FREQUENTLY ASKED QUESTIONS

1. **Name the different types of fishes on the basis of skelton system?**

Ans). On the basis of skelton system there are two main groups of fishes, bony fish (*Teleosts*) and cartilaginous fish (*Elasmobranchs*). As the common names imply, the skeletons of teleosts are made of bone while the elasmobranchs have cartilaginous skeletons.

2. **What is the chemical composition of fish?**

Ans). Fish represents a valuable source of micronutrients, minerals, essential fatty acids and proteins in the diet. The meat of fish and seafood products contains about 70-80% (w/w) water, 8%–25% proteins, 0.5%–30% fat, and 0.6%–1.5% mineral compounds. Fish meat contains abundant amounts of water-soluble vitamins, and fish oil (particularly from the liver) is rich in vitamins A and D.

3. **What is the contribution of fish lipids to human nutrition?**

Ans). Lipids contained in fish are rich in essential polyenoic fatty acids and particularly valuable nutritionally are the omega-3 polyenoic acids, which may reach up to 40% in the oil content of some fish.

4. **Why Fish and seafoods are considered in functional foods?**

Ans). Increasing realization of the positive link between fish consumption and good health has led to an upsurge in research and commercial exploitation of seafood biotechnologies to produce innovative functional marine food and medicinal products. The particularly low incidence of heart disease in fish-eating populations has been attributed to high ingested levels of the so-called omega-3 [eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA)] polyunsaturated fatty acids (PUFAs) in fish oil. For instance, in recent, researchers successfully incorporated omega-3 fatty acids into a range of products including bread, biscuits, soup, and an infant formula using spray-drying processes. These omega fatty acids reduce inflammation, and cardiovascular diseases by raising the plasma total high-density lipoprotein (HDL) cholesterol (the so-called good cholesterol). These are also the important components for brain development, immune modulation, and good vision and can help us from preventing type-2 diabetes.

5. **Name different methods used for cooking of fish.**

Ans). Fishes are generally cooked by dry heat such as broiling, baking and frying. Moist heat methods, such as steaming and poaching are also used.

6. **Enlist the different steps involved in FPH production through flow diagram.**

Ans). Figure 7 shows a process scheme for FPH production from fish or fish wastes.

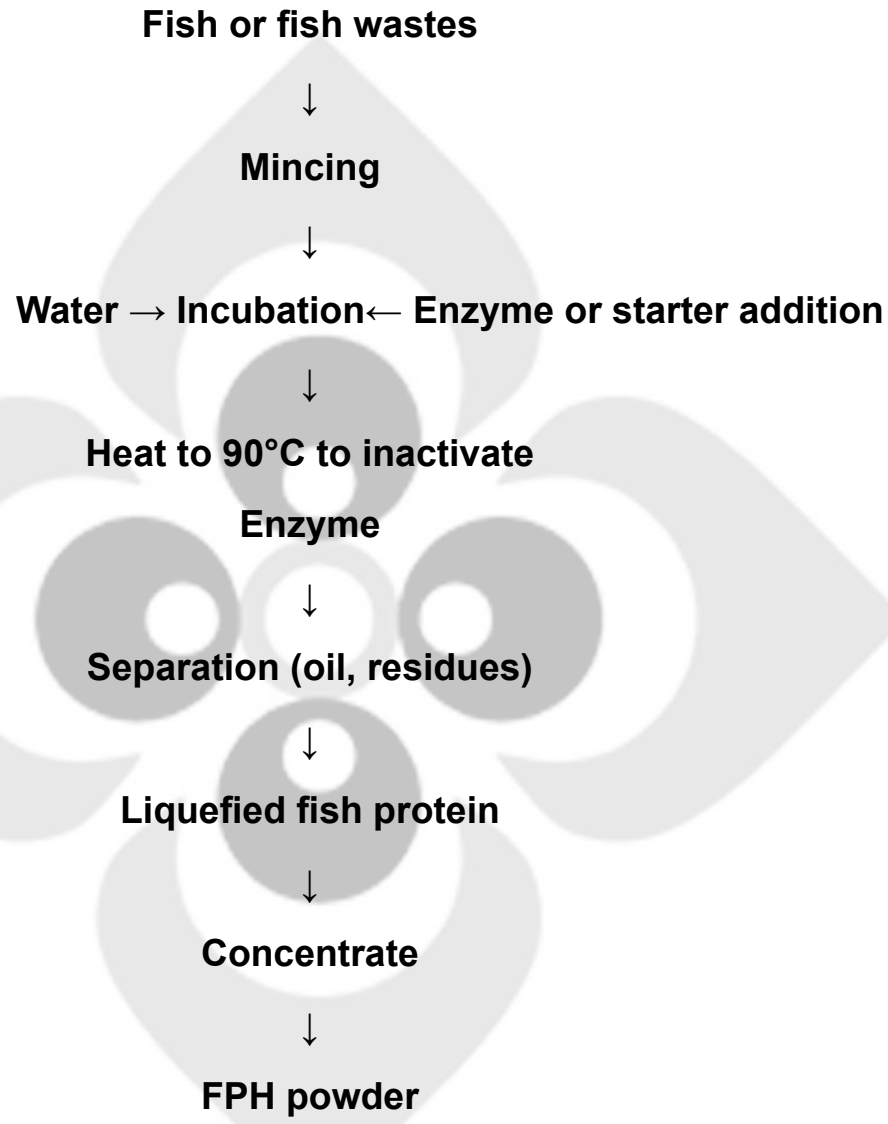

Figure 7: General process for the production of FPH

7. **What is the nutritional significance of fish meal?**

Ans). Fish meal in diets increases feed efficiency and growth through better feed palatability, and enhances nutrient uptake, digestion, and absorption. The balanced amino acid composition of fish meal complements and provides synergistic effects

with other animal and vegetable proteins in the diet to promote fast growth and reduce feeding costs. High-quality fishmeal provides a balanced amount of all essential amino acids, phospholipids, and fatty acids required for optimum development, growth, and reproduction. The nutrients in fishmeal also aid in disease resistance by boosting and helping to maintain a healthy functional immune system. It also allows for formulation of nutrient-dense diets, which promote optimal growth.

8. **What are the different preservation techniques of fish?**

Ans). The various preservation techniques used for fish preservation are freezing, curing, irradiation, active packaging and canning.

9. **Name different methods used for quick freezing of fish.**

Ans). There are three methods used for quick freezing of fish:

a) Direct immersion of fish in the refrigerating medium

b) Indirect contact with the refrigerant through plates

c) Forced convection of refrigerated air directed at heat transfer surfaces.

10. Define cured fish?

Ans). Cured fish refers to fish which has been cured by subjecting it to salting, drying, pickling, fermentation, smoking, or some combination of these before it is eaten. These food preservation processes can include adding salt, nitrates, nitrite or sugar, can involve smoking and flavoring the fish, and may include cooking it. The earliest form of curing fish was dehydration. Other methods, such as smoking fish or salt-curing also go back for thousands of years. The term “cure” is derived from the Latin *curare*, meaning *to take care of*.

11. **What is the difference between cold smoking and hot smoking?**

Ans). **Cold smoking**: In this method, the temperature is not high enough to cook the fish. It is not usually higher than 35°C.

Hot smoking: In this method, the temperature is high enough to cook fish. Hot smoking is often the preferred method. This is because the process requires less control than cold processing and the shelf-life of the hot-smoked product is longer, because the fish is smoked until dry.

12. **Define Bacteriocins?**

Ans). These are 'antibiotic-like' molecules, usually protein in nature, of varying molecular weight, mode of action and specificity of action. They are produced by many LAB either naturally or induced, with some LAB producing a single form whilst others produce two or three forms. Nisin (produced by *Lactococcus lactis*) shows activity against Gram-positive bacteria but not pathogenic Gram-negative bacteria such as *Escherichia coli* and *Salmonella*.

13. **What are the different quality criteria for thermally processed fish?**

Ans). The canning process will cause changes in the texture and flavour of the fish product compared to the raw material but these are usually acceptable (and even desirable) for most species – but not for the delicately flavoured and textured white fish. Consequently, oily fish such as tuna and salmon, among others, are canned most successfully as are many shellfish species. Other quality factors which can be affected by canning include slight loss in the nutritional value of proteins and associated denaturation giving a curdled appearance, losses in vitamins and colour changes (particularly for salmon). Attempts to minimize these quality defects involve the prevention of overcooking by improved heat transfer – just the kind of effects which would ensure the destruction of organisms with reduced energy and water usage as mentioned above. Thus, good processing, product quality and sustainability go hand in hand once again.

14. **Discuss briefly various issues relating to fermentation process of fish?**

Ans). The various issues relating to fermentation of fish are-

Fermentable carbohydrates: The presence of fermentable carbohydrates (mono- and disaccharides) is essential and is usually provided by the addition of rice (or cassava). However, starchy substrates must be broken down and enzymes with amylolytic activity have been demonstrated.

Presence of salt: The presence of salt inhibits spoilage bacteria and promotes LAB and halophiles generally by lowering the water activity, although LAB are inhibited by low water activity affecting the fermentation. The effect varies depending on the phase in which salt is found, being highest in the solid state and less in solution.

Initial pH: The initial pH of the raw material will vary and hence the pH drop due to any specific LAB activity will depend on this value. A rapid drop in pH demands the

presence of easily fermentable carbohydrates.

Temperature: This has an enormous effect on fermentation and in traditional products ambient temperatures alone, in the range of 25–35°C, promote a vigorous ferment-promoting tissue breakdown and favour sauce production.

15. **What is the importance of exhausting in canning operation?**

Ans). Exhausting is the operation prior to retorting, and entails the removal of gases in the headspace above the can contents and the reduction of oxidation and internal corrosion by excluding oxygen. The pressure differences in the can during retorting can lead to strain on the can seams and leakage, and this is the commonest cause of spoilage as organisms gain ingress – such effects are not always easy to spot once the cans have cooled down. Large cans also need a headspace to allow for the expansion of the contents in the retort, which is not usually the case with small cans.