

Minced fish can be used for the preparation of a number of products like fish sausage, cakes, cutlets, patties, balls, pastes, surimi, texturised products etc. The processes for the production of most of these products are available and some of them are very much suitable for starting small-scale industries.

Surimi

Surimi is a Japanese term for mechanically deboned fish flesh that has been washed with water and mixed with cryoprotectants for good frozen shelf life. Washing not only removes fat and undesirable matters such as blood, pigments and odoriferous substances but also increases the concentration of myofibrillar protein, the content of which improves the gel strength and elasticity of the product. This property can be made use of in developing a variety of fabricated products like shellfish analogues.

Method of production

Meat is separated using a meat-bone separator. The diameter of perforations in the drum should not be larger than 3-4 mm to prevent the skin and scales from passing through the holes.

The minced fish is washed repeatedly with chilled water (5-10°C) until most of the water soluble protein is removed. Usually 5-10 times water is used and three washings employed. In the final washing, 0.01-0.3% sodium chloride is used to ease the removal of water and pressed using a screw press to a moisture level of 78-80%. Using a silent cutter, cryoprotectants like sugar, sorbitol and polyphosphates are mixed into the dewatered fish meat at levels 4, 4 and 0.2% respectively. During the process the temperature is not allowed to exceed 10°C above which the protein functionally could be damaged.

The total protein lost during the washing process is approximately 30% of the minced meat and depends on the amount of water used and number of washing cycles employed.

Kneaded products

Several kneaded products like kamaboko, chikuwa, hampen, fish ham and sausage are processed using surimi incorporating other ingredients. The ingredients used in most of these preparations are identical; however, the classification is principally based on the manufacturing process involved. The ingredients employed other than surimi include salt, monosodium glutamate, sugar, starch, egg white, polyphosphate and water. The method of processing all these products involves grinding together of the various ingredients to a fine paste and some sort of heat treatment at some stage.

Fibreized products

Fibreized products are the greatest in demand among the surimi based imitation shellfish products. The ingredients used in the formulation of fibreized products includes, besides surimi, salt, starch, egg white, shellfish flavour, flavour enhancers and water. All the ingredients are thoroughly mixed and is ground to a paste. The paste is extruded in sheet on the conveyor belt and is heat treated using gas and steam for partial setting. A strip cutter subdivides the cooled sheet into strings and is passed through a rope corner. The rope is coloured and shaped. The final product is formed by steam cooking the coloured and shaped material.

Fish fingers

The mince is frozen in the form of rectangular slabs. The slabs are sawn into thin fingers and battered and breaded. They are then flash fried for 20 seconds. Alternately, fish fingers are made out of frozen compact slabs of fish fillets also.

Fish cutlets

Fish cutlets are prepared using cooked fish mince, which is mixed with cooked potato, fried onion and species etc. It is then formed into the desired shape, each weighing approx. 40 g. The formed cutlets are battered, breaded and flash fried for 20 seconds

Fish burgers

More or less similar to fish cutlets, burgers are made out of mince of lean white fish. Cooked mince is mixed with cooked potato and mild spices and formed into round shapes. Burgers are battered, breaded and flash fried for 20 seconds.

Fish balls

Fish balls are prepared using minced fish mixed with cornstarch salt and spices and formed into balls, 2-3 cm in diameter and cooked in boiling brine for 8-10 minutes. The balls can be further processed as a coated product by pre-dusting, battering and breading or as a heat processed product in a suitable fluid medium.

Fish sausage

Fish sausage is an analogue of sausage made from pork. The main ingredient is surimi or ground fish meat. The surimi is mixed with salt (3-4%), sugar (2-3%), sodium glutamate (0.3%) starch, and soy protein in a silent cutter. At the end of mixing, lard or shortening (5-10%), polyphosphate (0.2-0.3%) and flavourings are added and the minced meat is placed in a casing tube made from vinylidene chloride. Stuffing is done by an automatic screw stuffer. The casing tube is closed by metal rings. The tube is heated in hot water at 85-90°C for 40-60 min. After heating, it is cooled down slowly to avoid shrinking of the tube and then stored at refrigerated temperature.

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