A Policy Paper on Food Safety Implementation in Fish Processing Technology

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ABSTRACT
Food safety is vital in any fish processing activities. This paper aimed to determine how food safety be implemented in every fish processing activities and implemented this policy to the Local Government Units through Women's Cooperative as part of researcher’s advocacy. The application of coconut water into the chilled marinade solution of mullet chunks, chilled coconut water based brine solution as pre-treatment for processed sardines; and washing the anchovies with chilled brine solution as pretreatment prior to fermentation process are the technologies adapted by members of Poblacion, Sta. Fe Cooperative (POSTAFE), Cebu, Philippines and Women’s of Madridejos, Cebu, Philippines as basis on this policy formulation on food safety in fish processing technology observing the Good Manufacturing Practices (GMP) through proper hygiene and sanitation.

Keywords: food safety, policy, fish processing technology

INTRODUCTION
Food safety is everybody's concern, and it is difficult to find anyone who has not encountered an unpleasant moment of food borne illness at least once in the past year. Food borne illnesses may result from the consumption of food contaminated by microbial pathogens, toxic chemicals or radioactive materials. Ensuring food safety is becoming increasingly important in the context of changing food habits, popularization of mass catering establishments and the globalization of our food supply. As our food supply becomes increasingly globalized, the need to strengthen food safety systems in and between all countries is becoming more and more evident. That is why WHO is promoting efforts to improve food safety, from farm to plate (and everywhere in between) on World Health Day, 7 April 2015. The World Health Day 2015 slogan is: “From farm to plate, make food safe” (World Health Organization, 2015 accessed in http://www.searo.who.int/entity/world_health_day/2015/whd-what-you-should-know/en/).

Food safety should be applied to fish processing industries producing fishery products. In fish preservation, salting through brining is the preparatory step in fish handling, fermentation drying and processing. The salting process, including the temperature, should be sufficiently controlled to prevent the development of C. botulinum, or the fish should be eviscerated prior to brining. Salting of fish by brining should be carried out with full understanding of their effects on the quality of the final product and should be done under strict hygienic conditions and temperature control. Two particular conditions that can adversely affect the quality of salted fish are the occurrence of bacteria and mould. Both defects can be combated by maintaining a temperature lower than 8 °C. The quality of the salt is important, low temperature should be maintained during the process, and light and oxygen should be avoided (http://seafood.oregonstate.edu/pdfs%20Links/FAO-Codex-Alimentarius-Code-of-Practice-for-Fish-and-Fishery-Products.pdf).

The Cebu Technological University researchers are concerned on food safety, thus the application of coconut water into the chilled marinade solution of mullet chunks...
and processed sardines and washing the anchovies with chilled brine solution as pretreatment of fermentation process are the basis on this policy formulation on food safety in fish processing technology.

**Objective**

This paper formulated policies on food safety in fish processing technology particularly in the handling of marinated chunks, coco-enriched chilled brine solution as pre-treatment of processed sardines, application of chilled brine solution as washing preparatory steps in fermented anchovies producing fish sauce as stock solution of flavored fish sauce.

**METHODOLOGY**

This paper utilized the secondary data on the Good Manufacturing Practices (GMP) in handling coco-based marinated mullet chunks, coco-enriched brined processed sardines by sensory evaluation, and chilled brine solution used in washing as preparatory steps of fermented anchovies and enumerating the microbiological quality of the flavored fish sauce. Traditionally, qualities of foods are evaluated by our sensory organs – our eyes, nose or mouth more recently. Sensory evaluation is commonly practiced by food regulatory authorities, which consists of judging the quality of food by a panel of judges. The evaluation deals with measuring, evaluating, analyzing and interpreting the qualities of food as they are perceived by the senses of sight, taste, touch and hearing (http://www.compass-group.com/documents/FOOD_SAFETY_POLICY_STATEMENT_T_December_2012.pdf).

**RESULTS AND DISCUSSION**

The researchers/fish processors observed the Good Manufacturing Practices (GMP) to assure the food safety from farm to plate based on the succeeding researches conducted. The identified problems encountered during processing can be reduced by the food safety measures (Table 1).

**Processed fish products**

As revealed in Table 1, Macachor et al. (2015) utilized coconut water added to chillered brine solution for pre-treatment in marinated mullet, *Mugil cephalus* and chunks. This is a method of producing marinated mullet, *M. cephalus*, and chunks for enhancing the color, flavor, odor and texture containing coconut water. The method of producing marinated mullet chunks started with washing of the mullet with chilled water containing 10% salt solution to remove the blood and other foreign residues, then, while soaking it with chilled salt solution, fill the mullet and cut into chunks; soak the chunks in the marinade solution with 50% coconut water for three hours at chilling condition (UM Registration No. 2/2014/000712, 29/05/2015). This technology was applied as pretreatment step prior to the application of salt in dry-salted sardines and prior to the steaming step in processed sardines. The quality of coconut water enriched brined dry-salted sardines and processed sardines technology were transferred to the extension beneficiaries of Sta Fe and Madridejos, Cebu in collaboration with the Department of Trade and Industry, Cebu Province, Philippines and found out that the finished product has superior sensory qualities.

**Fish sauce from small anchovies**

Plete-Macachor (2002) formulated fish sauce with the washing application of chilled brine solution as a preparatory step in the fermentation process using 15% salt added to fresh small anchovies (*Engraulidae* spp) and this produced a good quality fish sauce after approximately two months of the fermentation period. The fish sauce has descriptive results of light brown in color, moderately salty flavor, fishy odor and a slightly soft texture. The microbial results revealed an aerobic plate count of 100 cfu/g, *Escherichia coli* of 1.8 MPN/g, *Staphylococcus aureus* of 10 cfu/gram, absence of *Salmonella* and *Shigella* with sample pH of 4.5. The sample had a proximate composition of 84.4% moisture content, 4.83% protein content, 3.4% salt content and 8.8% ash content. This fish sauce was utilized as stock solution for the formulation of flavored fish sauce by Renissa S. Quinones and Corazon P. Macachor, UM Registration No. 2/2010/000550, 02/14/2011).

**POLICY FORMULATION**

All of us at Cebu Technological University have moral obligation to formulate fishery products that are safe for human consumption from farm to plate. Prior to fish products formulations and process innovation, Good Manufacturing Practices (GMP) shall be strictly observed by personal hygiene and food laboratory sanitation. Our primary concern is that, the research outputs of the university like coconut water-based chilled marinated mullet chunks and coconut water enriched chilled brine solution as preparatory steps in producing dry-salted sardines and processed sardines and application of chilled brine solution for washing the fresh small anchovies for fish sauce production is prepared to the very highest standards and comply the approved codes of practice. To ensure best practice in fish handling using chilled brine solution with coconut water should be used and this were already
Table 1. The food safety measures of fish processing fish and other fish products.

<table>
<thead>
<tr>
<th>Products</th>
<th>Problem</th>
<th>Food Safety Measures</th>
<th>UM Registration/ Extension Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marinated mullet (<em>Mugil cephalus</em>) chunks</td>
<td>High in fat content</td>
<td>Washing the fresh mullet with chilled sea water enriched with coconut water</td>
<td>UM Registration No. 2/2014/000712, 29/05/2015</td>
</tr>
<tr>
<td></td>
<td>Soft texture of marinated chunks</td>
<td>Soaking the fresh mullet chunks in marinade with coconut water made the marinated chunks firm in texture</td>
<td></td>
</tr>
<tr>
<td>Dry-salted sardines (<em>Sardinella spp</em>)</td>
<td>Itchy flavor and soft texture dry-salted sardines</td>
<td>Washing and Soaking with chilled sea water enriched with coconut water resulted to firm and tasty dry-salted salted sardines</td>
<td>POSTAFE, Sta. Fe, Cebu</td>
</tr>
<tr>
<td>Processed sardines in oil and in tomato sauce</td>
<td>Soft textured processed sardines</td>
<td>Washing and Soaking with chilled sea water enriched with coconut water resulted to a very tasty and firm processed sardines</td>
<td>MAFFA, Madridejos, Cebu</td>
</tr>
<tr>
<td>Fermented Small Anchovies</td>
<td>Spoiled Fermented Products</td>
<td>Washing the small anchovies with chilled seawater and soaking the washed fish with 15% chilled brine solution produced a good quality fish sauce and served as stock solution for flavored fish sauce.</td>
<td>UM Registration No. 2/2010/000550, 02/14/2011</td>
</tr>
</tbody>
</table>

practiced by the fish processors beneficiaries at Sta Fe and Madridejos, Cebu in collaboration with the Department of Trade and Industry (DTI), Cebu Province, Philippines. These are based on proper fish processing practices to assure our clients and customers that we are providing fish products which is safe to eat while meeting their quality expectations. Specifically, we will require that: Fresh fish is always washed with coconut water enriched chilled brine solution by the fish processors observing good manufacturing practice (GMP) that do not expose it to the risk of contamination. All fish processors are provided with training and tools necessary to do their job in a hygienic manner. All processors comply with food safety policies and procedures especially observing proper packaging in marketing dried products.

It is my responsibility as Accredited Fish Expert/Resource Speaker of the Department Trade and Industry (DTI), Cebu Province to ensure that the appropriate resources are committed towards implementing this policy across all our operations and communicating our policies and standards to all our fish processors.

REFERENCES


Quinone RS, Macachor CP (2011). Flavored Fish Sauce. UM Registration No. 2/2010/000550, 02/14/2011.


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