**SUBJECT:LIVESTOCK PRODUCTS TECHNOLOGY**

**CHAPTER:4 PROCESSED MEAT TECHNOLOGY (PART 2)**

**CHAPTER NUMBER:4**

**IIPID :IIPER1699426770**

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SMOKING AND CURING

The smoking process aids in preservation by impregnation of the meats on the

surface with chemical preservatives from smoke, by combined action of heat and

these preservatives during smoking, and by the drying effect, especially on the

surface.

* Smoking and cooking, which are generally carried out together, are also involved in

the development of the colour, e.g. cure meat colour, which is stabilized by heating.

* The chief bacteriostatic and bactericidal substance in wood smoke is formaldehyde.
* Varying amounts of heats are applied in the smoke room and the combination of heat

and smoke usually causes a significant reduction in the surface bacterial population.

* In addition, a physical barrier is provided by superficial dehydration, coagulation of

protein and the absorption of resinous substances.

* The browning or maillard reaction is responsible for the development of characteristic brown colour on the surface of smoked products.
* It involves the reaction of the free amino groups from proteins or other nitrogenous compounds of meat with the carbonyl of smoke.
* Since carbonyls are major components of wood smoke, they play a major role in browning during smoking of meat.
* Smoking also is known to have a definite influence on the development of rancidity by

virtue of its antioxidant activity.

* This extends the shelf life of smoked meat products and helps to account for their desirability. The carbonyls produced during burning are responsible for the color components and sweet, fruity aromas.
* They also provide sweeter scents such as vanilla-scented vanillin and clove like

isoeugenol.

* Guaiacol is the main phenolic compound contributes to the smoky taste,whereas syringol is the primary contributor to smoky aroma.
* After curing, the meat is soaked in water at the temperature of 20˚C for about an hour

(desalination) and then dried and placed in smoke house.

* Smoking is done in addition to curing.
* The cured products are placed in airtight smoke house with heat and smoke simultaneously

applied.

* Hard wood logs and saw dusts are used to generate smoke.
* The kind of wood varies from country to country depending upon the availability and practice.
* Smoking gives the products a characteristic colour and flavour.
* Smoking process extends for 3 days at a temperature of 85°F (29.5°C).
* It retards fat oxidation.

CHILLING AND FREEZING

* Chilling and freezing can have some effects on meat colour, WHC and other

aspects of quality.

* Chilling influences the rate of penetration of oxygen from the surface of lean meat, and the rate at which the enzymic reducing activity in the muscle combats metmyoglobin formation.
* Because of the greater decrease in reducing activity than the rate of oxygen diffusion into the meat when it is stored at lower temperatures, the oxymyoglobin layer is thicker, and the meat colour brighter.
* Rapid chilling post mortem tends to reduce drip formation, probably by limiting protein denaturation.
* Storage at lower chill temperatures also tends to reduce drip formation
* Meat is a valuable element of the human diet as it contains essential elements such

as protein, vitamins, and minerals.

* However, these foods are also vulnerable to microbial pathogens and spoilage,

posing significant risks to human health.

IRRADIATION OF FOOD

* Ionizing radiation is used in food irradiation to maintain the safety and quality of

food items, specifically meat.

* For decades, food irradiation has been used to reduce microbial contamination and

extend the storage period. The procedure entails subjecting the food item to a

regulated amount of ionizing radiation, usually accomplished by applying gamma

rays, electron beams, or X-rays.

* The radiation disrupts the DNA and other cellular components of microbes, making

them unable to reproduce and causing their death.

* The procedure also breaks down some of the molecules in the food product, which

can affect its nutritional quality and sensory properties.

* Food irradiation is the process of exposing food to controlled levels of ionizing radiation to kill harmful bacteria, pests, or parasites, or to preserve its freshness.
* The process of food irradiation is often called cold pasteurization because it kills harmful bacteria without heat
* At doses applied IR does not and cannot make foods radioactive.
* **Radiations types and their characters**
* **UV rays:**

✓ Are powerful bactericidal agents

✔ Are non-ionizing radiations of < 450 nm wavelength - absorbed by proteins and nucleic acids leading to photochemical changes and subsequent cell death

✓ The death of microorganisms results from the production of lethal mutations in nucleic acid preventing transcription and DNA replication

✓ UV rays - bactericidal/virucidal in the wave length between 200-290 nm ✓Most effective at 260 nm (2600 Ao)

✓ Have poor penetration capacity (penetrate only 0.1 mm thickness) - their application in food industry is limited to disinfection of air, and application on food surface especially the packaging material

UV radiation can cause rancidity in high fat products

**Beta rays ( ẞ- particles):**

✓ These ionizing radiation are a stream of high energy electrons emitted by radioactive substances or machine generated electrons using cathode ray tubes

* Beta rays have poor penetrating power but better than UV radiations
* Known to induce radioactivity in some foods under high energy sterilization conditions (at upper limit of energy level).
* **Gamma rays:**
* Are uncharged electromagnetic radiations emitted from the exited nucleus
* of radioactive elements such as 60Cobalt, 137 cesium etc
* These ionizing radiations produced by the decay of radioactive isotopes are cheapest form of radiations for use in food preservation since source elements are available as byproducts of atomic waste
* Gamma rays have excellent penetration power and penetrate almost anything -can penetrate food up to a depth of 20 cm and effective as bactericidal agents
* **X-rays:**
* These ionizing radiations are produced by bombarding suitable metal target with high velocity electrons.

**SINGLE CHOICE TYPE QUESTION**

1. High pressure processing done to reduce or destroy microorganisms in food is also known as -
2. Pascalization
3. Pressurization
4. Baro process
5. Irradiation
6. Typical antimicrobial action require pressure in the range of ----------
7. 600-3000MPa
8. 300-1500MPa
9. 200-1000MPa
10. 100-500MPa
11. Intermediate moisture foods are characterised by moisture content of ---------and water activity between----------
12. 15-20% and 0.60-0.65
13. 20-80% and 0.90-0.95
14. 5-10% and 0.50-0.70
15. 15-50% and 0.60-0.85
16. Dried or dessicated food have moisture content upto -----------and water activity between -------------
17. 15%and 0.00-0.20
18. 10% and 0.20-0.40
19. 25%and 0.00-0.60
20. 50%and 0.00-0.10
21. Most bacteria require water activity values above -------- for growth
22. 0.50
23. 0.70
24. 0.90
25. 0.20
26. The organisms that can survive exposure to relatively high temperature but do not necessarily grow at these temperatures
27. Thermal
28. Thermoduric
29. Thermostable
30. Thermophillic
31. The non thermal processing which involves application of short pulses of high electric fields to food placed between 2 electrodes------
32. Thermal processing
33. Pulsed electric fields
34. Non thermal electro treatment
35. Electrotreatment
36. Due to improper packaging of food item during freezer storage it undergoes browning of light coloured skin known as----------
37. Freezer burn
38. Freezer darkening
39. Freezing loss
40. none
41. Gradual adaptation to low temp occurs in .
42. Slow freezing
43. Quick freezing
44. both
45. chilling
46. The destruction of all viable organisms is known as
47. Pasteurisation
48. Sterlization
49. Canning
50. Thawing
51. The time necessary to kill a given number of organisms at a specified temperature
52. Thermal death point
53. F value
54. Z value
55. D value
56. The concept that refers to the process lethality requirement long in effect in the canning industry
57. 12-D concept
58. 3-Dconcept
59. 14-D concept
60. 15-D concept
61. The time required to destroy 90% of the organisms
62. Decimal reduction time
63. Z value
64. D value
65. Both a and c
66. Emission and propagation of energy through space and through a material medium
67. radurization
68. irradiation
69. radicidation
70. radappertisation
71. The organisms that survive high temperature but also require it for growth and metabolic activities
72. Thermostable
73. Thermal
74. Thermoduric
75. Thermophillic
76. The percentage of separable lean meat varies inversely to the
77. Protein content
78. Vitamin content
79. Mineral content
80. Fat content
81. -----------is the percentage of muscles that constitute to the live weight.
82. 30-45%
83. 40-45%
84. 90%
85. 20%
86. \_\_\_\_\_ is the percentage of muscles that constitute to the carcass weight
87. 20-30%
88. 10-50%
89. 35-60%
90. 25-30%
91. The proportion of amount of collagen is more in-----------
92. Old animals
93. New born
94. Young animals
95. Dead animals
96. The toughness of meat during cooking is determined by
97. Heat stable collagen crosslinks
98. Tendons
99. Ligaments
100. Fat
101. The proteolytic enzymes responsible for ageing are ----------
102. Cathepsins
103. Calpains
104. Both
105. None

|  |  |
| --- | --- |
| 1. UV light
 | 1. In absence of oxygen
 |
| 1. Beta rays
 | 1. Poor penetration
 |
| 1. Gamma rays
 | 1. electromagnetic
 |
| 1. Radiation
 | 1. Excellent penetration
 |
| 1. Radiation resistance
 | 1. Surface application
 |

1. Match the columns and choose the correct option.
2. (1-b)(2-e)(3-a)(4-c)(5-a)
3. (1-e)(2-d)(3-b)(4-a)(5-c)
4. 1-e)(2(-b)(3-d)(4-c)(5-a)
5. (1-e)(2-d)(3-b)(4-c)(5-a)

|  |  |
| --- | --- |
| 1. Radappertization
 | 1. 30-40kGY
 |
| 1. Canning industry
 | 1. 0.75-2.5kGY
 |
| 1. Radicidation
 | 1. Commercial sterility
 |
| 1. Radurization
 | 1. Preservation
 |
| 1. Irradiation
 | 1. 2.5-10 kGY
 |

1. Match the columns and choose the correct option.

(a)(1-b)(2-e)(3-a)(4-c)(5-a)

(b)(1-e)(2-d)(3-b)(4-a)(5-c)

(c)(1-a)(2-b)(3-c)(4-e)(5-d)

(d)(1-a)(2-c)(3-e)(4-b)(5-d)

|  |  |
| --- | --- |
| 1. Quick freezing
 | 1. Nicholas Appert
 |
| 1. Slow freezing
 | 1. Production of off flavour
 |
| 1. Freezer burn
 | 1. Large ice crystals
 |
| 1. Irradiation
 | 1. Improper packaging
 |
| 1. Radappertization
 | 1. Small ice crystals
 |

1. Match the columns and choose the correct option.
2. (1-e)(2-c)(3-d)(4-b)(5-a)
3. (1-e)(2-d)(3-c)(4-b)(5-a)
4. (1-e)(2-c)(3-d)(4-a)(5-b)
5. (1-e)(2-c)(3-b)(4-d)(5-a)

|  |  |
| --- | --- |
| 1. Fresh
 | 1. Frankfurter,bologna
 |
| 1. cooked ,smoked
 | 1. luncheon meat
 |
| 1. Cooked ,non smoked
 | 1. Fresh pork sausage
 |
| 1. Dry ,semidry or fermented
 | 1. braunschweiger
 |
| 1. cooked meat specialities
 | 1. pepperoni
 |

1. Match the columns and choose the correct option.
2. (1-c)(2-a)(3-d)(4-e)(5-b)
3. (1-c)(2-a)(3-d)(4-b)(5-e)
4. (1-c)(2-d)(3-a)(4-e)(5-b)
5. (1-c)(2-d)(3-a)(4-b)(5-e)

|  |  |
| --- | --- |
| 1. Curing
 | 1. Prevent warmed over flavour
 |
| 1. Smoking
 | 1. Curing agent
 |
| 1. Salt
 | 1. Preservation
 |
| 1. Nitrite
 | 1. Distinctive flavour and aroma
 |
| 1. phosphate
 | 1. increase water binding
 |

1. Match the columns and choose the correct option.
2. (1-d)(2-c)(3-b)(4-a)(5-e)
3. (1-c)(2-d)(3-b)(4-a)(5-e)
4. (1-d)(2-c)(3-b)(4-a)(5-e)
5. (1-c)(2-d)(3-b)(4-e)(5-a)

|  |  |
| --- | --- |
| 1. Oxymyoglobin
 | 1. Red
 |
| 1. Deoxymyoglobin
 | 1. Bright red
 |
| 1. Nitrosylhaemochromogen
 | 1. brown
 |
| 1. metmyoglobin
 | 1. pink
 |
| 1. Nitric oxide myoglobin
 | 1. Purplish red
 |

1. Match the columns and choose the correct option.
2. (1-b)(2-e)(3-d)(4-c)(5-a)
3. (1-b)(2-d)(3-e)(4-c)(5-a)
4. (1-b)(2-c)(3-d)(4-c)(5-a)
5. (1-b)(2-c)(3-d)(4-a)(5-a)

|  |  |
| --- | --- |
| 1. Antioxidants
 | 1. 2 immiscible liquids
 |
| 1. communition
 | 1. Hydration and solubilisation
 |
| 1. Blending
 | 1. Additional mixing
 |
| 1. Emulsification
 | 1. BHT ,BHA
 |
| 1. Swelling
 | 1. Meat size reduced
 |

1. Match the columns and choose the correct option.
2. (1-d)(2-e)(3-c)(4-b)(5-a)
3. (1-d)(2-c)(3-e)(4-a)(5-b)
4. (1-d)(2-e)(3-c)(4-b)(5-a)
5. (1-d)(2-e)(3-c)(4-a)(5-b)

|  |  |
| --- | --- |
| 1. Liquid smoke
 | 1. carcinogenic
 |
| 1. benzpyrene
 | 1. erythrborate and ascorbate
 |
| 1. Cure accelerators
 | 1. antioxidant
 |
| 1. Organic acid of smoke
 | 1. Non carcinogenic smoke
 |
| 1. phenol
 | 1. skin formation of sausage
 |

1. Match the columns and choose the correct option.
2. (1-d)(2-e)(3-c)(4-b)(5-a)
3. (1-d)(2-c)(3-e)(4-a)(5-b)
4. (1-d)(2-e)(3-c)(4-b)(5-a)
5. (1-d)(2-a)(3-b)(4-e)(5-c)

|  |  |
| --- | --- |
| 1. Grinding-mixing-chopping-emulsifying-stuffing-tying-smoking-cooking
 | 1. Sausage formation
 |
| 1. MSG
 | 1. Curing agent
 |
| 1. Salsus
 | 1. 120ppm
 |
| 1. Nitrite
 | 1. latin
 |
| 1. Sodium nitrite
 | 1. Flavour enhancer
 |

1. Match the columns and choose the correct option.
2. (1-a)(2-b)(3-d)(4-e)(5-c)
3. (1-a)(2-e)(3-d)(4-c)(5-b)
4. (1-a)(2-e)(3-d)(4-b)(5-c)
5. (1-b)(2-c)(3-d)(4-e)(5-a)

|  |  |
| --- | --- |
| 1. Guaiacol
 | 1. Wood alcohol
 |
| 1. Syringol
 | 1. Smoky aroma
 |
| 1. Methanol
 | 1. Smoky taste
 |
| 1. Smoking
 | 1. Skin formation
 |
| 1. Vertical smoker
 | 1. Charcoal smoker
 |

1. Match the columns and choose the correct option.
2. (1-b)(2-c)(3-a)(4-e)(5-d)
3. (1-b)(2-c)(3-e)(4-a)(5-d)
4. (1-c)(2-b)(3-a)(4-e)(5-d)
5. (1-c)(2-b)(3-a)(4-d)(5-e)

|  |  |
| --- | --- |
| 1. Offset smoker
 | 1. Dried products
 |
| 1. Pellet smoker
 | 1. Cylindrical cooking chamber
 |
| 1. Nutritive value
 | 1. Wood pellets
 |
| 1. Long smoking hours
 | 1. Tar formation
 |
| 1. Particulate phase of smoke
 | 1. Lysine loss
 |

1. Match the columns and choose the correct option.
2. (1-b)(2-c)(3-d)(4-a)(5-e)
3. (1-b)(2-c)(3-e)(4-d)(5-a)
4. (1-c)(2-b)(3-e)(4-d)(5-a)
5. (1-c)(2-b)(3-d)(4-a)(5-e)

|  |  |
| --- | --- |
| 1. Cold smoking
 | 1. Natural process of tenderisation
 |
| 1. Conditioning
 | 1. Fermented meat products
 |
| 1. Achilles method
 | 1. More tender meat
 |
| 1. Tenderstretch method
 | 1. Less tender meat
 |
| 1. Stretching of muscles
 | 1. Tenderising effect
 |

1. Match the columns and choose the correct option.
2. (1-b)(2-a)(3-e)(4-c)(5-d)
3. (1-b)(2-a)(3-d)(4-c)(5-e)
4. (1-b)(2-a)(3-c)(4-d)(5-e)
5. (1-b)(2-c)(3-a)(4-d)(5-e)

|  |  |
| --- | --- |
| 1. Achilles tendon method
 | 1. Falling action in a rotating drum
 |
| 1. Tenderstretch method
 | 1. Electrical stimulation required
 |
| 1. Tumbling
 | 1. No electrical stimulation required
 |
| 1. Massaging
 | 1. Cuts made by blade to accelerate penetration
 |
| 1. Blade tenderisation
 | 1. Broad paddles operating producing churning action
 |

1. Match the columns and choose the correct option.
2. (1-b)(2-c)(3-a)(4-d)(5-e)
3. (1-b)(2-c)(3-a)(4-e)(5-d)
4. (1-b)(2-c)(3-a)(4-d)(5-e)
5. (1-b)(2-a)(3-c)(4-e)(5-d)

|  |  |
| --- | --- |
| 1. Pressure treatment
 | 1. Meat tenderisation method
 |
| 1. Phosphate addition
 | 1. Increased fat binding
 |
| 1. Papain, bromelin, ficin
 | 1. Enzymatic tenderisation
 |
| 1. Electrical stimulation
 | 1. Prevents cold shortening and thaw rigour
 |
| 1. salting
 | 1. corning
 |

1. Match the columns and choose the correct option.
2. (1-a)(2-c)(3-d)(4-b)(5-e)
3. (1-a)(2-b)(3-c)(4-e)(5-d)
4. (1-a)(2-b)(3-c)(4-d)(5-e)
5. (1-b)(2-a)(3-c)(4-d)(5-e)

|  |  |
| --- | --- |
| 1. Nitrate in curing process
 | 1. Inhibit clostridium growth
 |
| 1. Dry cured ham salt %
 | 1. Counteracts salt harshness
 |
| 1. Sugar
 | 1. 5-8%
 |
| 1. Max permissible limit for sugar
 | 1. 2%
 |
| 1. Cured flavour
 | 1. Nitrosyl hemochromes
 |

1. Match the columns and choose the correct option.
2. (1-a)(2-c)(3-b)(4-d)(5-e)
3. (1-a)(2-b)(3-c)(4-d)(5-e)
4. (1-a)(2-c)(3-d)(4-b)(5-e)
5. (1-d)(2-b)(3-c)(4-e)(5-a)

|  |  |
| --- | --- |
| 1. Ascorbate
 | 1. Increase water binding capacity
 |
| 1. Alkaline phosphate
 | 1. Prevent fading of cured meat colour
 |
| 1. Mono sodium glutamate
 | 1. Flavour enhancer
 |
| 1. Dry curing
 | 1. Traditional method
 |
| 1. Pickle curing
 | 1. Water as curing medium
 |

1. Match the columns and choose the correct option.
2. (1-b)(2-a)(3-c)(4-d)(5-b)
3. (1-b)(2-a)(3-d)(4-c)(5-b)
4. (1-b)(2-d)(3-c)(4-a)(5-b)
5. (1-b)(2-d)(3-a)(4-c)(5-e)

|  |  |
| --- | --- |
| 1. Artery pumping
 | 1. Multiple needle stitch pumping
 |
| 1. Single needle stitch pumping
 | 1. Femoral artery
 |
| 1. Machine pumping
 | 1. Pump pickling
 |
| 1. Fast curing
 | 1. 30-50 days
 |
| 1. Slow curing
 | 1. 7-14 days
 |

1. Match the columns and choose the correct option.
2. (1-b)(2-c)(3-a)(4-e)(5-d)
3. (1-b)(2-a)(3-c)(4-d)(5-e)
4. (1-b)(2-a)(3-c)(4-e)(5-d)
5. (1-d)(2-b)(3-e)(4-c)(5-a)

|  |  |
| --- | --- |
| 1. Nitrite
 | 1. Gray or kilogray
 |
| 1. Parsley
 | 1. Cold pasteurisation
 |
| 1. Food irradiation
 | 1. Nitrite alternative
 |
| 1. Dose unit
 | 1. Lethal dose 1gm
 |
| 1. Irradiation sterlisation
 | 1. Radappertisation
 |

1. Match the columns and choose the correct option.

a)(1-a)(2-b)(3-c)(4-d)(5-e)

b) (1-d)(2-c)(3-b)(4-e)(5-a)

c)(1-d)(2-c)(3-b)(4-a)(5-e)

d)(1-e)(2-a)(3-b)(4-c)(5-d)

|  |  |
| --- | --- |
| 1. Reduction of pathogen
 | 1. Radurisation
 |
| 1. Prolonging shelf life
 | 1. 1-10kGy
 |
| 1. Medium dose
 | 1. >than 10 kGy
 |
| 1. High dose
 | 1. Unusual cell wall composition
 |
| 1. Resistant to radiation
 | 1. Radicidation
 |

19)Match the columns and choose the correct option.

a)(1-a)(2-b)(3-c)(4-d)(5-e)

b)(1-d)(2-c)(3-b)(4-e)(5-a)

c)(1-d)(2-c)(3-b)(4-a)(5-e)

d)(1-e)(2-a)(3-b)(4-c)(5-d)

|  |  |
| --- | --- |
| 1. PSE
 | 1. ph below 6
 |
| 1. DFD
 | 1. pH above 6
 |
| 1. conditioning
 | 1. proteolytic enzyme
 |
| 1. Calpain
 | 1. Detach actin filament from z line
 |
| 1. Heat ring
 | 1. Prevented by electrical stimulation
 |

20)Match the columns and choose the correct option.

a)(1-a)(2-b)(3-d)(4-c)(5-e)

b)(1-d)(2-c)(3-b)(4-e)(5-a)

c)(1-d)(2-c)(3-b)(4-a)(5-e)

d)(1-e)(2-a)(3-b)(4-c)(5-d)

(1) Given below are two statements.

Statement I: Meat of young animals is less tenderer than aged animals.

 Statement II: Aged animals have increased amount of heat stable collagen crosslinks.

 a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(2) Given below are two statements.

Statement I: Flavour formation during ageing is due to formation of inosinic acid.

Statement II: Measurement of hypoxanthine level gives indication of flavour as it is precursor of inosine.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(3) Given below are two statements.

Statement I: Suspension of carcass improves the tenderness.

Statement II: Suspension by pelvic bone is not better than achilles tendon suspension.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(4) Given below are two statements.

Statement I: Processing of meat immediately after slaughter is known as cold processing.

Statement II: It increases the cost of refrigeration.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(5) Given below are two statements.

 Statement I: The most abundant fatty acid in meat fat is oleic acid followed by palmitic and stearic acid.

Statement II: Essential fatty acids in human diet are linoleic ,linolenicand arachidonic acid.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(6) Given below are two statements.

Statement I: Meat is highly nutritious food.

Statement II: It is almost fully digestible.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(7) Given below are two statements.

Statement I: Meat is a good source of iron

Statement II: Meat is a good source of calcium

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(8) Given below are two statements.

Statement I: Shrinkage occurs as a result of evaporation of water from the meat surface.

Statement II: Freshly killed carcass looses 10 % of weight by evaporation during first 2 hours.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(9) Given below are two statements.

Statement I: Sweating refers to the condensation of water vapour on meat when brought from cold store to ordinary temperature.

Statement II: Weeping denotes presence of bloody stained fluid which consists of water, damaged blood cells and watersoluble proteins.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(10) Given below are two statements.

Statement I: Cold store taint is manifested by brownish slime on surface of meat.

Statement II: Produced due to growth of Achromobacter spp of bacteria.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(11) Given below are two statements.

Statement I: bone darkening usually observed in freezing and thawing of old chicken.

Statement II: Occurs due to leaching of haemoglobin from the marrow of porous bones.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(12) Given below are two statements.

Statement I: freezer burn is denoted by patchy discolouration of meat.

Statement II : Occurs due to improper packaging which leads to this reversible condition.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(13) Given below are two statements.

 Statement I: Storage of fresh meat is done at a refrigeration temp of 20 to 40c

Statement II: Chilling storage of meat is done at a temp of 0 - 40c.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(14) Given below are two statements.

Statement I: chilling by ice leaves the meat surface moist and unattractive.

Statement II: Meat is of better quality when blown by cold air in mechanical chilling.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(15) Given below are two statements.

Statement I: bloom is enhanced by quick chilling.

Statement II: Shrinkage of meat is reduced during slow chilling

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(16) Given below are two statements.

Statement I: higher temperature, air velocities and lower relative humidity increase weight loss due to drying out.

Statement II: Relative humidity of 90%appears to be suitable for commercial chilling.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(17) Given below are two statements.

Statement I: freezing is choice for long term preservation.

Statement II: Freezing is choice for short term preservation.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(18) Given below are two statements.

Statement I: slow freezing achieved in 72 hours.

Statement II: Quick freezing is achieved within 2-3 hrs.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(19) Given below are two statements.

 Statement I: cryogenic freezing is said to produce less dehydration , better flavour, aroma and texture.

Statement II: Cryogenic freezing uses liquid nitrogen.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(20) Given below are two statements.

Statement I: Freeze drying also known as lyophilisation, accelerated freeze drying(AFD).

Statement II: Based on the principle of sublimation .

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(21) Given below are two statements.

Statement I: myoglobin in freshly cut uncured meat is in the reduced form (purple).

Statement II: Myoglobin gets rapidly oxygenated , becomes black and responsible for bloom of meat.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(22) Given below are two statements.

Statement I: nitrates are permitted at the level of 200ppm.

Statement II: Nitrites are permitted at levels of 500ppm.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(23) Given below are two statements.

Statement I: fiery red areas in cured meat are caused due to lack of available nitrite.

Statement II: Jelly pockets are caused by injection of brine into connective tissue causing denaturation.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(24) Given below are two statements.

Statement I: greening of cured meat is caused by reduced nitrate.

Statement II: Bacterial contamination also causes greening of cured meat.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(25) Given below are two statements.

Statement I: chief bacteriostatic and bactericidal substance in wood smoke is formaldehyde.

Statement II: Phenols in wood smoke act as antioxidant.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(26) Given below are two statements.

Statement I: pasteurisation is moderate heating in temp range of 58-750c

Statement II: Sterlisation refers to severe heating at temperature above 1000c.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(27) Given below are two statements.

Statement I: retort pouches are laminates of thermoplastic, aluminium foil and pvc material.

Statement II: These are more popular as occupy less space and transportation cost is more.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(28) Given below are two statements.

Statement I: exhaustion means removal of air from can.

Statement II: Exhaustion is done to prevent expansion of contents during processing operation.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(29) Given below are two statements.

Statement I: Springer condition in cans is when one end is bulged and can be forced back occurs due to gas formation.

Statement II: flipper condition occurs when one end is bulged but when stroked the other end bulges.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(30) Given below are two statements.

Statement I: leaker is can with a hole.

Statement II: Overfilled cans show convex ends due to reduced filling.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(31) Given below are two statements.

Statement I: chemical spoilage occurs in canning process.

Statement II: This kind of spoilage occurs in the presence of microorganisms.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(32) Given below are two statements.

Statement I: sulphiding is development of black colouration due to reaction between iron of tin and sulfur of meat.

Statement II: Hydrogen swell is associated with formation of hydrogen gas in the can following internal erosion,

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(33) Given below are two statements.

Statement I: flat sours occur due to microbial spoilage.

Statement II: sulphur stinker is the purple staining on the inner surface of cans due to breakdown of sulphur containing proteins.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(34) Given below are two statements.

Statement I: rust damage is usually seen above labels.

Statement II: Washing of cans and transport are the predisposing factors.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(35) Given below are two statements.

Statement I: jerked beef and pemmican are traditional dried products.

Statement II: Drying is one of the oldest methods of preservation.

 a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(36) Given below are two statements.

Statement I: artificial drying is not better than sun drying.

Statement II: It has better keeping quality and les area is required for it.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(37) Given below are two statements.

Statement I: foods preserved by drying are more concentrated than other preserved forms of food.

Statement II: Vacuum dryer and adiabatic dryers are also used for drying.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(38) Given below are two statements.

Statement I: SI unit for radiation is microgray mGy

Statement II: Absorbed dose is checked by placing dosimeter at various positions in a box.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(39) Given below are two statements.

Statement I: irradiation does make the food radioactive.

Statement II: Irradiation does affect the nutritional value of food.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(40) Given below are two statements.

Statement I: irradiation does not destroy microbial toxins and viruses in foods.

Statement II: Irradiation of food is not a costly affair

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(41) Given below are two statements.

Statement I: exposure to high dose of radiation produces “wet dog flavour “ in meat.

Statement II: Beef is less susceptible to flavour changes during irradiation than pork.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(42) Given below are two statements.

Statement I: flavour intensifies with the age of animal.

Statement II: Higher the ultimate pH lower is the flavour intensity.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(43) Given below are two statements.

Statement I: Hedonic score chart consists of score range from 1 to 8

Statement II: 1 stands for unacceptable and 8 being most acceptable.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(44) Given below are two statements.

Statement I: comminution means mincing of meat.

Statement II: All processed meat can be defined as comminuted or non comminuted.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(45) Given below are two statements.

Statement I: meat mincer is used for fine ground products .

Statement II: Bowl chopper is used to make coarse meat emulsion.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(46) Given below are two statements.

Statement I: meat emulsion is a oil in water emulsion.

Statement II: It comprises of solid or liquid fat droplets dispersed in aqueous continuous phase.

 a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(47) Given below are two statements.

Statement I: meat extension refers to the increment of volume .

Statement II: Extenders such as soy products , potato starch ,flour and corn are used .

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(48) Given below are two statements.

Statement I: deboning of the carcass immediately after slaughter without chilling is hot processing.

Statement II: Processing time is greatly increased and reduced chiller space required.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(49) Given below are two statements.

Statement I: dry method cooking is for relatively tough cuts of meat .

Statement II: Moist heat cooking is recommended for tender cuts of meat.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(50) Given below are two statements.

Statement I: broiling ,roasting, frying are included in dry heat cooking.

Statement II: Stewing ,simmering , braising are included in moist heat cooking.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(51) Given below are two statements.

Statement I: Microwave cooking involves high frequency ,non-ionizing electromagnetic waves generated by magnetron vacuum tube.

Statement II: Center of the food is heated last in the microwave cooking.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(52) Given below are two statements.

Statement I: sausage is derived from ancient latin word salsus.

Statement II: Smoking of sausage is done at a temp of 68-700c.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(53) Given below are two statements.

Statement I: water activity in meat products can be lowered by addition of chemicals known as humectants.

Statement II: Glycerol ,propylene glycol , sodium chloride are some of the humectants .

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(54) Given below are two statements.

Statement I: luncheon meat is a canned product prepared from pork and some cereal component.

Statement II: Meat patties are partially or completely emulsion based product.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(55) Given below are two statements.

Statement I: meat balls in Indian household is known as meat kofta.

Statement II: Meat nuggets are obtained by cutting cooked and cooled rectangular loaves into 4cm x 1.5cm x1.5cm.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(56) Given below are two statements.

Statement I: nate-yakhni is a soup like products obtained from Kashmir region.

Statement II: Rapka is a popular north eastern product.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(57) Given below are two statements.

Statement I: restructured meat products are prepared by incorporating some superior quality meat portions into inferior quality.

Statement II: Done to reduce the cost of production .

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(58) Given below are two statements.

Statement I: chunking – forming ,flaking -forming, tearing -forming are the procedures done to make restructured meat.

Statement II: In restructured meat sensory and nutritional quality are not compromised .

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(59) Given below are two statements.

Statement I: mortadella is a fermented sausage product.

Statement II: Thuringer is a non fermented sausage product.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

(60) Given below are two statements.

Statement I: stabilizers such as sodium alginate , carrageenan and gum are used to stabilise fragile meat emulsions.

Statement II: Pre- blending allows better extraction of protein in meat product.

a) Both Statement I and Statement II are true.

 b) Both Statement I and Statement II are false.

c) Statement I is true and Statement II is false.

 d) Statement I is false and Statement II is true.

Fill in the blanks

1.The substances which is capable of inhibiting ,retarding or arresting the process of fermentation ,acidification,or other deterioration.----------

2.---------- refers to any treatment including salting which brings substantial change in physical and chemical attributes of meat.

3.--------- used in curing increases the water binding capacity of meat product.

4.cured flavour occurs due to reaction between fatty acids and sodium nitrite resulting in formation of ----------and--------.

5.--------- gas is used as main refrigerant in commercial purpose.

6. ---------- is the process of inactivation of enzymes prior to canning

7.smoking fulfills two purpose that is -------- and --------.

8.---------- developed first can in France 1795.

9. -------- organism is used to know the efficiency of retort operation.

10. bulging of can due to internal pressure generated by microbial or chemical activity is known as --------

11.isotopes such as Co60 andCs137 emit ------rays.

12.in india ------- research center only controls the irradiation of foods.

13.------- is the subdivision or reduction of raw meat into meat pieces or particles.

14.------- is a mixture of 2 immiscible liquids that is continuous phase and dispersed phase.

15.-------- utilises both dry heat as well as moist heat for processing of meat

16.------- is a product prepared from minced and seasoned meat formed into cylindrical shape by natural casings.

17.intermediate moisture meat have about --------- moisture.

18.-------- utilises combination preservation technique.

19.2 examples of indigenous meat products are--------

20.chilling of cooked product is done to obtain internal temperature of about -------0c

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ANSWER KEY

MULTIPLE CHOICE QUESTION

1. (A)
2. (C)
3. (D)
4. (C)
5. (C)
6. (B)
7. (B)
8. (A)
9. (A)
10. (B)
11. (A)
12. (A)
13. (C)
14. (B)
15. (D)
16. (D)
17. (A)
18. (C)
19. (A)
20. (C)
21. (A)

MATCH THE FOLLOWING

1. (C)
2. (D)
3. (A)
4. (A)
5. (B)
6. (A)
7. (D)
8. (D)
9. (C)
10. (D)
11. (B)
12. (B)
13. (C)
14. (C)
15. (A)
16. (A)
17. (A)
18. (C)
19. (D)
20. (D)

MUTIPLE STATEMENT TYPE QUESTIONS

1. D
2. A
3. C
4. B
5. A
6. A
7. C
8. C
9. A
10. A
11. D
12. C
13. A
14. A
15. C
16. A
17. C
18. A
19. A
20. A
21. C
22. B
23. A
24. D
25. A
26. A
27. C
28. A
29. B
30. C
31. C
32. A
33. A
34. D
35. A
36. D
37. A
38. D
39. B
40. C
41. C
42. A
43. A
44. A
45. B
46. A
47. A
48. C
49. B
50. A
51. C
52. A
53. A
54. A
55. A
56. A
57. D
58. A
59. B
60. A

Fill in the blanks

1. Preservative
2. Processing
3. Phosphates
4. benzonitrile ans phenylacetonitrile
5. freon
6. .blanching
7. flavour and preservation
8. nicholas appert
9. cl.sporogenes PA3679
10. swell or blower.
11. Gamma
12. bhabha atomic research institute
13. comminution
14. emulsion
15. .braising
16. Sausage
17. 20-50%
18. hurdle concept
19. haleem , chicken kebab
20. 40c