

COURSE TRAINING ON CANNING AND CANNED FOOD PRODUCTS

TRAINING REPORT



**2ND December 2016 – Colonel Seafood and
Korangi Fish Harbour, Karachi**

SUBMITTED TO: Prof. Dr. Shahnaz Rashid

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ABSTRACT:

Colonel Seafood is the pioneer of canned seafood products in Pakistan. Tested and approved by the National Food Institution Thailand (NFI) and is properly registered by FDA (USA) with HACCP, PCE and SIDs NOs.

Centre of Excellence in Marine Biology in association with Colonel Seafood (Pvt.) Ltd. and Korangi Fish Harbor concluded the One-Day Course Training organized for Junior Research Fellows on Canning and Canned Food Products.

The course training was designed and conducted by Lt. Col. (R) Zahid Iqbal, Chairman of Colonel Seafood (Pvt.) Ltd. under supervision of Prof. Dr. Shahnaz Rashid, Assistant Professor, Centre of Excellence in Marine Biology.

The training was designed to skill the students with how Colonel Seafood has managed to introduce Canned Seafood exports from Pakistan of those fish that are found in the Arabian Sea and are highly demanded by clients internationally. It is further added that Colonel Seafood not only meets the international standards of food and therefore is exported to EU and USA but also contributes to the fisheries by adding the business. The training qualified the students to how the canning processing plant is contributing in fisheries and how it is contributing in international markets fulfilling the demands of the clients.

The report is based on the learning experiences and what has been concluded from the training by the students.

BACKGROUND & INTRODUCTION:

Centre of Excellence in Marine Biology, University of Karachi accompanied their junior research fellows to Pakistan's first Canned Products Company namely Colonel Seafood, functional at Korangi Fish Harbor, Ministry of Ports & Shipping Gulf, Karachi for a Course Training conducted on canned food processing and industries.

The Course Training was conducted at Colonel Seafood Processing plant situated at Korangi Fish Harbor on 2ND December 2016.

The aim of this Course Training was to aware young scientists about the importance of HACCP and how it plays a vital role in quality maintenance of perishable canned goods that are not only consumed locally but also internationally. The Course Training was a learning opportunity for the Research Fellows to understand the science of Canning of Seafood.

The Training was conducted under supervision of Prof. Dr. Shahnaz Rashid, Assistant Professor, Centre of Excellence in Marine Biology, by Lt. Col. (R) Zahid Iqbal, Chairman of Colonel Seafood (Pvt.) Ltd.

ABOUT COLONEL SEAFOOD:

To facilitate the foreign deep sea fishing vessels and to fulfill the requirements of USA and EU import standards, the Federal Government of Pakistan established a new Fish Harbor at Korangi Karachi, Designed by NEDECO Holland and Constructed by MOWLEM INTERNATIONAL UK.

Colonel Sea Food (Pvt.) Ltd. is not only the first commissioned factory at this Harbor but is also the first Seafood Canning Plant in Pakistan. Tested and approved by the National Food Institution Thailand (NFI) and is properly registered by FDA (USA) with HACCP, PCE and SIDs NOs.

CANNING:

Canning is a method of preserving food in which the food contents are processed and sealed in an airtight container. Canning provides a shelf life typically ranging from one to five years, although under specific circumstances it can be much longer. The fish most extensively salted are cod, herring, mackerel, and haddock.



HISTORY OF CANNING:

The canning process dates back to the late 18th century in France when the Emperor Napoleon Bonaparte, concerned about keeping his armies fed, offered a cash prize to whoever could develop a reliable method of food preservation. Nicholas Appert thinks of the idea of preserving food in bottles, like wine. After 15 years of experimentation, he realized if food is sufficiently heated and sealed in an airtight container, it will not spoil.

An Englishman, Peter Durand, took the process one step farther and developed a method of sealing food into unbreakable tin containers, which was perfected by Bryan Dorkin and John Hall, who set up the first commercial canning factory in England in 1813. As more and more of the world was explored, and as provisioning armies took on greater importance, the demand for canned foods grew. Thomas Kensett, who immigrated to the United States, established the first U.S. canning facility for oysters, meats, fruits and vegetables in New York in 1812. More than 50 years later, Louis Pasteur provided the explanation for canning's effectiveness when he was able to demonstrate that the growth of microorganisms is the cause of food spoilage.

The basic principles of canning have not changed dramatically since Nicholas Appert and Peter Durand developed the process. Heat sufficient to destroy microorganisms is applied to foods packed into sealed or "airtight" containers. The canned foods are then heated under steam pressure at temperatures of 240-250°F (116-121°C). The amount of time needed for processing is different for each food, depending on the food's acidity, density and ability to transfer heat. For example, tomatoes require less time than green beans, while corn and pumpkin require far more time.

Processing conditions are chosen to be the minimum needed to ensure that foods are commercially sterile, but retain the greatest flavor and nutrition. All processes must be approved by the U.S. Food and Drug Administration. Once the cans are sealed and heat processed, the food maintains its high eating quality for more than two years and is safe to eat as long as the container is not damaged in any way. And, like the home canning process, no preservatives are added or necessary.

The sequence of steps in the canning process differs with the product. Fruits and vegetables may be peeled or pitted, and have stems removed prior to canning. Some vegetables receive a heat treatment before they are placed in the can to remove air and improve packing. (Think about the bulk of raw vs. cooked spinach!) Acid juices, like orange and tomato, and acid vegetables, such as sauerkraut, can be sterilized before they are placed into containers. Seafood is usually packed after being boned or shelled, with the exception of smaller fish like sardines and anchovies, or even salmon, which have bones that are softened by heating. Meats and fish, like tuna, are usually cooked to soften the flesh before canning, separated from bones, compacted and placed in cans with appropriate liquid.

One significant difference in the modern canning process is that today's cans are made of 100% recyclable steel.

To ensure that foods are packed at their peak of freshness, most canning facilities are located within a few miles of the point of harvest. Fruit and vegetable canneries often can be seen from the fields where produce is harvested. Seafood canneries are within minutes of the docks. Meats, soups and stews are canned within the facilities in which they are prepared. Minimizing transportation keeps costs down as well as ensuring that food, especially fruits and vegetables, are packed when the flavor is greatest.

Because canned food is packed at the peak of harvest, it also is packed at its nutrient peak. As foods age, they begin to shed some of their essential nutrients. Fruits and vegetables especially have the highest nutrient content when they are ripest. Since canneries are located close to the point of harvest, few if any nutrients are lost in transit. According to a 1997 University of Illinois study and other recent studies, the canning process actually may help to enhance the nutrient profile of certain foods. According to the revised Recommended Dietary Allowances (2001), 1/2 cup of Canned Pumpkin, for example, contains over 600% of the Recommended Daily Intake of vitamin A, while the same amount of fresh pumpkin has only 143%. Other foods like canned beans have higher fiber content, and canned tomatoes contain significantly higher quantities of lycopene, an essential phytochemical, than fresh tomatoes.

The canning process was developed to preserve food safely and for long periods of time. Once a food is packed into a can, the can is heated to a temperature extreme which kills all known microorganisms. In addition, most processed foods are closely monitored, using a system called Hazard Analysis and Critical Control Point, or HACCP. A HACCP system identifies areas of potential contamination within the food process and builds check points to ensure that the highest possible safety standards are maintained at all times. Modern processors maintain close watch on the heating process, ensuring that the canned food that reaches the market is the safest possible product for the consumer.

THE SCIENCE OF CANS AND CANNING:

Pakistan as a developing country lacks many resources. Colonel Seafood as the pioneer company in canned seafood products in Pakistan buys its food grade cans rather than manufacturing or producing their own. Pakistan does not have any tin can producing industry or even a factory. The cans used by Colonel Seafood are bought from Malaysia and Thailand.

CANS AND TYPES:

The tins come in various shapes and sizes depending upon the requirement of the food that has to be preserved and canned. These food grade cans are either various pieces of low carbon mild steel electronically compressed into a tin or a single piece of low carbon mild steel deformed into the shape of a single pieced tin without any girdle.

Tins of highest quality are made of aluminum alloys usually single pieced. These are of highest demand as well. Other qualities include that aluminum alloy is harder than tin. It's cheaper than tin and it has a good appearance, good corrosion resistance. It is easy to open by ends light weighted and recyclable. These cans are pressure resistance as well during manufacturing.

THE CHEMISTRY OF NECKER:

Necker is the inside layer of tin can. The Necker of every can varies with the product that has to be canned in it. A type of can made for a particular food-type cannot be used for another food-type.

CONSTRUCTION OF CANS:

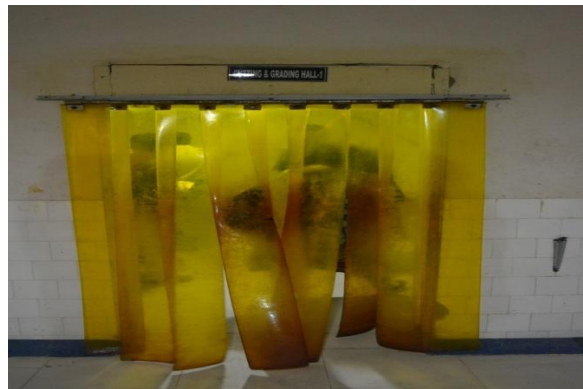
Metallic cans are in multitude of shapes and sizes. Three piece cans are manufactured from a rectangular piece of tin plate. These are cylindrical shape and joined along a vertical seam by welding or soldering or welding. Seaming is of single and double type where double seaming is costly. Two-piece cans are also made and it has a great benefit that they have no side seam and only one double seam thus reducing the risk of leakage that may arise from imperfect seam formation. Electron beaming is also used for welding purposes.

VISIT TO THE PLANT:

The blueprint of the plant shows various stages for the product to come to its final condition. Fish processing and canning is done step by step. Details are as follow:

1. **Fish Receiving:** Colonel Seafood is 100m away from the main jetty thus they receive fresh fish in ice boxes. Quality evaluations are performed during unloading, which include monitoring the temperature and condition of the fish. Fish found unacceptable are rejected and sent to fish meal processing.
2. **Storage:** Mostly fish is processed immediately or held frozen.
3. **Sectioning:** Sardines are placed into machines designed to mechanically remove the heads and entrails and, using suction, any remaining viscera. The fish are then flumed (conveyed in water) to the next processing step.
4. **Can Filling:** Empty cans are conveyed to filling tables after having been cleaned by being inverted and flushed with air jets and/or water sprays. Cans are then filled by hand with a prescribed number of sardines.
5. **Exhausting:** Filled cans are conveyed to an exhaust box where they pass through steam in order to heat the product; remove some of the natural liquid and better assure adequate can vacuum during sealing.
6. **Ingredient Addition:** Prescribed amounts of packing media and other ingredients, depending upon the pack style, are added to cans.

7. **Can Sealing/ Seaming:** Heated cans are conveyed to sealing machines where lids are put in place and the cans hermetically sealed. Each can or lid is affixed with a permanent production code that identifies plant, product date packed and other pertinent information. The integrity of the hermetic seal is evaluated at frequent intervals during processing to ensure product safety.
8. **Thermal Processing:** Sealed cans are retorted (cooked) under pressure utilizing process time and temperature schedules designed by processing experts to render the product commercially sterile. All aspects of thermal processing are strictly monitored and controlled.
9. **Finished Product Evaluation:** Samples of each finished production code receive qualitative (e.g., color, odor flavor, texture and cleaning) and quantitative evaluations prior to being released for labeling.
10. **Labeling & Casing:** Product lots meeting finished product evaluation criteria are labeled and cased. Cased products are appropriately marked with information necessary to facilitate product tracing.
11. **Warehousing & Shipping:** Cased products are shipped or staged in warehouses for later shipment.





CERTIFICATE DISTRIBUTION AND CLOSING:

Lt. Col. (R) Zahid Iqbal, Chairman of Colonel Seafood (Pvt.) Ltd. concluded the training at his processing plant. This was followed by certificate distribution ceremony. Students were appreciated for their active participation with certificates distributed amongst them. Prof. Dr. Shahnaz Rashid also thanked Lt. Col. (R) Zahid Iqbal, Chairman of Colonel Seafood (Pvt.) Ltd. to welcome her students at Colonel Seafood.





OFF THE HARBOR:

The junior research scholars were then taken out for boating to observe the Korangi Creek and vicinity where the harbor is situated. The surroundings were covered with mangroves specifically *Avicenna marina*. The average depth of the creek is 30 meters. A few seabirds were also observed. The waters were calm. Various buoys were also observed. Students enjoyed and learned at the same time. A lot of clicks were taken and moments were captured.



MEETING THE DIRECTOR:

The students were arranged to meet the Managing Director of Korangi Fish Harbor Mr. S. M. Tariq who warmly welcomed students and guided them professionally. His reviews about the Korangi Fish Harbor were as follow:

The harbor is in a take-off position and the auction hall would be made operational within a year. Six fish processing units and an ice factory have been set up at the harbor whereas process is under way to set up four more processing units. Right now, the auction hall is being used by a Korean company. The Karachi harbor, he said, had miserably failed to deliver and plans had been made to make the Korangi harbor to serve as the EU export zone. Illegal hydrants, he said, had been hampering water supplies for a long time despite operations by law-enforcement agencies. Replying to a question about taking fishermen on board, he said the harbor management had held many meetings with fishermen using the main harbor but they had declined to come.

CONCLUSION:

Centre of Excellence in Marine Biology in association with Colonel Seafood (Pvt.) Ltd. and Korangi Fish Harbor concluded the One-Day Course Training organized for Junior Research Fellows. It was a platform of awareness for the young scientists to understand the seafood industry of Pakistan.

