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A Comparative Study of Kroepeck Products Using Fish, Squid and Spider Conch (Lambislambis)[1]

Andres C. Pagatpatan* **Jr., PhD** [2]
College Administrator
ESSU-Guiuan Campus

Tirso A. Morante **PhD**
Faculty Member
ESSU-Salcedo Campus

Cecilia G. Lagramada
Faculty Member
ESSU-Guiuan Campus

Teresita Villa G. Lacaba **DBA**
Faculty Member
ESSU-Guiuan Campus

*Corresponding author email id: essu_salcedo@yahoo.com

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***Abstract*—The evaluation of the quality characteristics of kroepeck preparations (Fish, Squid and Spider Conch Kroepecks) in terms of color, aroma, flavor, texture and crispness through the use of organoleptic test was the focus of this study, which was conducted in order to determine the acceptability and quality attributes of Kroepeck samples at ESSU-Guiuan Campus. The product testing was done by 15 Food Technology Instructors and other food experts of this campus, who evaluated the quality characteristics of the samples; whereas one hundred ten (110) respondents evaluated the acceptability of different Kroepecks made from different fishery products. The Hedonic Rating Scale was used by the respondents to determine their preferences.**

Results of the study revealed that: in terms of the quality characteristics of the three Kreopeck preparations, Product 3 got the highest mean value of 7.81 which is interpreted as "like very much", followed by Product 2 with a mean value of 7.27 interpreted as "like moderately" and Product 1 got the lowest mean score of 6.91 which is also interpreted as "like moderately".

Recommendations of the study are: 1. further study on the shelf life as well as on the packaging of the Kroepeck products for commercialization purposes; 2. mass production of the Kroepeck, however, refinement on some of the quality attributes of the product may be considered; 3. the same Kroepeck products used in the evaluation should be submitted for food content analysis; and 4. the research product may be considered in the selection of food items produced in Guiuan in line with the one-town-one-product program of the government.

***Keywords* — Kroepeck, Squid Kroepeck, Spider Conch Kroepeck, Fish Kroepeck.**

I. INTRODUCTION

Food is something that should not only alleviate hunger and nourish the body, but it must also satisfy the human senses so that eating is pleasurable [3].

In the context of Eastern Samar, Philippines, Kreopeck is one of the more versatile finger foods when one wants a quick nibble. It is a popular crunchy food snack that is most liked not only by children but also by adults because of its unique attributes. As one grows older and learns to assimilate in circle of friends (*barkada*), Kroepeck never fails to provide the instant finger food during social gatherings (*pulutan*) to impromptu drinking binges. Its garlic and shrimp flavor dipped in vinegar (*sinamak*) laden with hot chili peppers (*kutitot*) and soy sauce is the perfect match for beer and other liquor, firewater or whatever alcoholic concoctions a measly school allowance could afford. It jives well with a chosen soft drink as well.

Filipino travelers never fail to stuff their luggage with ready to fry Kroepeck. Family members wear a ready smile when it is handed over as gifts from travelling (*pasalubong*). According to Espejo (1985) Kroepeck is made up of ground rice and other ingredients added with fishery products like shrimp and fish [2].

Kroepeck making is a post-harvest technology which prevents wastage of fishery products. The addition of fishery products such as crabs, shrimps, fish and squid will improve the taste of kreopeck. A value-added product will also be produced in commercial scale [4].

Since Guiuan, Eastern Samar has an abundant supply of marine resources, we were encouraged to pursue on determining the acceptability of Kroepeck using different marine products which are fish, squid and Spider Conch (Lambislambis) locally known as "*Ganga*".

II. METHODOLOGY

Variety of materials and methods wereutilized in the different phases of operation in the conduct of the study.

The following ingredients were used in this study: (Product 1) fish, plain rice, salt, seasoning, lime, powder, pepper & cooking oil; (Product 2) squid, plain rice, salt, seasoning, lime, powder pepper & cooking oil; (Product 3) Spider Conch/Ganga (Lambislambis), plain rice, salt, seasoning, lime, powder pepper & cooking oil.

The following were the equipment and utensils gathered, cleaned and used in the preparation of the Kroepeck: Rice grinder, measuring spoons, blender, knives, mixer, weighing scale, steamer, basins, aluminum trays, ladle, measuring cups, plastic sealer, stove, pastry brusher, pie plate, chopping board, casserole/kettle and plastic bags. Researchers were required to use cooking outfit.

All ingredients were measured. The fish, squid and spider conch were boiled and sliced thinly before they were ground. The rice was ground also. After which all the ingredients were combined, stirred, added with water and blended thoroughly. The mixture was strained by putting two tablespoons of the mixture in pie plate at a time, to have a uniform and desired thickness. Then it was steamed for one minute and sliced into desired sizes. They were placed in the trays and were dried under the heat of the sun for one and a half days. After drying thoroughly the Kroepeck were fried in deep hot cooking oil ready for sensory evaluation.

To obtain a reliable result in the evaluation of the Kroepeck samples, sensory evaluation (organoleptic test) and acceptability test were used, a score card for the panelists and the Hedonic rating scale were used [1]. In

order to determine the quality attributes, which include color, aroma, flavor, texture and crispness, and the acceptability of the Kroepeck samples, the organoleptic test was conducted. The products were presented to the members of the taste panel, who have the training and expertise in this line of work.

The data were tabulated and the mean preferences and percentages were determined. The analysis of variance (ANOVA) in the complete randomized design (CRD) was used to determine the significant differences in the evaluation of the Fish Kroepeck, Squid Kroepeck and Spider Conch Kroepeck.

III. Results And Discussion

The quality characteristics of *Kroepeck* were rated by the respondents using the organoleptic test. The result of the evaluation on quality characteristics of the three *Kroepeck* preparations is presented in Table 1.

Table 1 shows that all characteristics were rated "very good" for all attributes. These results indicated that the different *Kroepeck* preparations made from Spider Conch, squid and fish have good qualities since all the products were rated by respondents as "very good" in terms color, aroma, flavor, texture and crispness.

Table 2 presents the mean scores on the color of the *Kroepeck* preparations. The data showed that Product 3 (Spider conch) got the highest mean score of 4.25, followed by Product 2 (squid *kroepeck*) with a mean score of 4.10 and Product 1 (fish *kroepeck*) got the lowest mean score of 3.85. The grand mean obtained was 4.10, which was described as "very good" by the respondents.

Table 1 Mean Scores on the Quality Attributes of Kroepeck

Quality Attributes	Product	Replication		Mean	Quality Description
		1	2		
Color	1	3.8	3.9	3.85	Very Good
	2	4.0	4.1	4.05	Very Good
	3	4.2	4.3	4.25	Very Good
Aroma	1	3.6	3.7	3.65	Very Good
	2	3.6	3.8	3.70	Very Good
	3	4.2	4.4	4.30	Very Good
Flavor	1	4.1	4.3	4.20	Very Good
	2	3.6	3.8	3.70	Very Good
	3	4.3	4.5	4.40	Very Good
Texture	1	4.0	4.2	4.10	Very Good
	2	3.7	3.7	3.70	Very Good
	3	4.2	4.2	4.20	Very Good
Crispness	1	3.9	4.2	4.10	Very Good
	2	4.0	4.1	4.05	Very Good
	3	4.3	4.4	4.35	Very Good

Table 2 Color of the Kroepeck Samples

Product	Replication		Treatment Total	Treatment Mean
	1	2		
1	3.8	3.9	7.7	3.85^{c}
2	4.0	4.1	8.1	4.10^{b}
3	4.2	4.3	8.5	4.25^{a}
Grand Total			**24.3**	
Grand Mean				**4.10**

**Mean values followed by common letters are not significantly different with each other at LSD .05 level of significance.*

The analysis of variance on color of different *Kroepeck* preparations as rated by respondents is reflected in Table 2.1. It can be gleaned from this table that there was a highly significant difference among the different treatments. This claim was based on the fact that the computed F value of 26.67 was greater than the tabular F value of 13.27 set at .01 level of significance. This means that the hypothesis that there is no significant difference between the preparations made from fish, squid and Spider conch in terms of color, is rejected.

Since there were significant results of the analysis of variance along this quality characteristic, the Least Significant Difference (LSD) test was computed in order to determine where the mean differences occurred among the different Products. The comparison test showed that Product 3 differs significantly with Products 2 and 1. Likewise, Product 2 differs significantly with Product 1.

The aroma of the different *Kroepeck* preparations is presented in Table 3. It shows that Product 3 (Spider Conch) had the highest mean score of 4.25. This was followed by Product 2 (Squid *Kroepeck*) with a mean score of 4.10. Product 1 (Fish *Kroepeck)* got the lowest mean score of 3.85.

Table 2.1 Analysis of Variance on Color of *Kroepeck*

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value	Tabular Value	
					5%	1%
Product	2	0.16	0.08	26.67^{**}	5.79	13.27
Error	3	0.01	0.003			
Total	5	0.17				

LSD .05 = 0.02 ** highly significant

Table 3 Aroma of the *Kroepeck* Sample

Product	Replication		Product Total	Product Mean*
	1	2		
1	3.6	3.7	7.3	3.85^{c}
2	3.6	3.8	7.4	4.10^{b}
3	4.2	4.4	8.6	4.25^{a}
Grand Total			**23.3**	
Grand Mean				**3.88**

**Mean values followed by common letters are not significantly different with each other at LSD .05 level of significance.*

Table 3.1 Analysis of Variance on Aroma of *Kroepeck*

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value	Tabular Value	
					5%	1%
Product	2	0.52	0.26	13.0*	5.79	13.27
Error	3	0.05	0.02			
Total	5	0.57				

LSD .05 = 0.13

Table 4 Flavor of the *Kroepeck* Samples

Product	Replication		Product Total	Product Mean*
	1	2		
1	4.1	4.3	8.3	4.20[b]
2	3.6	3.8	7.4	3.70[c]
3	4.3	4.5	8.8	4.40[a]
Grand Total			**24.6**	
Grand Mean				**4.10**

* *Mean values followed by common letters are not significantly different with each other at LSD .05 level of significance.*

Analysis of Variance (Table 3.1) showed that there was a significant difference among the different products. The F value generated of 13.0 was greater than the tabular F value set at .05 level of significance, so the null hypothesis is rejected.

Comparison of product means showed that Product 3 (Spider Conch) differed significantly with treatments 2 (Squid *Kroepeck*) and 1 (fish *Kroepeck*) at .05 level of significance using the LSD test. Likewise, Product 1 and 2 differed significantly with each other. It goes to show that the Spider Conch *Kroepeck* had the more acceptable aroma that the squid and fish *Kroepeck.*

Flavor of the three *Kroepeck* preparations is presented in Table 4. It showed that Product 3 (Spider Conch) obtained the highest mean score of 4.40. This was followed by Product 1 (Fish *Kroepeck*) with a mean score of 4.20 and Product 2 (Squid *Kroepeck*) got the lowest mean score of 3.70. The grand mean generated was 4.10, which was described as "very good" by the food technology instructors.

The analysis of variance (Table 4.1) showed that there was a highly significant difference among the different products. The computed F value of 167.57 exceeded the tabular F value of 13.27 set at .01 level of significance. This means that the three *Kroepeck* preparations differ significantly with each other in their flavor. Therefore, the hypothesis, which stated that there is no significant difference among the different *Kroepeck* preparations made from fish, squid and Spider Conch, is rejected.

Comparison of Product means showed that pairing Products 3 and 1 showed no significant difference with each other, but both significantly differ with product 2. This means that the Spider Conch and Fish *Kroepeck* had similar better flavor than that of the Squid *Kroepeck.*

Table 5 has the data on the texture of different *Kroepeck* preparations. It shows that Product 3 obtained the highest mean value of 4.20. This was followed by Product 1 with a mean value of 4.10. Product 2 got the lowest mean value of 3.70.

Analysis of variance on the texture of the three *Kroepeck* preparations indicated no significant difference.

The computed F value of 0.50 failed to exceed the tabular F value of 5.79 set at .05 level of significance. Hence, the null hypothesis is not rejected.

The crispness of the three *Kroepeck* preparations is presented in Table 6. Results revealed that Product 3 got the highest mean score of 4.35. Product 1 followed with a mean vale of 4.10. Product 2 got the lowest mean value of 4.05. The grand mean value computed was 4.17, which means "very good" in the qualitative description.

Table 4.1 Analysis of Variance on Flavor of *Kroepeck* as Rated by Respondents

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value	Tabular Value	
					5%	1%
Product	2	100.54	50.27	167.57*	5.79	13.27
Error	3	0.90	0.30			
Total	5	101.44				

LSD .05 = 0.20 ** highly significant

Table 5 Texture of the *Kroepeck* Samples

Product	Replication		Product Total	Product Mean*
	1	2		
1	4.1	4.2	8.2	4.10[a]
2	3.7	3.7	7.4	3.70[a]
3	4.2	4.2	8.4	4.20[a]
Grand Total			**24.0**	
Grand Mean				**4.00**

* *Mean values followed by common letters are not significantly different with each other at LSD .05 level of significance.*

Table 5.1 Analysis of Variance on Texture of *Kroepeck Samples*

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value	Tabular Value	
					5%	1%
Product	2	0.28	0.14	0.50[NS]	5.79	13.27
Error	3	0.83	0.28			
Total	5	1.11				

NS = not significant

Table 6 Crispness of the Kroepeck Samples

Product	Replication		Product Total	Product Mean*
	1	2		
1	3.9	4.2	8.1	4.10[a]
2	4.0	4.1	8.1	4.05[a]
3	4.3	4.4	8.7	4.35[a]
Grand Total			**24.9**	
Grand Mean				**4.17**

* *Mean values followed by common letters are not significantly different with each other at LSD .05 level of significance.*

Table 6.1 Analysis of Variance on Crispness of Kroepeck Samples

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value	Tabular Value	
					5 %	1 %
Product	2	0.12	0.06	3.0^{NS}	5.79	13.27
Error	3	0.05	0.02			
Total	5	0.17				

NS = not significant

Analysis of variance on the crispness of the three *Kroepeck* preparations indicated a not significant difference (Table 6.1). The computed F value of 3.0 failed to exceed the tabular F value of 5.79 at .05 level of significance. Therefore, the null hypothesis is not rejected. This implies that the three *Kroepeck* formulations have the same crispness quality.

Acceptability of the Kroepeck Samples

Table 7 reflects the acceptability preference of the 110 respondents. The responses were based on the Hedonic Rating Scale.

It was manifested that Product 1 (Fish *Kroepeck*), 7 or 6.46 per cent of the respondents rated "like extremely", 40 or 36.36 % rated "like very much"; 25 or 22.73 per cent rated "like moderately"; 20 or 18.18 per cent rated "like slightly"; 10 or 9 per cent rated "neither like" nor "dislike" and 8 or 7.27 per cent rated "dislike slightly". Nobody rated other descriptive ratings below this rating scale.

In Product 2 (Squid *Kroepeck*) 9 or 8.19 of the respondents rated "like extremely", 39 or 35.46 per cent rated "like very much", 37 or 33.64 per cent rated "like moderately", 23 or 20.90 per cent rated "like slightly" and 2 or 1.81 per cent rated "neither like" nor "dislike".

For Product 3 (Spider Conch *Kroepeck*), 15 or 13.64 per cent of the respondents rated "like extremely", 67 or 60.91 per cent rated "like very much", 20 or 18.18 per cent "like moderately", 8 or 7.27 per cent rated "like slightly". Nobody rated below this descriptive rating.

The data on mean preferences (acceptability test) of the three *Kroepeck* preparations by 110 respondents is presented in table 8. It shows that Product 3 got the highest mean value of 7.81. This was followed by Product 2 with a mean value of 7.27. It was Product 1 which got the lowest mean score of 6.91.

The analysis of variance on the acceptability test of the three *Kroepeck* preparations as rated by respondent is reflected in table 8.1. It can be gleaned from this table that there is a significant difference among the different products. This claim was based on the fact that the computed F value of 5.86 was greater than the tabular F value set at .05 level of significance. Hence, the null hypothesis is rejected.

Comparison among the product means that Product 3 (*Lambis Kroepeck*) differ significantly from Product 2 (Squid *Kroepeck*) and Product 1 (Fish *Kroepeck*). But Product 2 and Product 1 did not differ significantly with each other. These findings indicated that Product 3 (Spider Conch *Kroepeck*) was the most acceptable *Kroepeck* preparation, followed by Product 1 (Fish *Kroepeck*) and Product 2 (Squid *Kroepeck*) has the lowest acceptability by respondents.

Table 7 Frequencies of Responses on *Kroepeck* Samples

Product	Preference Response	Frequency	Percentage
1 (Fish *Kroepeck*)	Like Extremely	7	6.46
	Like Very Much	40	36.36
	Like Moderately	25	22.73
	Like Slightly	20	18.18
	Neither Like Nor Dislike	10	9.00
	Dislike Slightly	8	7.27
	Dislike Moderately	0	0
	Dislike Very Much	0	0
	Dislike Extremely	0	0
	Total	**110**	**100**
2 (Squid *Kroepeck*)	Like Extremely	9	8.19
	Like Very Much	39	35.46
	Like Moderately	37	33.64
	Like Slightly	23	20.90
	Neither Like Nor Dislike	2	1.81
	Dislike Slightly	0	0
	Dislike Moderately	0	0
	Dislike Very Much	0	0
	Dislike Extremely	0	0
	Total	**110**	**100**
3 (Spider Conch *GangaKroepeck*)	Like Extremely	15	13.64
	Like Very Much	67	60.91
	Like Moderately	20	18.18
	Like Slightly	8	7.27
	Neither Like Nor Dislike	0	0
	Dislike Slightly	0	0
	Dislike Moderately	0	0
	Dislike Very Much	0	0
	Dislike Extremely	0	0
	Total	**110**	**100**

Table 8 Acceptability of the *Kroepeck* Samples

Product	Replication		Product Total	Product Mean*
	1	2		
1	6.87	6.95	13.82	6.91^{b}
2	6.98	7.56	14.54	7.27^{b}
3	7.69	7.93	15.62	7.81^{a}
Grand Total			**43.98**	
Grand Mean				**7.33**

** Mean values followed by common letters are not significantly different with each other at LSD .05 level of significance.*

Table 8.1 Analysis of Variance on Acceptability of *Kroepeck*

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value	Tabular Value	
					5%	1%
Product	2	0.82	0.41	5.86*	5.79	13.27
Error	3	0.20	0.07			
Total	5	1.02				

LSD .05 = 0.47 *= significant

Yield Study

The average cooking yield of Spider Conch *Kroepeck* for a single recipe was five (10) packs at 20 pesos per pack. The cost of materials in the preparation of the Spider Conch *Kroepeck* was computed based on the current market prices at the time of the study.

Cost-Profit Analysis

The net profit of each Kroepeck product was obtained based on the computation below:

Product 1

Sales based from the Current Market Price of Php 20.00 for othersimilar product
[Php 20 x 10 (maximum yield)] . . . . . **Php 200.00**
Less: Direct Cost of Main ingredients (Fish) . . . . . .**Php 120.00**
Gross Profit . . . . . **Php 80.00**
Less: Labor cost, Selling & Packaging expenses at anestimated 30% of the total ingredient cost . . . . . **Php 36.00**
Net Profit . . . . . .**Php 44.00**

Product 2

Sales based from the Current Market Price of Php 20.00 for other similar product
[Php 20.00 x 10 (maximum yield)] . . . . . **Php 200.00**
Less: Direct Cost of Main ingredients (Squid) . . . . . **Php 110.00**
Gross Profit . . . . **Php 90.00**
Less: Labor cost, Selling & Packaging expenses at anestimated 30% of the total ingredient cost . . . .**Php 33.00**
Net Profit . . . .**Php 57.00**

Product 3

Sales based from the Current Market Price of Php 20.00 for othersimilar product
[Php 20.00 x 10 (maximum yield)] . . . . . **Php 200.00**
Less: Direct Cost of Main ingredients (Spider Conch) . . . . . **Php 105.00**
Gross Profit . . . . . **Php 95.00**
Less: Labor cost, Selling & Packaging expenses at an estimated 30% . . . . . .**Php 31.50**
Net Profit . . . . . .**Php 63.50**

The cost and profit obtained for each product were valued to determine which product obtained the highest net profit based on the cost of production.

Table 9 Rank of Profit of the Three Products

Product	Net Profit	Rank
1	44.00	3
2	57.00	2
3	63.50	1

Table 9 reflects the rank of profit cost of the different *Kroepeck* preparations. It shows that Product 3 (Spider Conch) got the highest mean profit of Php 63.50 followed by Product 2 (Squid *Kroepeck*) with a mean profit of Php 57.00, and Product 1 got the lowest mean profit of Php 44.00 only.

This means that the three *Kroepeck* preparations differ with each other in terms of their profit. It further indicated that the utilization of Spider Conch in *Kroepeck* preparation was less expensive than the utilization of Squid *Kroepeck* and Fish *Kroepeck*.

IV. Conclusion

The following conclusions are drawn based on the findings:

A) the three *Kroepeck* preparations were all described by food technology instructors and other respondents as having "very good" quality in terms of color, aroma, flavor, texture and crispness;

B) the three *Kroepeck* preparations showed a highly significant difference in terms of color, aroma and flavor but not on texture and crispness;

C) acceptability preferences of the 110 respondents was based on the Hedonic Rating Scale. Fish *Kroepeck* was rated 36.36 per cent by the respondents as "like very much" and 69.91 per cent rated Spider Conch "*Ganga" Kroepeck* as "like very much" also; the Spider Conch "*Ganga" Kroepeck* got the highest number of respondents of 67 which means having the highest acceptability preference;

D) the analysis of variance of the acceptability test of the three *Kroepeck* preparations as rated by the respondents showed a significant difference among the different products. The Spider Conch (Lambis) *Kroepeck* was the most acceptable *Kroepeck* preparation followed by Fish *Kroepeck* and Squid *Kroepeck* having the lowest acceptability by consumers;

E) of the three *Kroepeck* preparations, Product 3 (Spider Conch *Kroepeck)* got the highest net profit of Php 63.50 while Product 2 (Squid *Kroepeck*) had a net profit of Php 57.00 and Product 1 (Fish *Kroepeck*) having the lowest net profit of Php 44.00 only.

V. Recommendations

The following are the recommendations of the study:

a) further study is recommended on the shelf life as well as on the packaging of *Kroepeck* products for commercialization purposes;

b) mass production of the *Kroepeck* products is recommended however, refinement on some of the quality attributes of the product may be considered;
c) the same *Kroepeck* products used in the evaluation should be submitted for food content analysis;
d) the research product should be considered in the selection of food items produced in Guiuan in line with its one-town-one product program of the government.

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AUTHOR'S PROFILE

Andres Pagatpatan, Jr., PhD
Dr. Andres C. Pagatpatan, Jr. is a Professor I and the Campus Administrator at Eastern Samar State University -Guiuan Campus. He earned his doctorate
degree at Eastern Visayas State University Tacloban City, Philippines.