet air is **130-140°C** and outlet air is **100-105°C**.
- The commonly used device in separation and recovery of milk-dust/fines is a **cyclone**.
- **Instantization** refers to the process by which dried milk is made instant soluble.
- Reconstitutability of dried milk is greatly improved by **instantization**.
- The important physico chemical properties of milk powder includes **particle size, shape, structure, density, flowability, dustiness** and **reconstitutability**.
- **Air cells** are absent in drum dried milk powder.
- High percentage of **free fat** is observed in drum dried milk.
- The normal satisfactory range of moisture content is **3-4%** for skim milk powder and **2-3%** for whole milk powder.
- In milk powders, the density of air-free solids is the **true density** and weight per unit volume is the **bulk** or **apparent density**.
- **Sinkability** refers to the ability of the dried particles to penetrate the surface tension of water.
- The amount and dispersion of fats influence **wettability**.
- **Spray dried milks** have poor sinkability
- **Keeping quality** of milk powder is influenced by fat content, moisture percentage and storage temperature.
- Shelf-life of **whole milk powder** is comparatively less than that of skim milk powder.
- Whole milk powder is used in preparation of **reconstituted milk**, whereas skim milk powder is used in **toned milk**.

INDIGENOUS MILK PRODUCTS

- The varieties of khoa are **Pindi, Dhap** and **Danedar**.
- Buffalo milk yields khoa which is **soft, loose bodied** and **granular**.
- The physio-chemical quality of khoa is influenced by **conditions of dehydration**.
- Conditions of dehydration includes **temperature of dehydration, speed of stirring, extent of dehydration** and **amount of milk taken per batch**.
- Milk with low fat percentages yields khoa with **hard body** and **coarse texture**.
- Khoa made from homogenised milk shows **reduced patting tendency**.
- Khoa is used as a base material in preparation of sweets such as **gulabjamoon, peda, kalakand** and **barfi**.
- Milk product prepared by heat simmering without stirring is **khurchan**.
- The over-run in kulfi is **0%**.
- Traditionally, **panner** is the pressed variety of chhanna.
- Ghee may be defined as **clarified butter**.
- The unsaponifiable matter of ghee are **carotene, vitamin A** and **tocopherol**.
- Ghee is produced by desi, creamery butter and continuous methods.
- In pre-stratification method of ghee production, butter stratifies into three layers *viz.,* **curd, fat** and **buttermilk**.
- Adulteration of ghee with vegetable oil can be detected by **Baudouin test**.
- Agmark ghee is packed under two grades, namely **special** and **general**.
- The free fatty acids (oleic) content is limited to **1.4%** in special grade and **2.5%** in general grade.
- Rapid cooling of hot ghee results in **greasy texture defect**.
- Khoa to which sugar has been added is **peda**.
- Fresh chhanna with added sugar and heat mixed gives **sandesh**.
- Product obtained by mixing chhanna, khoa and sugar is **pantooa**.
- High grade khoa can be prepared from **buffalo milk**.

FERMENTED DAIRY PRODUCTS

- Active bacterial culture in dairy industry is termed as **starters**.
- Starters commonly used in dairy industry are ***Streptococcus lactis***, ***Streptococcus cremoris***, ***Leuconostoc citrovorum*** and ***Leuconostoc dextranicum***.
- An active starter has three major functions *viz*., **Acid production, flavour production** and **antibiotic effect**.
- Skim milk that has undergone a clean lactic fermentation is **cultured buttermilk**.
- Acidophilus milk is fermented using the culture of ***Lactobacillus acidophilus***.
- ***Lactobacillus bulgaricus*** is used in the preparation of Bulgarian buttermilk.
- **Kefir** and **kumiss** are the two lactic acid-alcohol fermented milks.
- Kefir grains contain ***Streptococcus lactis***, ***Betabacterium caucasicum***, **Kefir bacilli** and **lactose fermenting yeasts**.
- Yoghurt is prepared using the cultures of ***Lactobacillus bulgaricus*** and ***Streptococcus thermophilus***.
- Indian curd is known as **dahi**.
- Desi butter milk is called **lassi**.

- **Srikhand** is an example for fermented dairy product.
- Strained curd gives a solid mass known as **chakka**.
- Srikhand further desiccated to obtain **srikhand wadi**.

Questions

1. Which among following is the official test to find out the quality of sterilized milk?
   (a) Phosphatase test
   (b) Turbidity test
   (c) Methylene Blue Reduction test (MBRT)
   (d) Storch's Peroxidase test

2. Consider the following statements with respect to grades of manufacturing milk –
   A. Milk with a clear pleasant flavour and practically no sediment on sediment disc is categorized as Grade-I.
   B. Grade-II milk shall be used for the manufacture of ice cream.
   C. The MBR time of Grade-III milk is less than 20 minutes.
   D. Reject or no grade is the milk with high acid, rancid, weedy or foreign flavours.

Choose the correct answer from the options given below:
   (a) A, B and D only
   (b) A, B and C only
   (c) B, C and D only
   (d) A, C and D only

3. Which of the following organisms are present in Kefir grains?
   A. *Lactobacillus bulgaricus*
   B. *Streptococcus lactis*
   C. Lactose fermenting yeasts
   D. *Betabacterium caucasicum*
   E. *Lactobacillus kefiranofaciens*

Choose the correct answer from the options given below:
   (a) A, C and D only
   (b) B, C, D and E only
   (c) B, D and E only
   (d) A, B, C and E only

4. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

   Assertion A: In cream, microbial growth is faster than in milk.

   Reason R: During cream separation, most of the microorganisms in the milk goes into the skim milk portion.

In light of the above statements, choose the correct answer from the options given below
   (a) Both A and R are true and R is the correct explanation of A
   (b) Both A and R are true but R is NOT the correct explanation of A
   (c) A is true but R is false
   (d) A is false but R is true

5. Which among the following is the process where the cream is impregnated with pure oxygen to a pressure of 10 kg/cm^2 followed by a gentle heat treatment at 55°C?

(a) Tyndallization
(b) Hoferization
(c) Oxidization
(d) Thermization

6. According to the FOOD SAFETY AND STANDARDS (FOOD PRODUCTS STANDARDS AND FOOD ADDITIVES) REGULATIONS, 2011, which one of the following is the maximum limit of *Staphylococcus aureus* count in dahi/yoghurt?

(a) 100/g
(b) 50/g
(c) 75/g
(d) 10/g

7. Match List-I with List-II

List-I	**List-II**
Microbial count	**Interpretation of cream quality**
A. Low total count but high coliforms	I. Good hygiene except aerial contamination
B. Low total count and coliforms but high molds	II. Good hygiene in manufacture but storage at high temperature
C. Low total count and coliforms but high yeasts	III. Poor hygiene in manufacture but storage at below 5°C
D. High total count but low coliforms	IV. Good hygiene except fruit contamination

Choose the correct answer from the options given below:

(a) A - I, B - III, C - II, D - IV
(b) A - I, B - III, C - IV, D - II
(c) A - III, B - I, C - II, D - IV
(d) A - III, B - I, C - IV, D - II

8. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: *Lactobacillus acidophilus* controls gastrointestinal disorders such as diarrhoea, dyspepsia, constipation, flatulence, colitis in adult and children.

Reason R: *Lactobacillus acidophilus* organisms are able to get themselves implanted in the large intestine of human beings through regular consumption of acidophilus milk.

In light of the above statements, choose the correct answer from the options given below

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

9. Match List-I with List-II

List-I	List-II
Abnormal colours in butter	**Causative organism**
A. Green and blue green	I. *Geotrichum candidum*
B. Muddy brown	II. *Rhodotorula* spp.
C. Orange and yellow	III. *Penicillium* spp.
D. Pink	IV. *Phoma* spp.

Choose the correct answer from the options given below:

(a) A - III, B - IV, C - II, D - I
(b) A - III, B - IV, C - I, D - II
(c) A - I, B - II, C - III, D - IV
(d) A - I, B - II, C - IV, D - III

10. Which among the following organism causes 'Fishy flavour/Fishiness' defect in evaporated milk?

(a) *Thermobacterium mathiacelle*
(b) *Proteus ichthyosmius*
(c) *Bacillus megaterium*
(d) *Clostridium foetidum*

11. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: The microenvironment of butter is relatively favourable for the growth of microorganisms as compared to that of cream (or milk).

Reason R: In cream (or milk), water is in a continuous phase and fat is in discontinuous phase, whereas the reverse is true for butter where the water is present as drops dispersed in fat.

In light of the above statements, choose the correct answer from the options given below

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

12. Match List-I with List-II

List-I	List-II
Flavour defects in cream	**Causative organism**
A. Slimy/ropy cream	I. *Pseudomonas putrefaciens*
B. Cheesy flavour	II. *Alcaligenes viscolactis*
C. Musty or moldy flavour	III. *Geotrichum candidum*
D. Yeasty flavour	IV. *Torulopsis sphaerica*

Choose the correct answer from the options given below:

(a) A - II, B - I, C - III, D - IV
(b) A - II, B - I, C - IV, D - III
(c) A - III, B - IV, C - I, D - II
(d) A - I, B - II, C - III, D - IV

13. Consider the following statements with respect to water-borne bacteria:

A. Butter is most vulnerable to spoilage by water-borne bacteria.
B. The most dangerous are those, which are strongly lipolytic, proteolytic and can grow at low temperatures (psychrotrophs).
C. The most important genus that is able to grow in water is *Pseudomonas*.
D. In case of cheeses, there are more chances of spoilage from water-borne bacteria than in case of butter.

Choose the correct answer from the options given below:

(a) A, B and C only
(b) B, C and D only
(c) A, C and D only
(d) A, B and D only

14. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: With milk, cream, ice-cream and comparable products, the chances of contamination through water supply are relatively higher.

Reason R: Water normally does not come in contact with the above said products and the equipments used in their preparation are readily sterilized.

In light of the above statements, choose the correct answer from the options given below

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

15. Match List-I with List-II

List-I	**List-II**
Purpose of dairy water	**Chlorine concentration (ppm) required**
A. Drinking	I. 100 - 250
B. Processing	II. 1.0 – 5.0
C. Cleaning	III. 0 – 0.5
D. Sanitizing	IV. 0.2
E. Rinsing	V. 10 - 20

Choose the correct answer from the options given below:

(a) A - V, B - III, C - II, D - IV, E - I
(b) A - IV, B - III, C - V, D - I, E - II
(c) A - III, B - I, C - II, D - IV, E - V
(d) A - II, B -IV, C - III, D - V, E - I

16. The bacterial growth factor in a milk held at 10°C for 18 hours is

(a) 1.00
(b) 1.05
(c) 1.08
(d) 10.00

17. Arrange the steps of cleaning and sanitization of dairy equipment:

A. Pre-rinsing
B. Hot water rinsing
C. Warm to hot detergent washing
D. Draining and drying
E. Sanitizing

Choose the correct answer from the options given below:

(a) A, C, B, D, E
(b) A, C, B, E, D
(c) A, B, C, E, D
(d) A, B, C, D, E

18. Consider the following statements with respect to Agricultural Produce (Grading and Marking) Act, 1937:

A. AGMARK defines the quality of butter and ghee.
B. The act provides for the compulsory grading of ghee by the recognized ghee dealers.
C. AGMARK ghee is packed under two grades based on the maximum limit of free fatty acids (oleic).
D. Currently, the central AGMARK laboratory is located at Nagpur.

Choose the correct answer from the options given below:

(a) A, B and C only
(b) B, C and D only
(c) A, C and D only
(d) A, B and D only

19. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: In India, the permitted anti-oxidant is Butylated Hydroxy Anisole (BHA).
Reason R: It can be added at 0.02% to whole milk powder and partly skim milk powder (by weight of the finished product).

In light of the above statements, choose the correct answer from the options given below

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

20. Which among the following refers to the product obtained when skim milk powder, vegetable fat and water are combined in correct proportions to yield fluid milk?

(a) Reconstituted Milk
(b) Recombined Milk
(c) Filled Milk
(d) Imitation Milk

21. According to the Prevention of Food Adulteration (PFA) Rules, 1976, which among the following milks contain the SNF content of 8.5 percentage?

A. Double toned milk
B. Skim milk

C. Toned milk
D. Standardized milk
E. Recombined milk

Choose the correct answer from the options given below:

(a) A, B and D only
(b) C, D and E only
(c) B, C, D and E only
(d) A, B, C, D, E

22. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: An FAO/WHO Expert Panel on Milk Quality suggested addition of hydrogen peroxide (H_2O_2) as an alternative for refrigeration.

Reason R: Higher concentration of H_2O_2 is toxic.

In light of the above statements, choose the correct answer from the options given below

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

23. Match List-I with List-II

List-I	**List-II**
Physical property	**Unit / Measured by**
A. Viscosity of milk	I. Zeiss apparatus
B. Refractive index of milk	II. Dyne cm^{-1}
C. Density of milk	III. Centipoise
D. Surface tension of milk	IV. Hydrometer

Choose the correct answer from the options given below:

(a) A - I, B - III, C - II, D - IV
(b) A - I, B - III, C - IV, D - II
(c) A - III, B - I, C - II, D - IV
(d) A - III, B - I, C - IV, D - II

24. Which among the following type of milk samplers also known as 'Milk Thief'?

(a) Dipper
(b) Tube or proportionate
(c) McKay sampler
(d) Drip

25. Which among the following preservatives causes hardening of casein in milk and interferes with the Fat test?

(a) Corrosive sublimate
(b) 40% Formaldehyde
(c) Potassium dichromate
(d) Bromo-2-nitro propane-3-diol

26. Match List-I with List-II

List-I	List-II
Tests/Reagents	**Purpose (to detect)**
A. Phosphatase test	I. Extend of bacterial contamination
B. CAMP test	II. Inadequacy of Pasteurization
C. Standard Plate Count (SPC)	III. pH & heat stability of milk
D. Alcohol-Alizarine test	IV. Diagnosis of Mastitis

Choose the correct answer from the options given below:

(a) A - III, B - I, C - II, D - IV
(b) A - II, B - I, C - III, D - IV
(c) A - II, B - IV, C - I, D - III
(d) A - I, B - II, C - IV, D - III

27. Consider the following statements -

A. In dairy industry, thermoduric microorganisms are those that survive pasteurization temperatures but do not multiply at these temperatures.
B. The gram-positive psychrotropic bacteria tend to outgrow the other group during the refrigerated storage (7.2°C and lower) of pasteurized milk.
C. Coliforms are gram-negative, sporeforming rods, which ferment lactose into acid and gas at 32°C within 48 hours.

Choose the correct answer from the options given below:

(a) A and B only
(b) B and C only
(c) C only
(d) A only

28. Given below are two statements, one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Mercuric chloride may be added in the form of tablets, which are coloured (usually bright red) to prevent the milk being mistaken for food.

Reason R: Mercuric chloride is very poisonous.

In light of the above statements, choose the correct answer from the options given below

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is NOT the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

29. The bacterial growth factor for a milk held at 5°C for 18 hours is

a) 1.00 b) 1.05
c) 1.80 d) 10.00

30. The organisms that have optimal growth in range of 20 – 30°C is

a) Psychrotrophs b) Mesophiles
c) Mesotrophs d) Yeast and mould

31. The test most commonly used for density test of pan samples of condensed milk is

a) Pycnometer test b) Hydrometer test

c) Refractometer test
d) Viscometer test

32. The basic viscosity of ice cream mix is
a) 1 – 50 Centipoise
b) 50 – 300 Centipoise
c) 400 – 600 Centipoise
d) > 1000 Centipoise

33. As per FSSAI standards, the permitted level of milk fat % (on dry matter basis) in low fat paneer is
a) Minimum 10%
b) Minimum 20%
c) Maximum 10%
d) Maximum 20%

34. In production of flavour and aroma of fermented milk products
a) Homolactis play more important role
b) Heterolactis play more important role
c) Both Homolactis and Heterolactis equally important
d) Nothing specific, depends on products

35. The whey protein nitrogen of (WPN) of high heat skim milk powder should be
a) ≥ 6 mg
b) 1.5 – 6 mg
c) ≤ 1.5 mg
d) Zero

36. The category of organism that grows in widest pH range is
a) Gram +ve organism
b) Yeast
c) Moulds
d) Gram -ve organism

37. In the preparation of kheer, high-grade rice and clean sugar is usually added at the level of _____ and _____ percent of milk respectively.
a) 1% and 5%
b) 2.5% and 5%
c) 5% and 10%
d) 2.5% and 10%

38. In the preparation of khurchan, a final concentration of _____ is desirable.
a) 2:1
b) 4:1
c) 5:1
d) 3:1

39. The variety of Khoa used is the manufacture of gulabjamoon is
a) Pindi
b) Dhap
c) Danedar
d) Pantoa

40. The solubility (% wt.) of whole milk powder by spray drying is
a) 85 ml
b) 90.5 ml
c) 98.5 ml
d) 75 ml

41. The process of introduction of lactose in very fine powder in condensed milk is
a) Lacteation
b) Thickening
c) Seeding
d) Stabilization

42. The biological value of whey protein is
a) 88
b) 73
c) 104
d) 100

43. The moisture content in Agmark ghee should not be more than

a) 0.5% b) 0.3%
c) 0.6% d) 0.4%

44. Ageing of ice cream involves
a) Hydration of milk proteins b) Crystallization of fats
c) Absorption of water by hydrocolloids d) All the above

45. Hard pressed cheese in early stages of ripening is known as
a) Processed cheese b) Green cheese
c) Yellow cheese d) Cottage cheese

46. The following is an external mould ripened cheese
a) Camembert b) Gorgonzola
c) Roquefort d) Cheddar

47. The raw material used for the preparation of cottage cheese is
a) Whole milk b) Skim milk
c) whey d) Condensed milk

48. Whipping cream contains fat content of
a) 30 – 40 % b) 45 – 50 %
c) 20 – 25 % d) 65 – 85 %

49. Optimum temperature for churning of cream is
a) 5 – 6 ° C b) 12 – 14 ° C
c) 7 – 9 ° C d) 9 – 11 ° C

50. To reduce the temperature of churn contents _____ is added
a) Milk powder b) Cream
c) Both a and b d) Break water

51. The butter should not contain less than _____ percent fat as per PFA rule
a) 60 b) 70
c) 75 d) 80

52. Ghee residue is used in making
a) Toffees b) Indigenous sweet meat
c) Both a and b d) beverages

53. Cream is rich in
a) Water soluble vitamins b) Fat soluble vitamins
c) Both a and b d) None

54. Feathering is hot coffee can be prevented by
a) Proper homogenization pressure b) Using sweet cream
c) Avoiding addition of salts d) All the above

55. Frozen cream is stored at
a) –18ºC b) –23ºC
c) –10ºC d) –12ºC

56. Diacetyl can be added to butter at the rate of

a) 3 ppm b) 1 ppm

c) 4 ppm d) 2 ppm

57. Acidity of sweet cream butter should not exceed

a) 0.2% b) 0.3%

c) 0.4% d) 0.1%

58. Fats with low melting points are known as

a) Hard fats b) Soft fats

c) True fats d) None

59. Underworking of butter leads to

a) Leaky butter b) Greasy butter

c) Hard butter d) None

60. Carotene content of ghee is

a) 3.2-7.4 mg/g b) 0.32-0.74 mg/g

c) 0.22-0.64 mg/g d) 2.2-6.4 mg/g

61. Average freezing point of normal ice cream mix is

a) 24.5º F b) 25.5º F

c) 26.5º F d) 27.5º F

62. Emulsifiers in ice cream helps in the production of

a) Smooth body and texture b) Drier ice cream

c) Improved whipping quality d) All the above

63. Acidity of ice cream mix is dependent upon

a) Milk fat content b) Sugar content of mix

c) Serum solids content d) Ageing period

64. Commercially butter is cold stored at

a) –18ºC to –20ºC b) –23ºC to –29ºC

c) –5ºC to –10ºC d) –12ºC to –15ºC

65. Shrinkage in ice cream is due to

a) Excessive overrun b) Excessive emulsifier

c) Both a and b d) High SNF content

66. Bitter or putrid flavours are caused by psychrotropic bacteria that produce

a) Amylase b) Maltase

c) Lipase d) Protease

67. Luoto Capillary Agglutination Milk test is used for which of the following milk-borne zoonotic disease

a) Yersiniosis b) Q-Fever

c) Campylobacteriosis d) Diphtheria

68. The minimum acidity percent required for positive clot-on-boiling test is _____.

a) 0.20 – 0.25 % b) 0.30 – 0.45 %

c) 0.26 – 0.29 % d) 0.50 – 0.65 %

69. The lipolysis leading to accumulation butyric and caproic acid results in _____ type of rancidity.

a) Hydrolytic b) Ketonic

c) Oxidative d) Soapy

70. _____ is a milder form of heat treatment (63°C / 10-15 seconds) given to milk before storing it at low temperature.

a) Bactofugation b) Boiling

c) Pasteurization d) Thermisation

71. _____ defect is not generally associated with dahi, but can be seen if milk is not pasteurized properly or is contaminated with sliminess producing organisms.

a) Gassiness b) Ropiness

c) Sweet curdling d) Frothiness

72. Which of the following disease is caused by contaminated refrigerators?

a) Yersiniosis b) Campylobacteriosis

c) Listeriosis d) Tuberculosis

73. The type of association in which the metabolic end products of one microorganism are utilized as foodstuff by the other for producing final change in milk and milk products is known as _____.

a) Synergism b) Metabiosis

c) Mutualism d) Antibiosis

74. An example for non-microbial induced off-flavour is _____.

a) Oxidized flavour b) Medicinal flavour

c) Unclean flavour d) All the above

75. Milk previously chilled and subjected to excessive agitation during transport causes _____.

a) Fat hydrolysis b) Protein degradation

c) Separation of milk fat d) Separation of milk protein

76. Which of the following organism is a ‘lactic acid producing aerobic sporeformer’?

a) *Streptococcus lactis* b) *Bacillus coagulans*

c) *Leuconostoc dextranicum* d) *Escherichia coli*

77. Which among the following is found be an excellent oxidizing agent for measuring the COD of both wastewater and natural waters?

a) H_2O_2 b) $NaBiO_3$

c) $K_2Cr_2O_7$ d) OsO_4

78. Which among the following is a dairy effluent treatment method that can be used for the recovery of energy in the form of biogas?

a) Activated sludge process b) Rotating biological contactors

c) Aerated lagoons d) Anaerobic fermentation process

79. In 1960, _____ company started the HACCP concept.

a) Nestle b) Pillsbury
c) Britannia d) Amul

80. The headquarters of International Organization for Standardization is situated at _____.
a) New York b) Paris
c) Geneva d) London

81. FSSAI was established in the year
a) 2006 b) 2008
c) 2007 d) 2009

82. Percentage of free fatty acid in special grade ghee should not be more than _____.
a) 1.4 b) 3.4
c) 2.5 d) 4.5

83. The BIS requirement of Milk fat percentage in ice cream is _____.
a) 5 b) 15
c) 10 d) 20

84. One of the first radioactive material to appear in milk following nuclear weapon test is _____.
a) Cs^{137} b) I^{131}
c) Sr^{90} d) Sr^{89}

85. In FSSAI standards of evaporated milk, the milk solids should be
a) Not less than 26% b) Not less than 33%
c) Not more than 26% d) Not more than 33%

86. Viscosity of whole milk at 25°C is _____.
a) 3.0 cP b) 2.0 cP
c) 4.0 cP d) 2.5 cP

87. The pressure in single stage homogenizer is _____.
a) 175 bars b) 50 bars
c) 300 bars d) 100 bars

88. Vitamin A content in fresh cow milk / 100 gm is _____.
a) 28 µg b) 10 µg
c) 40 µg d) 68 µg

89. The overrun in kulfi is
a) About 10% b) About 20%
c) About 30% d) Practically Nil

90. The emulsion type of milk is _____.
a) Oil in water b) Water in oil
c) Oil in oil d) Oil in colloidal

91. Which of the following has largest particle size in milk?
a) Lactose b) Fat globules

c) Casein micelles d) Lactalbumin

92. Homogenization temperature is

a) 30 – 40 ° C b) 60 – 70 ° C

c) 50 – 55 ° C d) 80 – 90 ° C

93. Hortvert apparatus is used to measure which physical property of milk?

a) Refractive index b) Density

c) Surface tension d) Freezing point

94. Lactose is present in milk in the form of _____.

a) Suspension b) Emulsion

c) True solution d) Colloidal solution

95. The specific gravity of milk can be increased by

a) Addition of water b) Addition of skim milk

c) Both a and b d) Addition of fat

96. The casein content of buffalo milk and cow milk respectively are

a) 4.3% and 3% b) 3% and 4.3%

c) 5% and 7% d) 4% and 3%

97. The major immunoglobulin present in ruminant milk is

a) Ig A b) Ig G

c) Ig D d) Ig M

98. Milk lost its colostral property and become normal within _____ hours after calving

a) 72 b) 24

c) 48 d) 36

99. Alcohol content of kefir and kumiss respectively are

a) 2.5% and 1% b) 2% and 3%

c) 1% and 2.5% d) 1% and 5%

100. The Maillard reaction involves a reaction between

(a) ε-amino groups of lysine and carbonyl compounds of reducing sugars
(b) ε-amino groups of lysine and carbonyl compounds of non-reducing sugars
(c) ε-amino groups of arginine and carbonyl compounds of non-reducing sugars
(d) ε-amino groups of methionine and carbonyl compounds of non-reducing sugars

KEY

1	**b**
2	**a**
3	**b**
4	**c**
5	**b**
6	**a**
7	**d**
8	**a**
9	**b**
10	**b**
11	**d**
12	**a**
13	**a**
14	**d**
15	**b**
16	**c**
17	**b**
18	**c**
19	**c**
20	**c**
21	**b**
22	**b**
23	**d**
24	**b**
25	**b**

26	**c**
27	**d**
28	**a**
29	**b**
30	**a**
31	**b**
32	**b**
33	**d**
34	**b**
35	**c**
36	**c**
37	**b**
38	**c**
39	**b**
40	**c**
41	**c**
42	**c**
43	**b**
44	**d**
45	**b**
46	**a**
47	**b**
48	**a**
49	**d**
50	**d**

51	**d**
52	**c**
53	**b**
54	**d**
55	**d**
56	**c**
57	**a**
58	**b**
59	**a**
60	**a**
61	**d**
62	**d**
63	**c**
64	**b**
65	**c**
66	**d**
67	**b**
68	**b**
69	**a**
70	**d**
71	**b**
72	**c**
73	**b**
74	**a**
75	**c**

76	**b**
77	**c**
78	**d**
79	**b**
80	**c**
81	**b**
82	**a**
83	**c**
84	**b**
85	**a**
86	**b**
87	**a**
88	**d**
89	**d**
90	**a**
91	**b**
92	**b**
93	**d**
94	**c**
95	**b**
96	**a**
97	**b**
98	**a**
99	**c**
100	**a**

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