

Production and Acceptability of Sea Urchin Bagoong

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Abstract - Bagoong production is potential export industry in the Philippines concentrated in Lingayen, Pangasinan. The municipality was labeled as the best place for bagoong making because of its perfect composition of salt humidity in air. The paste is produce using several varieties of fish such as galonggong, tamban, padas, sapsap and monamon. However, because of the decreasing number of fish caught in the waters of Pangasinan is not enough to support the increasing demand of market. Thus, there is a need to use alternatives for bagoong making.

Sea urchin industry is a growing market in Bolinao, Pangasinan because of its availability due to management plan of the municipality to sustain its number. The research used sea urchin as raw ingredient instead of fish for the production of fish paste. However, three formulations were made to identify the best preparation of the sea urchin bagoong. It was found out that the Formulation 3 which has three cups of salt and one kilogram of sea urchin had the highest acceptability descriptive rating. Moreover, there was no significant difference among various formulations and the control indicating that the sensorial characteristics used to measure its acceptability were similar to the commercially produced bagoong. However, there was a concern on the smell of the sea urchin paste. Nevertheless, its taste was perceived to be similar compared to bagoong-isda.

Keywords:Bagoong, sea urchin, acceptability, sensorial characteristics, fish paste

INTRODUCTION

Fish paste or *bagoong* is a popular condiment in the Philippines which is part of most of the native dishes in the country. It is considered as one of the basic necessities for most Filipinos especially those in Pangasinan and in the Ilocos Region. Further, it is one of the established industries in Region I which made it a good export commodity [1], [2].

Moreover, bagoong making is a thriving industry of the town of Lingayen, Anda, Bani, Infanta, Bolinao and Binmaley[3]. There are 65 registered operators of bagoong plants with a combined production of approximately 659 metric tons in 1974. Lingayen has the most number with 32 out of the 65 manufacturers present [4]. The municipality of Lingayen is hailed as the best place for *bagoong* production because of its perfect composition of salt humidity in air [4].

Pangasinanbagoong producers use several fish species for the substrate like *galonggong*, *tamban*, *padas*, *sapsap* and others. Currently, they are not using *monamon* (anchovies) because they claim that this species is quite expensive although it is most

preferred by the Pangasinanbagoong producers because of the better taste of the fish sauce. Bagoong does not only add flavor to certain dishes, but also a good low-cost source of protein including mineral salts, Vitamin A, calcium and niacin [2].

Also, because of the depletion of fish particularly anchovy in Pangasinan most of these industries opted to secure fish from neighboring provinces. In the Philippines, the use of sea urchin as a food resource, although, considered on its rising stage, is considered as resource enhancement tool to address the severe depletion of the resource due to excessive gathering of wild stocks [6]. Moreover, Juinio-Meñes [7] compared the utilization of sea urchin in Nalvo, Sta. Maria, Ilocos Sur and Bolinao, Pangasinan. Results of their study showed that in Nalvo, sea urchins are a regular part of the local diet or sold whole at the local market; while in Bolinao, sea urchins are harvested primarily for export in which gonads are shucked from whole urchins and marketed fresh or in brine to local buyers for Manila-based exports. In addition, as

cited by Juinio-Meñes, et.al. [8], Namisato in 1974 indicated that fishery for sea urchin is rapidly expanding in many countries because of its nutritional value which includes glycogen, carotenoids, alanine, valine, glycine, methionine, and glutamic acid. Likewise, it was mentioned that a 100-gram portion of sea urchins, contains 172 calories and very little fat. The fat present contains almost all unsaturated fat particularly omega-3 fatty acids, which can help lower blood pressure and reduce the risk of an abnormal heart beat [9].

Currently, a project is implemented in Bolinao, Pangasinan on community-based sea urchin (*Tripneustes gratilla*) grow-out culture as a resource management tool formulation of an alternative approach management integrating culture technology and local community participation. This project focuses on family/village-managed reproductive reserves in the form of sea pens or cages where juvenile sea urchins can be grown and selectively harvested to address the pressing issue of impeding depletion. The objective of the research is to produce and determine the acceptability of sea urchin *bagoong*. Specifically it is endeavored to identify the level acceptability of the *bagoong* in terms of appearance, aroma, taste and color of various formulations prepared.

MATERIALS AND METHODS

Research Design

The research implemented experimental and descriptive research. Various formulations of *bagoong* using sea urchin were prepared and determined their acceptability using a score card following the 5-Hedonic scale.

Preparation of Various Formulations

Standard procedure in making *bagoong* [3] was followed however, sea urchin was used instead of fish. The sea urchin meat were bought from Bolinao, Pangasinan Php 100.00 per kilo last December 2013. Ice floatation was used for transportation of the bought sea urchin from Bolinao to Nutrition and Dietetics Laboratory. Also the amount of salt per formulation was modified. For Formulation 1 (F1) contained 1 cup of salt and 1 kilogram of sea urchin; Formulation 2 (F2) had 2 cups of salt and 1 kg of sea urchin *bagoong* and lastly Formulation 3 (F3) had 3 cups of salt and 1 kg of sea urchin. A commercially produced *bagoong* for export sold in Pangaspisan Sur,

Lingayen, Pangasinan was used as a comparison for the determination of the sensorial characteristics of sea urchin *bagoong*.

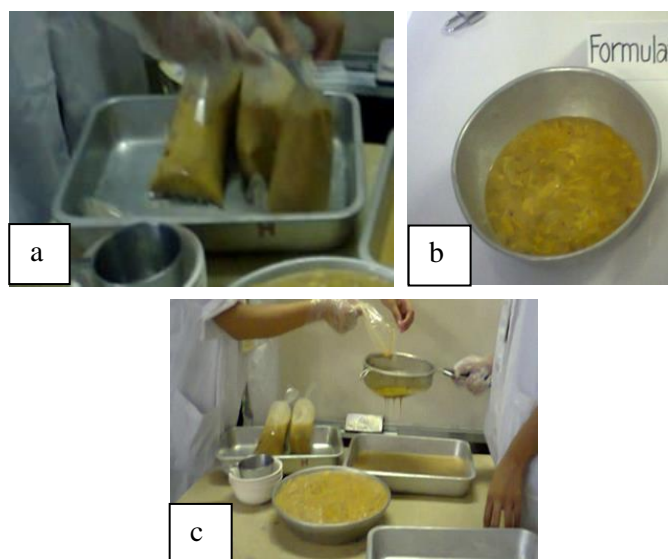


Figure 1. a. Actual sea urchin “meat” bought from Bolinao, Pangasinan; b. Appearance of the sea urchin “meat” prior to straining; c. Straining of the sea urchin mixture leaving the “meat” ready for *bagoong* preparation

Determination of Acceptability of the Various Formulations

Score card following the Five-Point Hedonic Scale was used to determine the acceptability of the various formulations. The following arbitrary weights with the corresponding values descriptive values were 5-Extremely Acceptable; 4-Highly Acceptable; 3-Moderately Acceptable; 2-Fairly Acceptable and 1-Not Acceptable.



Figure 2. a. Sea urchin *bagoong* after 2 months of fermentation; b. Interview with respondents for validation and feedback.

Statistical Treatment

Average Weighted Mean (AWM) was used to determine the best formulation. Moreover, Analysis of Variance was used to determine if significant difference was present in the level of acceptability of the various formulations.

Respondents of the Study

37 BSND students, three Non-BSND students and one faculty member of ND Department of Pangasinan State University, Lingayen Campus evaluated the various formulations of sea urchin bagoong. The respondents were interviewed after tasting the various formulations to validate their answers in the scorecard.

RESULTS AND DISCUSSIONS

Acceptability of Various Formulations of Sea Urchin Bagoong

Based on the sensorial characteristics appearance, aroma, taste and color, Formulation 3 which has 3 cups of salt and 1 kilogram of sea urchin had the highest average weighted mean followed by Formulations 2 and 1 making Formulation 3 as the best formulation with the total average weighted mean of 4.47 with a corresponding description of highly acceptable. Among the various formulations, Formulation 3 has the closest salt-to-fish ratio with the standard recipe for *bagoong* making which is 1 salt is

to 3 fish ratio thus possibly had the highest total average weighted mean among the sea urchin bagoong. It was mentioned that salt affects the activity of microorganisms as well as the action of the enzymes present in the fish. Salt is commonly used as a food preservative. However, too much salt prevents the action of bacteria and enzymes in any food. Thus, material, causes a longer time for the fermentation on aging of *bagoong*, and slows down the formation of a pleasant flavor. A salt to-fish mixture of 1 part salt to 2 parts fish (1:2 ratio) or 2 parts salt to 3 parts fish (2:3 ratio) was found as too much salt. Under these ratios, the aging time took from three to six months [10]. Furthermore, ANOVA shows that there is no significant difference in the acceptability of the various formulations and the commercially produced *bagoong-isda*.

However, based on the interviews with the respondents, they had issues on the smell of sea urchin *bagoong* which were described to have foul odor as compared to the commercially bought *bagoong*. Although it was mentioned that the smell was tolerable, but it was not as the exceptional and distinct smell of *bagoong-isda* possibly because of the variation in the enzymes present among echinoderms and fishes. Therefore, there is the need for the creation of process for the elimination or reduction of the foul smell of sea urchin *bagoong* although it has high potential as an alternative for *bagoong* production.

Table 1. Average Weighted Mean of the Acceptability of Various Formulations of Sea Urchin Bagoong Based on Sensorial Characteristics Appearance, Aroma, Taste and Color

Formulations	Appearance	Aroma	Taste	Color	Descriptive Equivalents	Ranking	
		AWM	AWM	AWM			TWM
Formulation 1	4.08	3.74	4.46	3.9	4.05	Highly Acceptable	3
Formulation 2	4.22	4.01	4.27	4.22	4.18	Highly Acceptable	2
Formulation 3	4.51	4.31	4.39	4.66	4.47	Highly Acceptable	1
Bagoong-isda (Commercially produced)	4.73	4.81	4.6	4.8	4.74	Highly Acceptable	

CONCLUSIONS

The formulated sea urchin bagoong has highly acceptable descriptive rating which implies a potential market for sea urchin industry. The best formulation was Formulation 3 which has 3 cups of salt and 1 kilogram of sea urchin meat

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