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Processing of Frigate Mackerel *Auxis thazard*: Post-harvest Gender Roles

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Abstract

In Danao City, Philippines, processing of tinap-anan, or hot smoked frigate mackerel (*Auxis thazard*), is the main livelihood of about 30 fish port vendors. This is a tasty foodstuff with a shelf life of three days at ambient temperature and five days if refrigerated. In 2005, research on histamine levels in tinap-anan found that the product, when processed using traditional methods, would be safe for human consumption if properly handled. In June to December 2010, the roles of women and men in the different stages of producing a safe product were studied. The processors were the offspring of the traditional processors. Eighty-two percent of the present processors were female and 18% were male. Women marketed the product through retail stores and direct selling. The men caught the fish, were responsible for assuring quality at sea, and purchased raw materials from fish ports. Men delivered the processed tinap-anan to restaurants outside the fish port while women delivered it to restaurants inside the port.

Introduction

The Philippines is one of the top fish producing countries in the world. Over 1.5 million people depend on the fishing industry for their livelihood. The Philippines is also considered a major tuna producer in the Western and Central Pacific Ocean (WCPO). Tuna is one of the top export fishery commodities and its products are exported fresh/chilled/frozen, smoked/dried and canned. Most of the Philippine municipal tuna catch (110,295 tonnes of oceanic tunas in 2008) is landed as wet fish at thousands of landing sites all over the Philippines. Much of the municipal catch is processed by drying, salting and smoking (Barut and Garvilles, 2009).

The commercial fisheries catch in 2003 comprised: small pelagics (59.6%), tunas (36.2%) and demersal fishes (4.2%) (BFAR, 2005). Post-harvest support facilities that provide access to salt, ice and cold storage are lacking in strategic locations in many areas. Espejo-Hermes (2004) noted that around 70% of the total catch was consumed fresh or chilled, while 30% was processed into cured, canned or frozen products. The bulk of cured fish and fishery products are consumed locally, and processing into traditional products, such as salted, dried, smoked and fermented fish is still widely practiced. These products are mainly produced where there is a guaranteed supply of raw material.

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The processors are generally small-scale, family establishments that have limited capital and do not receive assistance from government agencies and financing institutions. The processing methods they employ vary considerably, resulting in inconsistent quality and limited shelf-life of finished products.

One fishing port for landing tunas is Danao City, Cebu, Philippines. In the 2007 census, it had a population of 109,534 people. Approximately 30 households in Danao City depend on smoke-curing tunas as their chief means of livelihood. Bahian (2005) studied the processing of frigate mackerel (*Auxis thazard*), a member of the Family Scombridae that includes tuna, and determined the histamine level of smoked frigate mackerel. This study found that if fresh frigate mackerel is processed immediately, the hot-smoked product is safe. If frigate mackerel is kept at ambient temperature for one hour before smoking, eating the product leads to detectable itchy sensations. The histamine level of frigate mackerel smoked after one hour at ambient temperature was 11.12 $mg \cdot 100\ g^{-1}$ sample or 111 ppm, higher than the recommended safe level of 10 $mg \cdot 100\ g^{-1}$ sample or 100 ppm (Huss et al. 2003).

The present study was conducted in 2010 to investigate the roles of women and men in the processing of smoked frigate mackerel in Danao City.

Methods and Findings

A gender role questionnaire was prepared, based on one developed by Lolita V. Villareal and Jeremy M. Turner (Villareal and Turner, 2004). It was administered by Cebu Technological University (CTU) researchers to 30 smoked frigate mackerel processors engaged in processing in Danao City. Of the processors interviewed, 25 (83%) were women and 5 (17%) were men.

Respondents Backgrounds

Of the female respondents, 22% were aged 50-59 years, 17% were 40-49 years, 22% 30-39 years, 13% were 20-29 years, and one was below 20. Eighty-four percent (84%) of the respondents were married, 96% were literate, and 96% practiced the Roman Catholic religion. All were Cebuanos. Sixty percent of the female respondents were married, with children from ages one to nine and 25% were nursing mothers. With respect to family planning, 83% were aware of the methods and practiced family planning; 75% of the nursing respondents currently used family planning methods.

Eighty percent of the fathers of respondents were *tinap-anan* producers. The technology of *tinap-anan* processing was therefore largely acquired from their parents.

Work/Occupation

All female respondents processed frigate mackerel as their main occupation. Marketing and part-time utility work in the fish port were subsidiary occupations for the women (Table 1). The male respondents were fishers, for whom processing fish and marketing the processed fish were subsidiary occupations. Fifty percent of the respondents had processed frigate mackerel as their means of livelihood for the past 25 years and, as mentioned above, most had transferred the craft/technology to their children.

Table 1. The main and subsidiary work/occupation of the respondents.

Work/Occupation	Main		Subsidiary	
	No. Women	No. Men	No. Women	No. Men
Fishing in the open sea	0	5	0	0
Fish Marketing	0	0	25	1
Fish Processing	25	0	0	2
Service sector employee	0	0	0	2
Total	**25**	**5**	**25**	**5**

Survey respondents typically worked 40-48 hr wk^{-1} on their main occupations, as fishermen or fish processors, and 8-15 hrs wk^{-1} on their subsidiary activity, mostly marketing *tinap-anan*. The women who processed *tinap-anan* as their main occupation and marketed fish as their subsidiary work, performed both tasks within the same week. The CTU researchers found that women processors processed *tinap-anan* immediately after obtaining it from the fishing boats near the fish port.

Gender Roles

Table 2 summarizes the roles of women and men in the *tinap-anan* industry of Danao City fish ports. The male respondents were the fishers who caught the frigate mackerel and supplied the fish to the Danao fish port. The men cleaned and sanitized the paraphernalia used for fishing and storing their catch. They also equipped their boats with sufficient ice to hold their catch at the appropriate temperature. Men's roles also included purchasing fish for smoking, smoking fish, and transporting processed *tinap-anan* to restaurants outside the fishing port.

The female respondents who processed fish also performed two additional roles. They were port fish samplers, selecting individual fish for processing, and also fish handlers, transporting the fish from the fish port to their workplaces. Typically, the female processors marketed their product through retail stores and by direct selling inside the fishing port area.

Table 2. The roles of women and men in the *tinap-anan* industry of the Danao City Fish Ports.

Men	Women
Fishing	
➢ Fish as crew on local vessels ➢ Boat cleaning, sanitizing, repairs and maintenance ➢ Fishing gear maintenance and construction ➢ Proper fish handling and delivery to shore	
Processing	
➢ Purchasing and icing fresh frigate mackerel ➢ Hot-smoking cleaned frigate mackerel into *tinap-anan*	➢ Port samplers ➢ Observe proper icing of fish ➢ Preparing fish for processing and proper application of chilled brine to fish ➢ Hot-smoking cleaned frigate mackerel into *tinap-anan*
Marketing	
➢ Delivering processed *tinap-anan* to restaurants	➢ Marketing processed *tinap-anan* on a retail or wholesale basis to restaurants situated on the 2nd floor of the fish port

Women dominated post-harvest processing of *tinap-anan*, marketing the product in the fish port, and ensuring product safety for human consumption. Men dominated fishing, fish handling, and ensuring fish quality. They also transported fish to restaurants outside the fish port. The women's and men's roles were complementary and important to product quality at different stages from capture to consumption.

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