



Post-Harvest Fishery On-Job Training

Trainee Manual

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Training Manual

1. Good Manufacturing Practices (GMP) and Personal Hygiene.

Post-Harvest (Processing) is the processing of raw materials collected from the fishing boats and fish culture ponds to get the value-added fishery products such as Dry Fish, Dry Prawn and Shrimp, Fish Paste, packing, storage and marketing of the end products to the consumers. There are 4 kings of important steps for the processing.

- (1) Cold - Raw materials must be kept at the cold places. E.g. Ice storage of raw materials.
- (2) Clean- Raw materials, operation tools and the operator must be clean.
- (3) Fast- Processing operation must be quick and finish within a short time.
- (4) Aware- Must have the awareness on processing technology and accountable with the processed end products.

The operator and workers that will conduct the processing operation must have the personal hygiene and must be fulfill with the stated 4 important points.

- (1) Healthy and free from contaminated diseases.
- (2) Hairs must be neat and tidy binned and covered.
- (3) Not have the long fingernail.
- (4) Must wear the operation suit, including, stocking cap, mask, apron, trousers and top-boots.

Nutrition value of Fish, Shrimps and Prawns were also explain as follows:

- | | |
|-----------------------------|-----|
| (1) Moisture | 70% |
| (2) Protein | 14% |
| (3) Fat | 10% |
| (4) Minerals | 2% |
| (5) Vitamins | 2% |
| (6) Fibers | 1% |
| (7) Starch and carbohydrate | 1% |

Deterioration of fishery products were due to

- (1) Internal metabolism process
- (2) External effects.

Internal metabolism processes were:

- (1) Enzyme reactions.
- (2) Bacterial reactions.
- (3) Oxidation of fats.

External effects were:

- (a) Higher room temperature.
- (b) Longer time consuming at the operation.
- (c) Rough Handling.
- (d) Bed fishing methods and practices.
- (e) Low usage of Ices.
- (f) Various fishing seasons.
- (g) Un-proper size and type of fish containers.

To avoid the deterioration due to internal metabolism processes, the fish must be gutted, take out the internal organisms; remove the gills immediately before icing. For shrimp and prawn, remove the heads immediately before icing.

Heat treatments for preserve fishery products include:

- (1) Canning.
- (2) Fry in hot eatable oil.
- (3) Steaming.
- (4) Drying.

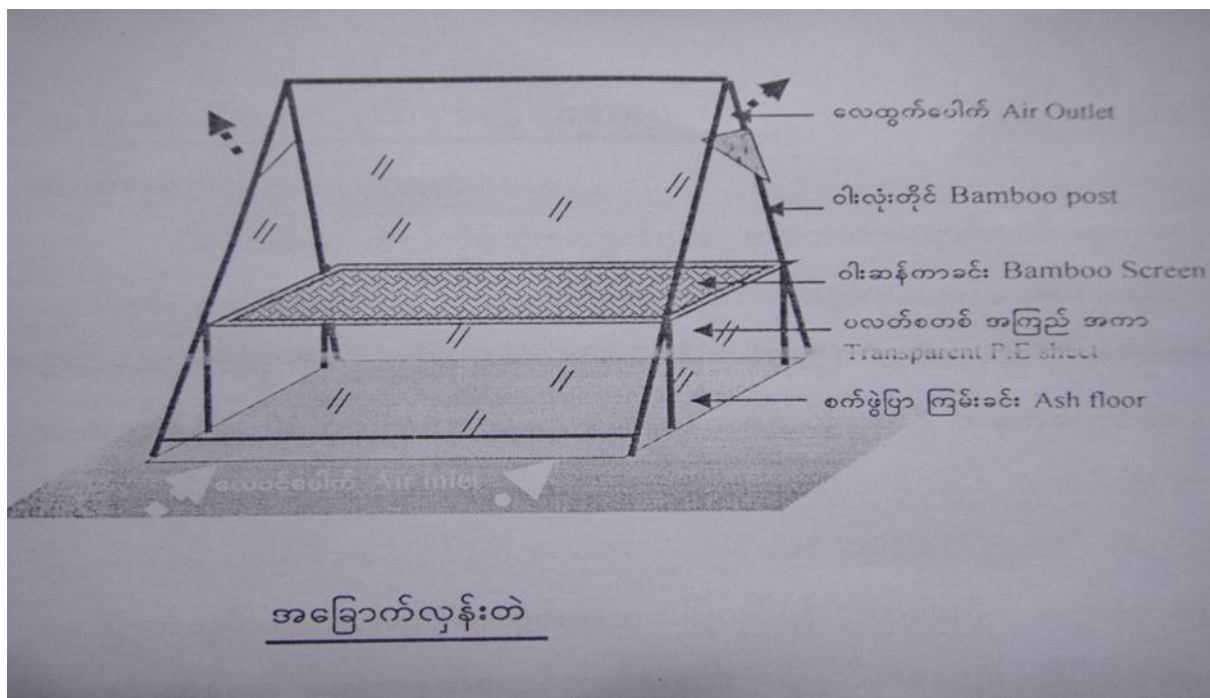
The reasons to follow, the Good Manufacturing Practices (GMP) were to ensure the better quality of the products, to get the better prices and to get the safe food.

The important 4 steps of Good Manufacturing Practices (GMP) were:

- (1) Avoid the contaminations.
- (2) Protect the microbial development.

- (3) Kill the micro-organisms.
- (4) Reduce the microbial population.

Demonstration of the systematic drying of fishery products including the practical construction of Improved Solar Dryer with the basement of (6x8 feet) and 7 feet high. Improved Solar Dryer can be constructed with bamboo or woods. Construct the (6x8 feet) wide 4 foot table with 3.5 feet height within the solar dryer hut as bamboo screen as table top. Transparent plastic sheet must be covered on to the hut, starting from the height of 6 inch. The 6 inch height from the base must be un-covered. Let the upper top Conner as un-covered for air exhaust. Place the burned rice-husk underneath the table.



The advantages of utilizing the improved solar dryer were as follows:

- (1) Prevent from damages due to abnormal rain.
- (2) Prevent from the disturbances of human and animal due to the sun drying process carried out in the protected area.
- (3) Better quality products can occur due to free of dust and sand from air.
- (4) Can produce the safe food as the contamination from fly and birds cannot enter into the solar dryer.

2. Fermented Prawn Production Method

The requirements to produce the Fermented Prawn were wide mouth bowl, meat grinder, balance and banana leaves or Napa palm leaves for packing, required raw materials including fresh prawn, Rice and Salt.

First of all, the fresh prawns were cleaned with plenty of water. Take out the heads and peel the prawns to get the prawn meat. Measure one viss of prawn meat, 30 tickles of rice and 7 tickles of salt separately with the balance. Grind the prawn meat and rice separately. Then mix all the ingredients and grind again.

Pack the equal weight (e.g. 20 tickles or 25 tickles) of grinded materials with banana leaves or Napa palm leaves and press the packages with the weight for about 3 days. After 3 days, those packages will turn into fermented prawn and the color of the fermented prawn meal turned into purple color. Those packages can be stored at the refrigerator for long time storage.

3. Dry Prawn or Dry Shrimp Processing Method

The better quality dry prawn that can achieve the good price must have the characteristic of purple color and not have the salty taste. The most important steps to get the quality dry prawn were "boiling the prawn" and "drying" steps.

First of all, clean the prawn with plenty of water and then let the water to drain. Put all the prawns into the pot and fill with water until the water cover all the prawns. The water must be transparently clean. Put 10 tickles of salt for every 1 viss of prawn. Put the pot onto fire until the water was boiling. Check that the prawns change the purple color and the separation of skin and the prawn meat at boiling process. It is the right time to put the boiled prawns into the sieve. Let the water to drain.

After boiling and water draining, the prawns were ready for drying, which can be done by sun-drying or drying by heating. The best way is to dry the prawn with sun-drying process using improve solar dryer. Mix the prawn several times during the sun-drying process. One or two days will be required to get the dry prawn. By utilizing the "drying by heating" method, the boiled prawns were put on the bamboo screen and put the bamboo screen on fire. Only the mild firing is required. Mixing or changing upside down the prawns in every 15 minutes. 5 to 10 hours will be required to get the dry prawn. Put the dry prawn into a bag

and beat the bag to peel the prawn. This will separate the skin and prawn meat. After beating separate the skin and meat by threshing. The collected prawn meat can be stored at the cool and dry place. The taste of the dry prawn meat will be not salty and the color must be purple color. Only 12 to 15 tickles of dry prawn can get from 1 viss of raw fresh prawn.

4. Dry Fish Processing Method.

The raw fish must have low fat content type of fish to produce the dry fish. The size of the fish will be around 1 foot in length and the weight will be about 70 tickles per piece.

As the preparation work, take out the scales of the fish and cut the head of the fish. Open the gut of fish to remove the internal organs. Use clean knives and cutting stone. Clean the fishes with plenty of water and cut the fishes starting from dorsal portion. 2 horizontal cuts beside the back-bone will change the fish to flat. Horizontal cut 3 to 4 time again to get the fish meat blocks.

After cutting, fishes will be placed overnight in the thick salty solution. At the next day, cleaning with water 2 to 3 times and place the fishes for sun-drying. To avoid the contamination from the flies, the best way is to use the improved solar dryer. It is at-least 2 to 3 days required to dry the fish.

5. Fish Paste Production Method.

Only the small fishes can be used to produce the fish paste. Varieties to fish species can be utilized with mixing for fish paste production. For the fish paste production, first cut the head and open the gut to take out the internal organs of the fishes. Then wash with plenty of water to clean the fishes. Let the water to drain out. After draining, mix the fishes with salt with the ratio of (100: 20) and thoroughly mixed the salt and fishes. Leave overnight. Put those fish and salt mixture into pot and cover the pot to avoid contamination from flies and other insects.

At the next day, dry the mixture by leaving in the sun for one day. After one day of sun-drying, the mixture will become partially dry. At the next day pounded the mixture with a motor and pestle. Note that the fish meat will not be assimilated at the pounding operation. After pounding operation, the pounded fishes were placed in the glazed earthen-pot tightly.

Dissolve salt into the boiling water and pouring the salted water into the glazed earthen-pot until all the fishes totally covered with salt water. The fish paste can be ready to eat after 3 to 4 months period. Avoid the contamination from flies throughout the nursing period.

6. Fish and Prawn crackers production method.

Required materials are wide mouth bowl, balance, meat grinder and steam cooker. Raw materials are fish meat ball or prawn meat, tapioca powder, flour powder, salt, sugar, fish sauce, garlic and boiled water.

The ratios of the ingredients are as follows:

Fish or Prawn meal	10 tickles (160gm)
Tapioca powder	30 tickles (480gm)
Flour powder	4 tickles (64gm)
Table salt	1 tickle (16gm)
Fish sauce	1 tickle (16gm)
Sugar	2 tickle (32gm)
Garlic	2 tickle (32gm)
Boiled water	13 tickle (208gm)

First of all, grind the fish or prawn meat with the grinder. Mix Tapioca powder and Flour powder and mix with water and blend it until its get the sticky mass. The sticky mass is then mixed with salt, fish sauce, sugar, pounded garlic and grind again with the grinder. Form the grinded materials to get the cylinder shape meat bar by hand manually.

The meat bar is then steaming in the steaming cooker for about 2 hours. Leave the steamed meat bars submerged in the cool water overnight. At the next day take out the meat bars and dry them in the shade area, slice into small pieces and sun-dry the slices one or two days until the slices is totally dried. Put them into the plastic bags and close (air-tight) the plastic bags and store them.