Course Name: Canning Technology and Value Addition in Seafood
Professors name: Dr. Maya Raman, Dr. Abhilash Sasidharan
Department: Food Science and Technology
Institute: Kerala University of Fisheries and Ocean Studies
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Seafood pre-processing P2

Welcome once again to another session Canning technology and value addition of sea foods. We were discussing about canning procedures for various seafood products and under this, we had discussed about step-by-step process variations in item wise seafood canning. We have seen what are the different types of seafoods that can be canned and what are the protocols that need to be adopted for canning. We have seen certain steps they are unique and they can be adopted only for the particular item but in general, the steps are same for all the seafoods and we have also seen pre-processing steps and in that we have seen what is a grader, what are the different types of graders, how it can be done manually and what are the different mechanized types of graders and we had also seen about the sorters and washers. We stopped with washer in the last class and washer is mainly used for removing the blood stains and the adhering materials that are on the surface of the meat or on the surface of the skin that will give a bad appearance or it will interfere with the appearance of the tissue. So, those things and even the slime is also washed out and for that we use washers. Efficiency of washer depends upon the kinetic energy of the water or the speed with which or the force with which the water is pumped into the machine.

In this session, again, we have to discuss about other pre-processing techniques and we also discussing about additives in the coming sessions. Now, let's start with the deheading. Immediately after washing, the fish is deheaded. Deheading means removing the head and the deheading can be done in different ways and when we do deheading, we concentrate on the efficiency that there should not be any loss in the tissue. Or muscle should not or meat should not be lost. We can cut a round cut. These are the different cuts seen over here. So, we can have round cut and then contour cut, straight cut and we also have slant cut. In the round cut, the cut is made just behind the upper

column.

In this cut, the loss of meat is minimum and in case of contour cut first the cut is made perpendicular to the back bone and then it is made at an angle of 45 degree. So, it is a slanting angle and even there is a slight loss but it is comparatively it is less and, in the slant, cut, the cut is in the slanting angle and here around 4 to 5 percent of tissues are lost so meat is lost in this type of cuts. After cutting, the meat needs to be washed because when deheading is done, the blood will ooze out and other tissues will be damaged. So, it need to be cleaned thoroughly and washed properly and generally head contributes to around 10 to 20 percent of the total body weight. When we are removing the head portion, this much part will be lost, and this head can be used for other purposes. It can be converted to other byproducts. We can also use it as animal feed. The contour cut technique is also used when filleting is done, and when it is contour cut, it is used for fillets without bones or when the skin is removed. In such fillets, which have a very high economic value and fetch a lot of money in the market, we go for contour cut. For such cuts, we go for contour cut. In this, the pectoral bones and fins are removed along with the head.

In small fishes, deheading can be done manually. However, for large fish, manual deheading is impractical due to its laborious and challenging nature. Thus, we generally opt for mechanized or automated systems. There is no single system capable of handling all types of cuts. Different machineries are required for various cuts, and one cannot find all these capabilities in a single machine. Cutting can be performed using different types of knives, such as disc knives, contoured knives, cylindrical knives, band saws, and guillotine cutters. Band saws and guillotine cutters are typically used for large-sized fish. The deheading can be adjusted in the mechanized system based on the size and shape of the fish. The knife position can be changed accordingly. In mechanized machines, cutting and deheading can be achieved at a rate of 20 to 40 fish per minute. The speed of deheading in an automated system demonstrates its efficiency. Manual cutting, done at a slow pace, lacks this efficiency, but it ensures minimal meat loss. Experience is crucial in automated systems, requiring skilled individuals to be highly experienced through regular practice. In guillotine cutters, the fish is placed on the

platform, and cutting is done directly on the head. The knife falls perpendicularly on the fish, and these cutters can be changed based on the species and size. Usually used for freshwater fish, guillotine cutters allow for contour cuts and round cuts, known for their economic efficiency due to minimal meat loss. Cylindrical rotational saws are used for round cuts, with sizes ranging from 12 to 18 centimeters in diameter, modifiable according to the type of fish used. Depending on the species and material size, knives need to be changed.

Ultimately, different types of knives can be used for cutting fish, considering factors like species, size, and shape. Manual cutting is more convenient and economical, minimizing tissue loss. However, in cases where manual cutting is impractical, adopting mechanized or automated systems becomes necessary. Guillotine cutters, suitable for large fishes, feature a platform where the fish is placed, and a guillotine knife falls on it for efficient deheading. These machines represent various types of deheading processes. So, it is perpendicular to the fish and just cuts the head from the fish body. In the guillotine cutter, we cannot control the loss of tissue. Using the guillotine cutter results in much higher tissue loss than other types of cutters. Another type of cutter is the cylindrical rotational saw, used for a round cut just behind the operculum, performing the heading. This is a circular saw, manually operated with the help of a lever, providing a straight cut as the fish is placed over the cutter. In another configuration, a combination of a disc saw and a guillotine cutter is used.

The platform over which the fish is placed in these machines allows for both disc saw and guillotine actions to be used for cutting the heads. These machines are commonly found in preprocessing centers or companies. The waste materials are vacuum sucked and collected in bins to maintain a clean platform, which can be used continuously. There is also a machine that combines deheading and gutting, performing knobbing, which involves removing the head and gut region. Various brushes are employed to clean the body thoroughly, removing any oozing or sticking substances after deheading and gutting.

Different types of brushes, including rotating and vacuum suction brushes, are used for cleaning the body, ensuring the removal of unwanted tissues, kidney, and other small

organs. Three cleaning techniques can be employed based on the type of fish and its size. After deheading, fins need to be removed, which is typically done manually. For larger fish, mechanized scissors or rotating disc knives are utilized due to the laborious nature of manual cutting. An automated device with a rotating disc knife, powered by an electric motor, can cut fins quickly, processing 20 to 40 fish per minute.

After deheading, the fish is cut into two slices. The slicing or steaking process involves cutting the tissues on the sides of the backbone into slices or steaks. The size and shape of the fish determine the knife used in the mechanized or automated system for cutting. Manual cutting is generally more convenient and economical, but in some cases, mechanized or automated systems are necessary. Guillotine cutters, suitable for large fishes, feature a platform where the fish is placed, and a guillotine knife falls on it for efficient deheading.

The text also discusses other preprocessing machines, including a platform for deheading and de-cutting, a deheading and gutting machine, and a machine for cutting the ribs. The process of slicing involves making cuts perpendicular to the backbone and tilting them at an angle of 45 degrees. The resulting slices or steaks can be used as they are or converted into other value-added products. The size and efficiency of the slicing machine depend on factors like fish size and shape. Different types of cutters, such as drum type loading machines and conveyor belts, are used for slicing and sticking.

Filleting is another option, involving separating abdominal and dorsal muscles. Filleting can be done manually or automatically using a machine system. Automated filleting devices contain a single rotating disc and two conveyor belts. The backbone retention depends on the type of filleting machine used. Separation of bones from fillets is crucial, and meat bone separators are used for this purpose. Mechanized slicers with multiple rotating circular saws can efficiently process fish, slicing 20 to 40 fish per minute.

The text also covers the use of minced meat separators, which separate meat from bones and skin. The minced meat can be used for various products like fish burgers, fish sticks, canned fish, and dumplings. The efficiency of the separation depends on the size of the pores in the separator cylinder. Skinning is discussed as another process, which can be

done manually or using automated systems with oscillating knives. The final step in preprocessing involves scaling and removing the skin, with the automated system being faster and requiring less water.

In summary, the preprocessing steps for fish involve various machines and techniques, each serving a specific purpose in preparing the fish for further processing or consumption.