Course Name: Canning Technology and Value Addition in Seafood
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Week:8
Lecture:30

Quality standards for seafood value added products - Part 2

Welcome back to the NPTEL course, Canning Technology and Value Addition of Sea Foods. In this section, we'll discuss about the quality standards for sea food and value-added products developed from sea foods. In the previous class, we discussed the importance of rules and regulations in ensuring safe and hygienic food, emphasizing their link to health. We also distinguished between acts, regulations, rules, and laws. Compliance with these regulations is mandatory to ensure access to healthy food and promote a healthy life. Now, turning to food laws and regulations, national legal frameworks are a crucial pillar of an effective food control system.

As we all know, food is a primary commodity traded globally. Unlike other goods, food is exchanged worldwide. Therefore, it's necessary to maintain its quality and safety. Even as we extend shelf life, preserving nutritional quality is essential. Each nation has its own legal frameworks to control and ensure food quality maintenance.

A control system is essential in the food sector. Many national governments have established complex laws and regulations that food chain operators must adhere to in order to ensure food safety and quality. This responsibility extends beyond operators to anyone involved in the food sector, including those in raw material production, processing, distribution, and consumption. However, regulations and requirements vary from country to country. What is followed in India may differ from regulations in European countries or the United States. Therefore, regulations are subject to change.

The term "food law" applies to legislation regulating the production, trade, and handling of food. It covers the regulation of food control, safety, quality, and relevant aspects of food trade across the entire food chain, from the provision of animal feed to the consumer. This legal framework also applies to animal feed, ensuring safety and quality. Legislation di that food processing, from farm to consumer, must adhere to regulations to guarantee food safety and quality retention. It mandates that nutritional quality parameters remain unchanged, allowing only minimal alterations. Furthermore, food law ensures that global food trade operates smoothly, unaffected by external factors or institutions. These aspects are all encompassed within food law.

The World Trade Organization (WTO) introduced two agreements during the Uruguay Round discussions, marking the first laws related to food safety and quality. These negotiations, initiated in 1986 and concluded in 1994, led to the formulation of two agreements: the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) and the Agreement on Technical Barriers to Trade (TBT Agreement). These agreements mandate adherence to SPS measures and TBT standards for ensuring food safety and quality in international trade. They succeeded the GATT agreement and play a crucial role in regulating the safety and quality of traded food products.

The World Trade Organization established two agreements: the SPS Agreement, which addresses sanitary and phytosanitary measures, and the TBT Agreement, which focuses on technical barriers to trade. The SPS Agreement pertains to chemical or biochemical aspects of food safety, while the TBT Agreement ensures harmonious trade relations and resolves conflicts between countries or in trade practices.

Now, regarding the Sanitary and Phytosanitary Agreement, also known as the SPS Agreement, it affirms the right of WTO member countries to implement measures safeguarding human, animal, and plant life and health. These measures utilize internationally accepted risk assessment techniques, aiming to prevent risks to human, animal, and plant health. Member countries of the WTO adopt these international assessment techniques and formulate their own measures accordingly. This agreement prohibits unjustifiable discrimination in trade between countries. The WTO was established during a period of increasing global trade, with a primary focus on ensuring smooth trade relations. While emphasizing food safety and quality, its main objective remains uninterrupted trade. Therefore, the Sanitary and Phytosanitary Agreement also ensures non-discriminatory trade practices among countries.

One country being given priority over another, or discrimination between countries, is avoided through this agreement. WTO members base their national measures on international standards, guidelines, and other recommendations adopted by the Codex Alimentarius Commission (CAC) after the Sanitary and Phytosanitary Agreements were established. The CAC, also known as Codex Alimentarius Commission, sets regulations and standards for all exported items or products involved in trade. These regulations and standards are documented in the Codex, which we regularly adhere to. The WTO committee on SPS measures includes representatives from the CAC, the International Office of Epizootics, and the International Plant Protection Convention. Representatives from these organizations contribute to harmonized trade practices, ensuring cooperation among various bodies involved. The International Office of Epizootics focuses on animal health, while the International Plant Protection Convention concentrates on plant health. The Codex Alimentarius Commission primarily addresses food aspects related to human health. These three bodies collectively contribute to the agreement, each focusing on their respective areas.

Now, regarding the TBT Agreement, it ensures harmony in trade relations. TBT prohibits members from using technical regulations or standards to protect domestic industries from foreign competition. Essentially, the agreement discourages favoritism towards specific products from particular countries in trade. Instead, it promotes an open trade environment where products from any country can participate freely. Any disputes arising must be negated, including labeling disputes or testing procedures, ensuring transparency in labeling and product declaration. This ensures complete harmony in trade, allowing products to be sold in any country without discrimination.

Regarding WTO agreements relevant to fisheries, aside from the SPS Agreement and the TBT Agreement, there are additional agreements on subsidies and countervailing measures, import licensing procedures, anti-dumping, rules of origin, dispute settlement, and tariff reduction. For example, the anti-dumping agreement addresses situations where economically important species are caught along with low-value fishes, which are then dumped at sea. Dumping anything into the sea pollutes the environment, so the anti-dumping agreement was designed to prevent such practices.

Likewise, we have other agreements. Now, this also says that international organizations recognized by SPS agreement as reference points. We have seen this earlier in the previous slide. We have organizations dealing with animal health and animal life or the World Organization for Animal Health, Plant Health International, Plant Protection Convention, then human health CODEX, that is CODEX Alimentarius Commission, which is an international organization formulated jointly by FAO and WHO. This organization concentrates mainly or deals mainly with the food products, their standards, and their quality.

The World Health Organization and Food and Agriculture Organization, these two organizations significantly contribute towards human health and hygiene. They have five key principles for food hygiene. The first one is to prevent cross-contamination of food with pathogens spreading from people, pets, and pests. So, there shouldn't be cross-contamination of food products. The second thing is to separate raw and cooked products. We should not keep raw and cooked products together because it will contaminate the cooked product. Cooked product is meant for eating. Sometimes, you eat immediately after cooking or you leave it in the fridge with some other raw materials and then have it later. This will transfer any contaminations or microbes from the raw material to the cooked material. Sometimes, you won't process this cooked material immediately. You'll have it after your office hours or at any other time, which might cause sickness or ill health.

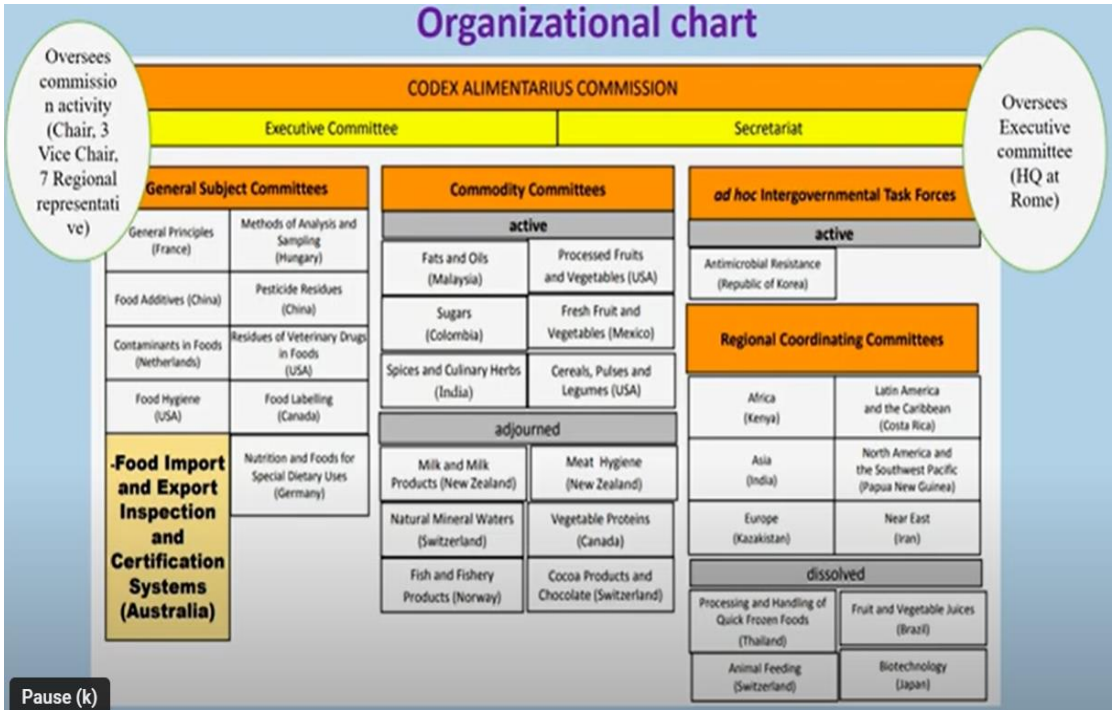
Now, cooking foods: you cannot cook food to any level of time or any temperature. There is a particular temperature for cooking food. For example, if fish is cooked at 70 degrees Celsius, the texture is maintained. Similarly, there is a specific length of time,

like one minute or so, for the time and temperature relationship to be maintained while cooking the food. This ensures that pathogens are killed.

Also, storage of food should be done at proper temperature. For example, cereals have a moisture content of 14%, and they should be stored in an airtight container. No moisture should enter into it. If moisture enters, the moisture content will increase, making it prone to pest infestations and infections. In the case of fish, if you're not going to consume it immediately, it has to be stored at a low temperature. The storing temperature should be either chilling temperature or freezing temperature. Temperature again plays an important role in storage. Additionally, the use of potable water is very important in processing. We use it regularly for washing, cleaning, and other purposes. We cannot compromise with the water quality; hence, we have to use potable water to ensure quality. Furthermore, the raw material is crucial because the end product depends on it. If the raw material is not in good condition, it will definitely lead to a spoiled product. Therefore, the quality of the raw material is also important here.

Now, FAO and WHO give scientific advice to Codex CAC, but they are not officially part of Codex; they only provide advice. They are separate bodies that offer timely advice to Codex, ensuring that good food is produced everywhere and available to everyone. CAC came into practice after 1962; it was created in 1963 by the joint FAO and WHO food standards program, Codex Alimentarius. It's an intergovernmental body with members from different countries, with almost 165 member countries involved in forming Codex. It is open to all UN members, and besides these 165 members, we also have members or observers from other organizations like international scientific organizations, food industry, food trade, and consumer organizations, who attend sessions regularly and give advice or suggestions to Codex. FSSAI is also an observer; sometimes, they provide advice, and FSSAI members also participate in these meetings. The primary objective of Codex is to ensure international food standards, setting up standards, guidelines, and codes of practice to contribute to safety, quality, and fairness in international food trade.

Codex is also concentrating on trade, ensuring fair trade. The agreement put forth by TBT also ensures safe and quality food. SPS agreement is also a concern for Codex. Codex Alimentarius Commission gives importance to both SPS and TBT agreements, with 99% of the world's population following it now, and more countries are joining Codex.



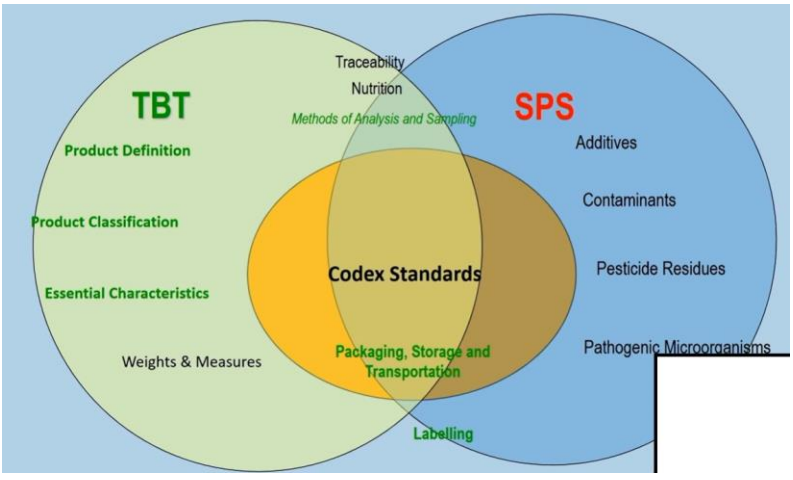
This is the organization chart of Codex: executive committee, secretariat, located in Rome, and nine general subject committees. On the left side, we have general principles in France. We have committees for food additives, contaminants, food hygiene, analysis, and sampling, among others. These committees' activities are managed by the executive committee, comprising a chair, three vice-chairs, and seven regional representatives. Initially, there were 12 committees for commodities, some of which were adjourned, like milk and milk products, meat hygiene, natural mineral waters, vegetable proteins, fish and fishery products, cocoa and cocoa products, and mixed with the active committees.

So, they were all put together, and a new one evolved which is like food. Under food, everything came, and then we also have ad hoc intergovernmental task forces and regional coordinating committees. Food import and export inspection and certification system is another part of the organization of Codex, which is called CC, Codex Committee on Food Import and Export Inspection Certification System. It ensures harmonized trade, whether bilateral or multilateral trade agreements, and supports food control system exchange of information, accreditation, inspection, certification, and monitoring. These are the activities involved in this committee: Codex Committee on General Issues covering general principles, method of analysis and sampling, food hygiene, pesticide residues; Codex Committee on Food Additives and Contaminants; Codex Committee on Import Export Inspection and Certification System; Codex Committee on Nutrition and Foods for Special Dietary Use, meant for nutraceuticals and functional foods; and Codex Committee on Residues of Veterinary Drugs for Food.

Now, we have different committees on general issues. These committees work together and formulate standards and regulations in these areas. According to their definition, food is any substance that can be used as processed, partly processed, or raw. Initially, we had separate committees for fish, milk, veterinary, which were adjourned. Now, we only have food, and anything that satisfies this definition falls under this category. Food hygiene will also include fish hygiene or fishery products hygiene. Food additives and contaminants discussions will also include fish additives or contaminants found in the fishery industry or sector. The demarcation has been removed, and anything that satisfies this definition of food—any substance that is processed, partially processed, or raw meant for human consumption—may include drinks, chewing gum, or any substance manufactured, prepared, or treated as food but does not include cosmetics, tobacco, or substances. If this definition is satisfied, then it can be included, so fish falls into this category.

Now, Codex legal tool, according to the standard, labeling is very important. Everything has to be labeled clearly on the pack: the name of the product, the scope of the product, its description, the ingredients being used, and the nutritional facts, meaning the calorie; percentage of different components. All these things need to be displayed clearly on the product; labeling is very important. Code of practices, guidelines, and recommendations are also other tools of Codex.

The achievements of Codex include 237 food standards, 43 codes of practice, and 33 guidelines. They have evaluated 197 pesticides and set limits for pesticide residues, with 3274 residue limits set. Veterinary drug residues in animals or food have been set at around 289 limits. Approximately 1300 food additives have been evaluated. If you look at the figure here, Codex is placed in the center, overlapping the area of SPS and TBT. It contains all the parameters of the SPS agreement or the TBT agreement. Codex comprises both aspects and gives importance to labeling, packaging, storage, transportation, methods of analysis, and sampling. Coming to fish and fishery products, we have the Codex committee, governed by Norway, called CCFFP. It is responsible for elaborating standards for fresh, frozen fish, crustaceans, and mollusks.



If you look into the details given here, you can understand that CCFFP gives more importance to fresh products, frozen products like frozen fish

products, crustaceans, and mollusks. There are also regulations for canned products such as canned shrimp, canned fin fish, other canned products, dried products, and smoked products. But most of the products are either frozen or fresh.

If you look at the figure here, you can see this is the website of Codex. If you go and search, you will find the standards for different fishery products. Here, you can find standards for quick frozen fin fish, canned fin fish, quick frozen blocks, fish sticks, crackers, salted fish, fish sauce, and fish oil. These are the only two products which are the value-added products, or the crackers, which are the value-added products, and smoked products. The last four are the value-added products where Codex has come up with standards, but most of the standards are limited to frozen products or fresh products. We have some limitations of standards in Codex also, and in due course, it will be continuously evolving possibly. If you look at the standards given here, you can distinctly find, if you click on the right side, the ticks are beautifully given. So EN stands for English, you click on the standards, and the ticks here are meticulously arranged. You can open this page and wonderfully understand the standards. It includes right from the collection of raw material till it reaches to the consumer, so all the parameters are comprehensively covered in this. It's intricately given in detail. Codex Alimentarius has also given the limits for all the standards, all the parameters, and these are vividly given in detail, which will be delightfully uploaded along with the study material.

So, in today's session, we have passionately discussed about the different bodies that are involved in setting up the rules and regulations. We have the WTO trade agreements, which gracefully evolved into Codex, and Codex is the main body which is ardently concentrating on the human health. So, they are giving utmost importance to food quality

and food safety from the human perspective. And with this, let's end the session for today.