DSE-4: Sea food and Dairy Technology Credits 06

DSE4T: Sea food and Dairy Technology Credits 04

Course Contents:

Technology of Sea food:

Unit-I: Introduction. Status of fishery industry in India.

Questions:

1. Write the production and economic status fishery industry in India . (3+3)

Unit-II: Chilling and Freezing of fish. Relationship between chilling and storage life, MAP, general aspects of freezing, freezing systems (air blast freezing, plate or contact freezing spray orimmersion freezing, freezing on board, onshore processing, changes in quality in chilled and frozen storage, thawing.

Questions:

1. How chilling of fish is related to its storage life? (3)
2. How the relative spoilage rates for fish and shellfish is related to temperature? (2)
3. Write the full form of MAP. How MAP can be used to increase the shelf life of fish product? (1+5)
4. What is CAP? (2.5)
5. What should be the recommended percentage of O_2, CO_2, N_2 for lean fish preservation through MAP? (2)
6. What should be the recommended percentage of O_2, CO_2, N_2 for oily and smoked fish preservation through MAP? (2)
7. Write the three gases used for MAP of fish. (1)
8. Write the recommended ratio of fish and gas in MAP? (1)
9. Write the relationship between CO_2 solubility and temperature. (1)
10. What are the important factors use for MAP of fish? (4)
11. Write the general aspects of freezing. (5)
12. What is the freezing point of fish. (1)
13. What is critical or frozen zone? (2)
14. What are two stages occurs when precipitation out of the solution and formation of ice crystals? (2)
15. Write the full form of IQF. (1)
16. What is IQF?
17. What is quick freezing of fish products?
18. Write the three basic methods for freezing fish. (3)
19. Write the methods of freezing system. (7)
    Or,
    Describe air blast freezers. (4)
    Describe plate or contact freezers. (4)
    Describe spray and immersion freezers. (3)
    Describe immersion freezers. (3)
    Describe spray freezers. (3)
    Describe Carbon dioxide freezers. (3)
    Describe liquid nitrogen freezer. (3)

20. What are the advantages and disadvantages of air-blast freezers. (2+2)
21. What causes freezer burn of fish products? (2)
22. What is the cause of product's blown across the belt during air blast freezing? (2)
23. What is Torry freezer? (2)
24. Describe spiral freezer in brief. (2)
25. Write its advantages. (2)
26. Write the thickness of fish block for vertical and horizontal type plate freezer. (1+1)
27. Write the time and temperature of freezing of large tuna. (1+1)
28. Describe the cryogenic freezer. (2)
29. Describe the application process of freezing system in fish processing. (8)
    Or,
    Write a short note on –
    I) Freezing on board process (4)
    ii) Onshore processing (4)
30. Describe different types of batter with its application in onshore fish processing. (4)
31. Write the changes in quality in chilling and frozen storage condition. (5+5)
    Or,
    Briefly describe about chilled storage and frozen storage method. (5+5)
32. What does the self life of fish vary on? (2)
33. What is the major cause of quality loss during frozen storage? (2)
34. What is sublimation? (2)
35. Which type of fractuation alter the water holding capacity of the air in the store or pack of fish? (2)
36. Which factor reduces the weight of fish by dehydration. (2)
37. On which factors the amount of glaze pick-up in fish processing depends? (2)
38. What do you mean by thawing? (4)
    Or,
    How thawing is done in fish processing. (5)
39. In which cases the thawing process should be avoided in fish processing? (2)
40. Short note on vacuum thawers. (3)
41. How the fish is thawed with electrical resistance? (3)

Unit-III: Fish Curing and Smoking - Drying and salting of fish, water activity and shelf-life , salting process, salting methods (brining, pickling, kench curing, gaspe curing), types of salts, dried and salted fish products- pindang, fishwood, dried shrimp. Preservation by smoking, smokeproduction , smoke components, quality, safety and nutritive value of smoked fish, processing and equipment, pre-smoking processes, smoking process control. Traditional chimney kiln,modern mechanical fish smoking kiln, examples of smoked and dried products.

Questions:

1. What do you mean by cured fish?
   Or, Briefly describe the fish curing. (2)
2. What is drying of fish? (2)
3. What is salting of fish? (2)
4. Write the drying phases of fish. Write the constant rate of drying phase.
   Or, What is drying phases of fish? During the drying phase which factors depends on drying ? (2+3)
5. Write the methods of drying. (3)
6. Write a short note on solar drying. (3)

7. What are artificial driers?
   Or, What is mechanical dryers? (2)
8. What do you mean by cabinet dryers. (2)
9. Write the difference between solar drying and mechanical dehydrator. (3)
10. Write the advantages and disadvantages of solar drying. (4)
11. What is salting? Write the source of salt. (5)
12. Write the properties of salt. (3)
13. Write the difference between rock salt and solar salt. (4)
14. Write the types of salting. (5)
15. Briefly describe the pickle salting and kench salting. (4)
16. Write the quality issues in dried and salted fish. (5)
17. What do you mean by fragmentation ? (2)
18. Write the factors affecting the salting process. (3)
19. What is water activity and shelf-life of fish? (4)
20. What is pindang and fishwood? (4)
21. Briefly describe the dried shrimp. (2)
22. What is the smoking of fish? Write the objectives of preservation of fish products. (2+3)
23. What is smoke production? (2)
24. Write the smoke components. (2)
25. Write the difference between hanging and salting. (3)
26. What is pre-smoking process? (2)
27. Write the short notes on traditional chimney kiln. (3)
28. Write a short notes on modern mechanical fish smoking kiln. (3)
29. Describe the smoking process control. (3)
30. What is smoke products? Gives some example. (2+1)
31. What is dried products? Gives some example. (2+1)
32. Write the nutritive value of smoked fish. (3)
33. Describe the quality and safety of smoked fish. (4)
34. Write the processing and equipment of fish curing.
    Or, Write the needs of equipments of fish curing. Write the processing of fish curing. (4)

Unit-IV: Canning of fish: Principles of canning, classification based on pH groupings, effect of heat processing on fish, storage of canned fish, pre-process operations, post process operations, cannery operations for specific canned products. (Tuna,Mackerel,Sardine)

Questions:

1. Write the principle of canning. (3)
2. Write the classification based on pH for canning of fish. (4)
3. Write the effect on heat processing on fish. (5)
4. Write the storage on canned fish. (3)
5. Write the pre- processing operation on canned fish. (7)
6. Write the post processing operation on canned fish products. (3)
7. Write cannery operations for different canned type fish products. (5)
8. Write the flow chart for the production of canned brisling in oil. (3)
9. Write the flow chart for the packing of mackerel as skinless fillets in a variety of sauces. (3)
10. Write the flow diagram of general canning process. (3)
11. What is D value? (2)
12. What is F0 value? (2)

13. What is skinning during pre processing operation of fish products? (2)
14. What is brining? (2)
15. Write the choice of heat process. (2)
16. What is dry salting? (2)
17. What is integral F values? (2)
18. What are the reasons of struvite crystals in fish products? (2)
19. What is cook values? (2)
20. What are Z values? Write the full form of ID and PID. (1+1)
21. What is greening? (2)
22. What is peaking and paneling? (1+1)
23. What is commercial sterility of fish products? (2)
24. What is cold spot will canned fish? (2)
25. What is cook out during fish processing technology? (2)
26. Write short note on aseptic canning. (3)
27. Why gasses from canned should be prior to sealing? (2)
28. How exhausting is done during canning process? (5)
29. Write different types of batch retorts of canning of fish products. (3)
30. Write the advantages of horizontal type retorts over vertical. (3)
31. Write the steps of stem pressure retorts operation. (3)
32. Write heat processing of pouches and heat sealed plastic container during canning of fish products. (3)
33. Write continuous retorts during canning on fish products. (3)
34. Write the flow chart on canned pickled muscle. (3)

Unit-V: Fishery by-products - Surimi- Introduction, fish muscle proteins, the surimi process, traditional and modern surimi production lines, quality of surimi products, comparision of surimiand fish mince products. Fish protein concentrates (FPC), fish protein extracts (FPE), fish proteinhydrolysis (FPH)

Questions:

1. What is surimi? (2)
2. What are the process of surimi product methods? (5)
3. Write down the quality parameter of surimi products. (5)
4. What is fish muscle protein? What are the types of fish muscle protein? Shortly describe fish muscle proteins.
5. Write the difference between surimi and fish mince. (3)
6. Write the full form of 'FPC', 'FPE', 'FPH'. (3)
7. What is fish protein concentrate (FPC)? (2)
8. What are the types of FPC? (2)
9. What are raw materials used to make FPC? (2)
10. How FPC is made? (2)
11. Why FPC is a good protein source? (2)
12. How FPC is used? (3)
13. How long FPC is kept? (2)
14. Write flow diagram of FPC production plant. (5)
15. How does protein is extracted from fish? (2)
16. Write the protein content in some waste parts of the fish? (2/3)
17. Write the recovery of FPH? (3)
18. Write the characterization of FPH. (4)

19. Write the microbial growth media of FPH. (5)
20. Write flow diagram for the enzymatic fish protein hydrolysis. (5)

Unit-VI: Fermented fish- Flowchart of Indigenous products- Fish sauce and Paste

Questions:

1. Write the flow diagram for preparation of plain and spiced fish sauce. (5)
2. Write the flow diagram for fish paste. (5)

Unit-VII: Concept of other Sea foods - Crabs, lobsters, prawns, shrimps, shell-fish.

Questions:

1. Describe the processing of crabs. (5)
2. Define crabs. (2)
3. What do you mean by lobstar and prawns ? (1+1)
4. Write the short note on shellfish. (3)
5. Write the name of some popular dishes useing shellfish. Write two disadvantages of shellfish. (2+2)
6. Write preservation and storage process of prawns. (5)
7. Write flow diagram for preservation of shrimp. (5)

<u>Technology of milk and milk products</u>

Unit-VIII: Physical properties of milk : Color, taste, pH and buffering capacity, refractive index, viscosity, surface tension, freezing, boiling point, specific heat, OR, electrical conductivity.

Questions:

1. Write short note on following physical properties of milk - Color, taste, pH and buffering capacity, refractive index, viscosity, surface tension, freezing, boiling point, specific heat, OR, electricalconductivity. (2.5 each)
2. Why cow milk is more yellowish in colour as compare to buffalo milk? (2)
3. Due to which component, whey is greenish yellow in colour? (1)
4. How will you confirm, adulteration of water in milk by determine boiling point or freezing point of milk? (3)

Unit-IX: Lactose - Lactose (alpha and beta forms and their differences) Significances of lactose in dairy industry.

Questions:

1. Write short note on alpha and beta forms of lactse? 3
2. Differentiate alpha and beta forms of lactse? 3
3. Write significances of lactose in dairy industry. 5

Unit-X: Milk fat: Composition and structure, factors affecting melting point, boiling point, solubility and Refractive Index, fat constants (saponification value, iodine value, RM value, Polenske value, peroxide value) Chemical reactions of fat (hydrolysis, auto-oxidation), condition favouring autooxidation, prevention, measurement of auto-oxidation.

Questions:

1. Describe in brief the composition and structure of milk fat. 8
2. Write the effect of different factors on the melting point of milk fat. 4
3. Define saponification value, iodine value, RM value, Polenske value, peroxide value. Mention its value for milk fat. 2+1 for each
4. Write the steps of auto oxidation of milk fat. 6
5. Write short note on hydrolysis of milk fat. 4
6. What are the conditions for favouring auto-oxidation of milk fat? 3
7. How auto-oxidation can be prevented? 3
8. How auto-oxidation can be measured? 3

Unit-XI: Protein and Enzymes : General structure, amphoteric nature, difference between casein and serum protein, different types of casein (acid and rennet), uses of casein, fractionation of protein. Enzymes- catalase, alkaline phosphatase, lipases and proteases.

Questions:

1. Describe primary, secondary and tertiary structure of milk protein. 6
2. What is denaturation of milk protein. Which factors causes denaturation of protein? 2+3
3. Describe structure of casein and whey protein. 4+3
4. Describe amphoteric nature of protein. 3
5. Write difference between casein and serum protein.
6. Write flowdiagram for manufacture of acid and rennet casein. 3+3
7. Write uses of casein. 8
8. Write short note on fractionation of milk protein. 5
9. Write short note on enzymes- catalase, alkaline phosphatase, lipases and proteases. 3 each

Unit-XII: Market milk industry and milk products: Systems of collection of milk Reception, Platform testing- Various stages of processing, Filtration, Clarification Homogenization Pasteurization Description and working of clarifier, cream separator, homogenizer and plate heat exchanger. Flow diagram of following milk products - Butter, ghee, flavored milk, yoghurt, dahi, shrikhand, ice-cream, condensed milk, milk powder, channa, paneer, cheese (cheddar)

Questions:

1. Describe milk reception operation in reception dock of a dairy industry. 6
2. What are plat form test for milk? 6
3. What is can drip saver? 2
4. What is tipping bar?
5. How sampling of milk is done? 3
6. Which are the common preservatives used during sampling of milk?
7. Write the purpose of the following milk test- Acidity, alcohol-alizarin, COB, Dye – reduction test (MBR/resazurin), DMC, SPC, Lactometer, Freezing point, Fat and SNF. 1 each
8. What is milkshed? 2
9. Write the types of milk collection system in India. 3
10. What are the equipments used at the milk collection centre?
11. Differentiate filtration and clarification. 2
12. Write the differences between filtration and clarification. 3
13. Which factors affect clarification? 3
14. How milk fat is separated cream separator? 4
15. What do you mean by milk homogenization? 2
16. Write merits and demerits of milk homogenization. 2+2
17. Write principle of milk homogenization. 3
18. Describe homogenizer. 3
19. Describe the process of homogenization of milk. 3
20. What do you mean by milk pasteurization? 2
21. What is the main purpose of milk pasteurization? 2
22. “Market milk available in the pouch at market, need not be boiled before drink” – justify. 3
23. “Raw milk should not drink” – justify. 3
24. Write the importance of milk pasteurization. 2
25. Write drawbacks of milk pasteurization. 2

26. What is FCBT? 2
27. What is FDV? 2
28. What do mean by regeneration process during milk pasteurization? 2
29. How holding time for milk in pasteurization is tested?
30. What is the time temperature combination in LTLT and HTST method of milk pasteurization? 2+2
31. Describe milk pasteurization in a HTST pasteurizer with diagram. 10
32. Write flowdiagram of manufacture of following products- butter, ghee, flavored milk, yoghurt, dahi, shrikhand, ice-cream, condensed milk, milk powder, channa, paneer, cheese (cheddar). 5 each
33. Why neutralization of cream is done? 2
34. Why aging of cream is done before churning during butter making? 2
35. What is the purpose of washing, salting and working of curd during butter making? 2+2+2
36. What is the purpose of ripening of cream during butter making?
37. What is the purpose of flavored milk making?
38. What are the differences between dahi and yoghurt? 3
39. Which starter cultures are used for dahi and yoghurt making 2+2
40. What is the incubation time and temperature for yoghurt making?
41. What is *chakka*?
42. What are the innovations can be made in Shrikhand making in instead of conventional method? 3
43. What should be the minimum percentage of fat in ice cream?
44. What is the purpose of homogenization, cooling and ageing step in icecream making? 2+2
45. Write the importance of stabilizer and emulsifier in ice cream making. 2+2
46. In which step of manufacturing process in ice cream air is incorporated in ice cream? At what temperature hardening of ice cream is done? 1+1
47. Why sugar is added in condensed milk? 2
48. In condensed milk up to what level milk is condensed? 1
49. Write the importance of cooling and crystallization step in condensed milk. 3
50. Between cow and buffalo milk which milk is preferred for in case of channa and paneer making? 1+1
51. "During paneer making before coagulation, milk is heated to 90^{O}C followed by cooled to 70^{O}C" – mention the reason 2
52. During cheddar cheese making what should be the casein:fat ratio of milk? 2
53. Mention the sequence of use of different cheese knife for cutting of coagulam during

cheese making. 2

54. Describe cheddaring step for Cheddar cheese making. 3
55. What is the purpose of ripening/curing step of cheddar cheese making? 3