Utilization of Paros (Soletellina diphos) Meat Extract in Sauce

Reyma P. Albaladejo[1]
[1]Capiz State University - Pilar Satellite College

ABSTRACT

Soletellina is a genus of bivalve mollusks in the family Psammobiidae commonly known as sunset and Tellen shells; sunset and gari clams (www.issc.org/consumerinfo/clams, 2008) and locally called in Pilar (Capiz) as Paros. They are sold in the market fresh, unshelled and shelled and processed by salting. Salted paros or bagoong is a popular "pasalubong"or a "pabaon" item to guests and relatives of Pilareños.

Due to limited technology of processing Paros into other food products, this study ventured on the utilization of paros meat extract into sauce to determine the acceptability of the product in terms of its sensory qualities as to appearance, flavor, consistency and general acceptability.

The experiment was in a single factor at Complete Randomized Design with five treatments replicated three times. There were fifteen selected experts' panel evaluated the product using a Score sheets in a Hedonic 9 point scale.
The data gathered were statistically computed through means, interpreted and analyzed using Analysis of Variance (ANOVA). Significant difference among treatments was determined by the Least Significant Mean Difference (LSMD) Test.

Results revealed that Paros sauce with 1,250 grams of paros meat extract was the most acceptable in terms of appearance, flavor, consistency and general acceptability. Significant differences among treatment on the flavor, consistency and general acceptability of the product as affected by varying levels of Paros meat extract used per treatment. A 200ml bottled paros sauce has a total energy value of 119kcal/200grams. T The amount of paros meat extract used in the mixture varies the cost and yield of the product. Paros sauce as a product has the potential for commercialization that could compete commercially with the existing products in the market.

Keywords: processing, seasoning, proximate analysis

Corresponding author: Reyma P. Albaladejo
Address: Capiz State University-Pilar Satellite College, Pilar, Capiz, Philippines
E-mail:

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INTRODUCTION

The Philippine seas, bays, estuaries, and other sheltered coast are rich with major marine species and minor aquatic resources that are potential sources of food. Among these are mussels, oysters, clams and other shellfishes.

These clams are also abundant in Panay Island; Aklan and province of Capiz (Laureta, 2008).The province of Capiz has an abundant source of marine and aquatic resources from its seas, rivers and inland fishes (Socio Economic Profile of Capiz, 1989). Pilar is one of the coastal municipalities in the province of Capiz. Fishes and shellfishes are considered a source of livelihood of costal dwellers. Different fishing gears for catching fishes and digging edible mollusks are used. Fishing is the main source of livelihood and clamming is an alternative source during increment weather. Some housewives venture on clamming to augment family income.

Clams are mollusks with two hinged shells (bivalves) which filter their food from the surrounding water and are buried in mud or sand in shallows of both fresh and salt waters. Soletellina a genus of bivalve mollusks in the family Psammobiidae commonly known as sunset and Tellen shells; sunset and gari clams (www.issc.org/consumerinfo/clams, 2008) and locally called in Pilar (Capiz) as Paros. There are about 14 species of the genus Tellena found in the Philippines, all of which are used as food (http://www.biodiversitylibrary.org.2011). The usual size of most abundant species is about 6 to 8 centimeters. (Laureta, 2008).

Clams, like other bivalves, are high in omega-3 fatty acids, a rich source of potassium and are relatively low in calories (www.issc.org/consumerinfo, 2008). They are low fat, high protein seafood with an average amount of healthful minerals such as selenium, zinc, iron and magnesium and B vitamins like Niacin.(http;//sharecare.com, Retrieved: 12/26/14.)

In other countries, clams are cooked into curries and side dishes. Some are often used as an ingredient of mixed seafood dishes, or eaten together with pasta. In Capiz, specifically in Pilar, Paros sold in the

market fresh, unshelled and shelled and processed by salting. Salted or bagoong is a popular "pasalubong"or a "pabaon" item to guests and relatives of Pilareńos.

Due to limited technology of processing Paros into other food products this study ventured on the utilization of paros meat extract into sauce which has the potential for commercialization that could compete commercially with the existing products in the market.

Results of this study may benefit the public specifically the Paros clammers that their income will be augmented by collecting Paros for processing. Clammers and non- working housewives in the locality that will be interested in processing Paros can venture

in small scale enterprise. Other interested persons or individuals like teachers, students, entrepreneurs, and business minded individuals and non-professionals can process and develop Paros shell meat into one of the demandable products in the market. Processing of Paros shells will increase the local government's income of the barangays where Paros is abundant. Most importantly to the researcher and a product processor that will give pride and honor to the university with this product innovation.

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MATERIALS AND METHODS

The acceptability of Paros meat extract used in sauce-making was evaluated by 15 experts' panel using a Hedonic Scale Score Sheet. Panels' ratings in terms of the degree of likeness or dislikeness for a given sensory qualities of Paros sauce were indicated by descriptive words on the scale.

Experts' panel was composed of three Home Economics major teachers of Pilar Elementary School, one Technology Livelihood Education teacher of Marciano M. Patricio National High School, three Home Economics major teachers of San Nicolas Elementary School, one BSHRM faculty of CapSU Pilar Satellite Campus, a canteen in-charge of CapSU Pilar Satellite Campus, four restaurant owners and caterers, and two chefs.

They were informed personally by the researcher that they were included in the list of experts to evaluate the product. Product samples were personally delivered by the researcher to the panel as per replication.

Testing of the products was done and replicated three times. A salad container and a spoon were used in product sample tasting. Drinking water was also provided after each sample tasting to avoid bias in evaluating the flavor of the product.

Proximate Analysis of Paros sauce as food product was done to determine the moisture, ash, crude protein, total fat, carbohydrate, and energy value. This was done at the Department of Science and Technology Laboratory, Iloilo City.

A single factor experiment in a Completely Randomized Design (CRD) was used. There were five treatments replicated three times. The five treatments used were as follows: TA- 1, 500 gram Paros meat extract, TB- 1,250 grams Paros meat extract, TC- 1,000 grams Paros meat extract, TD-750 grams Paros meat extract, and TE-500grams Paros meat extract.

Paros sauce was evaluated according to its sensory qualities such as appearance, flavor, consistency, and general acceptability. Each characteristic was assigned a corresponding weight and score using the 9-point Hedonic scale.

After the evaluation of Paros sauce as a product, the score sheets were gathered, tallied and summarized for computation. The weighted mean was used to determine the level of acceptability of Paros sauce as a product in terms of appearance, flavor, consistency and general acceptability. Significant differences among treatments were computed using Analysis of Variance (ANOVA) or F-test in one-way classification. To further test the significant differences among treatments, the Least Significance Mean Difference (LSD or LSMD) test was computed.

RESULTS AND DISCUSSIONS

The weighted means in computing the level of acceptability in terms of appearance of Paros Sauce as a food product is shown in Table 1. Treatment B which used 1,250 grams of Paros Shell meat extract obtained the highest acceptability score of 7.27 and was interpreted as very much liked. Moderately liked treatments were Treatment A which used 1, 500 grams of Paros Shell meat extract with 7.11 acceptability score, Treatments C and E (with 1,000 grams an d 500 grams of Paros Shell meat extract, respectively) obtained acceptability score of 7.07 and 7.00, correspondingly. Treatment D which used 750 grams of Paros Shell meat extract obtained the lowest acceptability score of 6.82.

These differences, however, in acceptability scores in terms of appearance of Paros Sauce were not significantly different (as presented in Table 1.1). Varying levels of Paros Shell meat extract yield the same appearance which were liked moderately by the panelists with a grand mean acceptability score of 7.05.

Table 1. Acceptability level and scores in terms of appearance of Paros sauce as a product.

Treatment	Replication			Total	Mean	Level of Acceptability
	I	II	III			
A	7.53	7.60	6.20	21.33	7.11	Moderately liked
B	7.80	7.47	6.53	21.80	7.27	Very much liked
C	7.13	7.00	7.07	21.20	7.07	Moderately liked
D	7.00	7.00	6.47	20.47	6.82	Moderately liked
E	6.67	6.87	7.47	21.00	7.00	Moderately liked
Grand Total				105.80		
Grand Mean					7.05	Moderately liked

n.s. - Not significant

Table 1.1 Acceptability level and scores in terms of appearance of Paros sauce as a product.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Computed	Ftab	
Treatment	4	0.3159	0.0790	0.297^{ns}	3.48	5.99
Error	10	2.6548	0.2655			
Total	14	2.9707				

CV = 7.31% n.s. - Not significant

Acceptability level and scores of Paros Sauce in terms of flavor

The acceptability level and scores in terms of flavor of Paros sauce is displayed in Table 2.Results showed that Treatment B (with 1,250 grams of Paros Shell meat extract) obtained the highest acceptability score of 7.80 in terms of flavor. This was followed by Treatment A (with 1,500 grams of Paros Shell meat extract) with flavor acceptability score of 7.60. These two treatments were rated very much liked by the panelists. Treatment C (with 1,000 grams of Paros Shell meat extract), was rated moderately liked by the panelists with acceptability score of 6.91 in flavor. Treatments D and E (with 750 grams and 500 grams of Paros Shell meat extract, respectively) were rated slightly liked in terms

of flavor by the panelists with acceptability scores of 6.04 and 5.87, correspondingly.

Highly significant differences among varying levels of Paros shell meat extract were noted in terms of flavor (as shown in Table 2.1). In terms of flavor, Treatment B had a remarkably higher acceptability score in terms of flavor compared to other treatments except for Treatment A which had similar level of acceptability in flavor. Acceptability scores in terms of flavor between Treatments A and C were not significantly different but remarkably higher compared to Treatments D and E. Treatments with lower levels of Paros shell meat extract (Treatments D and E) had the same acceptability scores in terms of flavor.

Results implied that higher levels of Paros shell meat extract yield higher acceptability scores in terms of flavor, whereas those treatments with lower Paros shell meat extract obtained lower acceptability scores in terms of flavor as rated by the panelists.

Table 2. Acceptability level and scores in terms of flavor of Paros sauce.

Treatment	Replication			Total	Mean	Level of Acceptability
	I	II	III			
A	7.60	7.93	7.27	22.80	7.60[ab]	Very much liked
B	7.93	7.87	7.60	23.40	7.80[a]	Very much liked
C	6.60	7.27	6.87	20.73	6.91[b]	Moderatelyliked
D	5.80	5.73	6.60	18.13	6.04[c]	Slightly liked
E	6.13	5.20	6.27	17.60	5.87[c]	Slightly liked
Grand Total				**102.67**		
Grand Mean					**6.84**	**Moderately liked**

**-highly significant

[abc] - means with the same letter superscript are not significantly different

Table 2.1. Analysis of Variance on acceptability scores in terms of flavor of Paros Sauce

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Computed	Ftab	
Treatment	4	9.2533	2.3133	14.02**	3.48	5.99
Error	10	1.6504	0.1650			
Total	14	10.9037				

CV = 7.31% n.s. - Not significant

Acceptability level and scores of Paros sauce in terms of Consistency

Table 3 shows the acceptability level and scores in terms of consistency of Paros Sauce. Results showed that Treatment B (with 1,250 grams of Paros Shell meat extract) obtained the highest acceptability score of 7.16 in terms of consistency. This was followed by Treatment A (with 1,500 grams of Paros Shell meat extract) with consistency acceptability score of 7.13, Treatment C (with 1,000 grams of Paros Shell meat extract) with acceptability score of 7.00, and Treatments D (with 750 grams of Paros Shell meat extract) with acceptability score of 6.56. These four treatments were rated moderately liked by the panelists. However, Treatment E (with 500 grams of Paros Shell meat extract) was rated slightly liked by the panelists with lowest acceptability score of 6.09 in consistency.

Significant differences among varying levels of Paros shell meat extracts were noted in terms of consistency (as presented in Table 4.1). Treatments B, A, C and D had significantly the same acceptability score in terms of consistency. Except for Treatment D, these treatments have comparably higher consistency acceptability scores compared to Treatment E. Acceptability scores in terms of consistency between Treatments D and E was not significantly different.

It could be implied that treatments with higher levels of Paros shell meat extract yield higher acceptability scores in terms of consistency while treatments with lowest levels of Paros shell meat extract was slightly liked in terms of consistency as rated by the panelists.

Table 3. Acceptability level and scores in terms of Consistency of Paros sauce

Treatment	Replication			Total	Mean	Level of Acceptability
	I	II	III			
A	7.07	7.40	6.93	21.40	7.13[a]	Moderatelyliked
B	7.67	6.80	7.00	21.47	7.16[a]	Moderatelyliked
C	7.40	6.47	7.13	21.00	7.00[a]	Moderatelyliked
D	6.60	6.87	6.20	19.67	6.56[ab]	Moderatelyliked
E	6.07	6.27	5.93	18.27	6.09[b]	Slightly liked
Grand Total				**101.0**		
Grand Mean					**6.79**	**Moderately liked**

**-highly significant
[ab] - means with the same letter superscript are not significantly different

Table 3.1. Analysis of Variance on acceptability scores in terms of consistency of Paros sauce

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Computed	Ftab	
Treatment	4	2.5262	0.6316	4.97*	3.48	5.99
Error	10	1.2711	0.1271			
Total	14	3.7973				

CV = 5.25% [n.s.] - Not significant

Acceptability level and scores of Paros Sauce in terms of General acceptability

The general acceptability level and scores of Paros Sauce is presented in Table 5. Results showed that Treatment B (with 1,250 grams of Paros Shell meat extract) obtained the highest general acceptability score of 8.09. This was followed by Treatment A (with 1,500 grams of Paros Shell meat extract) with general acceptability score of 7.87. These two treatments were rated very much liked by the panelists. Treatment C and D (with 1,000 grams and 750 grams of Paros Shell meat extract, respectively), however, were rated moderately liked by the panelists with general acceptability score of 7.04 and 6.82, correspondingly.

Treatment E (with 500 grams of Paros Shell meat extract) was rated slightly liked by the panelists with general acceptability score of 6.29. Highly significant differences among varying levels of Paros shell meat extracts were noted in general acceptability (as shown in Table 5.1). Treatment B had a remarkably higher score compared to other treatments except for Treatment A which had similar general acceptability score. General acceptability scores between Treatments C and D were not significantly different but Treatment C had remarkably higher general acceptability score compared to Treatment E. Treatments with lower levels of Paros shell meat extract (Treatments D and E) had the same general acceptability scores.

Data implied that higher levels of Paros shell meat extract yield higher general acceptability scores, whereas those treatments with lower Paros shell meat extract obtained lower general acceptability scores as rated by the panelists.

Table 4. General acceptability level and scores of Paros Sauce.

Treatment	Replication			Total	Mean	Level of Acceptability
	I	II	III			
A	7.73	8.00	7.87	23.60	7.87[a]	Very much liked
B	8.27	7.80	8.20	24.27	8.09[a]	Very much liked
C	6.40	7.27	7.47	21.13	7.04[b]	Moderately liked
D	6.47	6.60	7.40	20.47	6.82[bc]	Moderately liked
E	6.13	6.13	6.60	18.87	6.29[c]	Slightly liked
Grand Total				**108.33**		
Grand Mean					**7.22**	**Moderately liked**

** - highly significant

[abc] – means with the same letter superscript are not significantly different

Table 4.1. Analysis of variance on general acceptability scores of Paros sauce.

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Computed	Ftab	
Treatment	4	6.6874	1.6719	11.45**	3.48	5.99
Error	10	1.4607	0.1461			
Total	14	8.1481				

CV=5.29% **-highly significant

As reflected in Figure 1, Paros sauce with 1,250 grams of Paros shell meat extract obtained the highest acceptability scores among the sensory qualities, and rated as moderately liked in consistency (7.16) but very much liked in appearance (7.27), flavor (7.80) and general acceptability (8.09).

This was followed by Paros sauce with 1,500 grams of Paros shell meat extract which was rated as moderately liked in appearance (7.11) and consistency (7.13) but very much liked in flavor (7.60) and general acceptability (7.07). Paros sauce with 1,000 grams of Paros shell meat extract was moderately liked in appearance (7.07), flavor (6.91), consistency (7.00) and general acceptability (7.04).Paros sauce with 750 grams of Paros shell meat extract was moderately liked in appearance (6.82), consistency (6.56) and general acceptability (6.02) but slightly liked in flavor (6.04). Paros sauce with the lowest level of Paros shell meat extract was moderately liked in appearance (7.00) and slightly liked in flavor (5.87), viscosity (6.09), and general acceptability (6.29)

CONCLUSIONS

Based on the findings of the study, Paros meat extract can be utilized into sauce. Paros sauce with the highest amount of meat extract (1,250 grams) was the most acceptable in terms of appearance, flavor, consistency and general acceptability of the product. The flavor, consistency and general acceptability of Paros sauce were affected by the varying amount of Paros meat extract used in the mixture.
The bottled product (paros sauce) containing 200ml has a proximate energy value of 119Kcal per 100 gram. The cost and yield of the product varies according to the amount of Paros meat extract used in the mixture

RECOMMENDATIONS

Based on the results of the study, the following recommendations are hereby given: Paros meat extract is recommended for sauce making by using the amount of
1,250 grams of shell meat extract. The procedures and materials to be used in processing should be strictly followed to derive favorable result. By- products of paros sauce making can be processed into other food commodities. The use of other kinds of sugar for further studies in sauce-making is recommended. Processed food from Shellfishes should be subjected to microbial analysis to safeguard consumers' health. Processing of Paros sauce for commercialization should be commercially sterile. Other method of processing Paros meat into other food products is recommended. The housewives, chefs, home economist, food technologists, and consumers are encouraged to adopt the use of Paros sauce as food seasoning and condiment. To sustain the supply of Paros shell meat for processing, a municipal ordinance for conservation and protection of the source of Paros shell may be imposed by the local government. To verify the results of the study, another study along this line may be conducted.

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