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PROCESSING, PRESERVATION AND MARKETING

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Shellfishes (Bivalves) are highly perishable and this irrespective of their market potential is a major hurdle to the development of the industry. Soon after spawning the meat will be thin and not very tasty. Therefore during the breeding season they are not marketed. The consumer's food preference also affects the market. In France fattened oysters having green coloured meat due to overfeeding on rich algal bloom are highly priced and in much demand. For this before marketing the oysters are grown for a short duration in special nutrient enriched ponds. In America such oysters are not favoured and does not find a place in the cosumer market. In most countries what is preferred is a large deeply cupped oyster with plump white meat. Though consumers like to eat live oyster meat raw, sale of shelled oysters (live) become difficult if the marketing centres are at great distances. It is very expensive to deliver live oysters to distant places, and the risk of mortality is also high when transported in dry conditions. A cheaper and more convenient way to deliver the oysters in the consumer market, is by shucking them and delivering them as raw, deep frozen, canned or smoked. Therefore, processing of oyster meat is essential. The producers and suppliers have to ensure uniformly good quality shellfish which are graded according to size and weight, by quality or by quantity.

PROCESSING

Certain standard techniques in processing and preserving of oysters are done before they are delivered for sale in markets. Shucked oysters are undoubtedly the most important form of oyster product and are relatively cheap, popular with customers, and potentially saleable anywhere. Shellfish offer a wider choice of recipes to the modern housewife who likes to offer variety in the family menu. The processing of molluscan shellfish is of great importance and there

is wide scope for further improvement. Shucking is done manually and gaping is effected mechanically or chemically. Recently shell valves are being opened utilising microwave energy.

Manual shucking: Manual shucking is generally used only by smaller companies where quality is more important than quantity. For manually opening the oysters special tools and great skill are required. The shucking knife is fiarly long to provide leverage to turn the valves open after its sharp blade-like edges cut the adductor muscles. Gloves and finger stalls are needed to protect the fingers from getting hurt by the sharp edges of the shells and the process is slow.

Mechanical shucking: Although many attempts have been made to develop a mechanical method for shucking oysters, the lack of uniformity in size and shape of oysters, have made a purely mechanical system difficult and no suitable method has yet been devised. But mechanised conveyor belts have been used by some of the companies to get the oysters to the shucking tables and another conveyor belt system to remove the meat and waste shell from the shucking table. In this process first the oysters are steam-opened. While the oysters are steamed, the juices and flavour of the oysters are considerably lost. Hence during steaming the temperature is maintained at a level just enough to relax the adductor muscle and to open the valves and not to cook the meat. This blanching process prevents slime formation during storage and it firms the meat enough to make it attractive. This process is essential prior to freezing.

Chemical process: Chemicals can be used to cause the adductor muscle to relax so as to enable the shucking knife to be introduced more easily. This is done by placing the live oyster in water to which acetic acid or hydrochloric acid is added. A chemical reaction with the lime salts of the oyster shell releases Co_2 and the oysters gape widely.

Utilisation of microwave energy; Research carried out at the National Marine Fisheries Atlantic Fishery Products Technology Center in Glouscester, Massachussets, U.S.A., has shown that microwave energy (2450 MHz) can be used to increase the productivity of shucking oysters and other bivalves. A short microwave treatment relaxes the muscle of the bivalve without cooking the meat, resulting in the visible loosening or opening of the shell valves. This allows easy separation with a shucking knife and greatly facilitates the shucking process, retaining the flavour intact.

PRESERVATION

Once the oysters are opened and shucked, they are marketed as raw, deep frozen, pickled, canned and smoked for which different methods of preservation are followed.

Refrigeration: The important factors involved in the storage of freshly shucked oysters are (1) the speed of cooling after shucking and (2) the temperature at which it is stored. Uncooked, shucked oysters can often be stored for two weeks at 1.7°C. However cooked and shucked oysters can be stored for a longer period. When heated at 65 to 70 °C for 30-50 minutes it can be stored well for nearly two months at a temperature of 0°C. If uncooked meat is to be frozen, it must be protected from loss of/discolouration. Reasonably quick freezing is needed and the frozen meat should be stored at -18°C. If oysters are stored at -21°C storage life of upto one year may be obtained. Before freezing the oysters are packed in wax coated carton with polyethylene lining. /moisture and contact with air during storage so as to avoid desication and

Canning: Canning is one of the most popular methods of preparing the bivalve for market. First the shucked oyster meat is washed well with a jet of water, preferably with good quality brine to remove shell bits and any other adhering particles on a perforated strainer of stainless steel. The washing should not exceed three minutes and thereby osmotic loss of tissue fluids is avoided. Immediately after water is drained and the meat is graded according to size. In some

factories prior to shucking the oysters are dipped in hot(60.0-65.5°C) water and immediately chilled similar to pasteurisation. A good blanching renders the product with better shape and flavour. There are various ways of cooking oysters prior to canning, some firms use the live steam method instead of water and the process lasts 30 minutes at 115°C. Another method is to place the meat on perforated trays and have them cooked in brine for 4-8 minutes. After cooking the oysters are to be filled in suitable cans and sealed. Before sealing care must be taken to leave a headspace below the lid and pure sea water or purified brine or salted sweet water is added. After the cans are sealed they are sterilized at 121°C for 10 minutes or at 115°C for 25 minutes.

Canned smoked oysters: Oysters which have been steamed open or which have been shucked fresh and partially cooked are used for smoking. They are rinsed for 5 minutes in a 2.5% brine solution and then spread in a single layer on a 1" mesh galvanized wire tray and immediately transferred to the smoking room (temperature 48.9°C). In about 4 hours at this temperature the meat though remain intact attain brown colour. Smoked oysters are packed in ½ pound (227 g) flat cans filled with 1½ fl. oz. (29.6 ml) of salad oil and exhausted for 15 minutes at 4.5 - 5.5 kg pressure in the retort. After double seaming the cans are processed in a retort at 115.5°C for 60 minutes.

Oyster stew: Oysters that are too large are used for the preparation of oyster stew. They are precooked, chopped into small pieces and prepared with milk, spices and butter followed by standard canning techniques.

In addition to the above products, oyster chowder, oyster soup, oyster sticks and oyster pickles are some of the common preparations in the market. But the demand varies from place to place and varies with consumer's preferences.

Frozern oysters: This is a new method of processing oysters and as yet a perfect method is to be adopted. A slimy secretion is produced when the product is thawed and attempts have been made to overcome

this by preliminary blanching and also by freezing individual oysters. Intensive research work on this type of processing oysters is going on at various oyster processing centres.

MARKETING OF BIVALVES

Marketing has always been the weak link in the shellfish industry. It is of no use producing large quantities of shellfish if they cannot be sold. Several factors affect the marketing efficiency of bivalves. Apart from biological and seasonal aspects it is also affected by the lack of transport and storage facilities, remoteness of marketing centres, lack of consumer education and publicity. In developed countries many of such impediments have been overcome and the shellfish industry thrives well by an organised system. They are marketed in a number of ways such as (1) direct to consumer, (2) to retailers (3) to whole-sale fish dealers (4) to other oyster producers and (5) to processors (canners). However in developing countries shellfish trading is still in the infant stage. Although areas for potential shellfish production are available they remain still unexploited for want of necessary domestic market.

During the journey to the market if proper precautions are not taken, it is often found that oysters get contaminated by pathogenic and nonpathogenic organisms. This weakens public confidence in the product and is often confused with primary pollution. Contamination risk increases with the distance the shellfish have to travel.

The consumer's attitude towards food is always on the subjective plane. Taste and quality are two important aspects for a food item to draw the notice of the general public. For a new and seemingly disagreeable food the industry should present it in the most appetising form possible. After all, man's food preferences are learned and not inherent. In this respect food processors could achieve desirable results by preparing suitable gourmet dishes on molluscs and popularising them.

In most of the countries at present the publicity for sea foods is mainly restricted to professional press and leaflets. Shellfish products are advertised in most of the fish trade journals, but such publications are not normally read by the public at large and are directed at the retailer more than the consumer. Periodic advertisements in newspapers and weeklies and occassionally featuring in television would create an awareness among the public.

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