



Product innovation, nutritional content of squid (*Loligo duvauceli*) powder and level of acceptability of the innovated products, Mindanao, Philippines

Mary Jane A. Moralia ^{1*}, Sofia C. Naelga ¹

¹ Master in Technician Teacher Education, Doctor in Technology Education, University of Science and Technology of Southern Philippines, PHILIPPINES

*Corresponding author: maryjane.moralia@ustp.edu.ph

Abstract

This study determined the product Innovation, Nutritional Content of Squid (*Loligo duvauceli*) Powder, and Level of Acceptability of the Innovated Products. This study sought to answer the following questions: Problem 1. The product innovations of Squid Powder. Problem 2. the nutritional content of Squid Powder. Problem 3. the level of acceptability of the Squid Powder in terms of food attributes (Appearance, Color, Aroma, Flavor, and Taste) in terms of product innovations in different formulation 30% Squid Powder with 70% All-Purpose Flour, 45% Squid Powder with 55% All-Purpose Flour, 60% Squid Powder with 40% All Purpose Flour and 100% squid powder with 0 % All-Purpose Flour. Problem 4. the formulation gained the highest acceptability per recipe. The study used an experimental method design. This research will also utilize qualitative analysis, through product development and nutritional content, presented in graphic format. It also utilized quantitative procedure as commonly used in descriptive research studies in terms of acceptability.

The respondents of the study are composed of 30 Semi-Trained individuals directly coming from the University of Science and Technology of Southern Philippines-CDO Campus comprising of Teachers and students. Ten (10) were students, twenty (20) were teachers handling Food Technology, Food Processing, Culinary Arts, and any related Food courses.

The result shows that the nutritional content of Squid powder is rich in crude protein; it has 75.4 % (Nx6.25); it was tested using the Kjeldahl Testing Method. Another parameter like Copper and iron was tested using atomic absorption spectrophotometry, and Copper has 5.84 mg/kg. Phosphorous is 0.599 % using the Colorimetry testing method. In contrast, iron has 46.2 mg/kg, the potassium is 0.258 %, and it was tested using the Atomic Emission Spectrophotometry Test method. Parameter selenium is less than 0.10**, and the test method used was Inductively-Coupled Plasma-OES.

The data also shows that the highest acceptability in empanaditas recipe was with the formulation of 30% squid powder. However, in the Squid Ball and Pasta recipe, the highest acceptability was with the 100% squid powder formulation.

Based on the results, it shows that the squid innovated products with the different formulation is acceptable to the evaluators and consumers. Squid Powder can be used as an alternative for flour. The squid innovated products can be sold in the form of a snack. But fundamentally, the Squid innovated product is acceptable most, especially the 100% of Squid Powder for Pasta and Squid Ball.

Based on the results of the study, it is therefore recommended that Food innovators use Squid Products as an innovative idea to sell or manufacture.

Keywords: squid powder, empanaditas, squid ball, pasta

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INTRODUCTION

Seafood is currently accepted as an essential food for humans (FAO 2010). Seafood is highly regarded for its abundance of high-quality proteins, n-3 polyunsaturated fatty acids (PUFAs), and other nutrients, such as minerals, trace elements, and vitamins (FAO 2010). These nutrients are essential for

bodily functions and are beneficial to growth, the brain, and the nervous system; they also have anticancer properties (Liao & Chao 2009). Seafood has helped

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alleviate food crises in many developing countries, providing a valuable supplement to a diverse and nutritious diet. In recent years, seafood consumption has gradually increased throughout the world (FAO 2010).

Squid or “Lumiyagan” is a very abundant seafood that can be caught in Misamis Occidental. During its season, squids are sold at low cost. When people visit the place they would dare not to miss the “kilawin and Adobong Lumiyagan”. Squids are simply irresistible and Lip-smacking. When you add them to different recipes or serve them with assorted dips, squids never fail to displease your taste buds. Yet like any other natural resources, this is the seasonal, such that its supply dwindles when not in season, thus affecting business in terms of cost and sustainability.

Squids are typically marine cephalopods belonging to the Loliginidae family. Squid when consumed is quiet nutritious. It offers a myriad of wonderful advantages with so high benefits such as rich in minerals like protein, copper, phosphorus and iron. Also proteins, found in squids, are extremely beneficial for the healthy functioning of the Human body. The same is true with Copper as it is essential for absorbing, storing and metabolizing iron and stimulating the formulation of red blood cells.

This study aimed to create and produce a Squid Powder where the “Lumiyagan” or Squid is being sun dried and powdered. In this study, the Squid powder served as a raw material alternative to flour, which acts as an added ingredient to enhance the nutritive value of the innovated product.

The study focused on creating a Squid Powder ready for utilization, as it will serve as flour for the different Squid innovated products such as empanaditas, squid ball and pasta. Therefore, if squid is out of season, through squid powder, we can still make squid flavored empanaditas and pasta, and squid ball all year round.

This proposed food innovation primarily aimed at determining the Nutritional Content and Acceptability of the squid innovated product out from squid powder as a main ingredient. It is further hoped to provide knowledge and valuable information for researchers, students, professionals and experienced cooks, who are considering entrepreneurial plans, and that this may serve as a baseline reference for future studies.

METHODS

Research Design

The study used experimental method design – a systematic and scientific approach to research in which the researcher manipulates one or more variables and controls and measures any change in other variables (Oskar, 2008). This research also utilized qualitative analysis, through product development and nutritional content, presented in descriptive format. It also utilized quantitative procedure as commonly used in descriptive

research studies in terms of acceptability and stability. Creswell (2003) maintained that descriptive research is an approach in which the inquirer often makes knowledge claims based primarily on constructivist’s perspectives. These are constructed with intent of participatory perspectives in quantitative data analysis.

Research Setting

The study was conducted at University of Science and Technology of Southern Philippines -Cagayan de Oro Campus. The production and sensory evaluation of the Squid Products were all done in the Culinary Arts Laboratory in the University. The analysis of the Nutritional content was conducted by the F.A.S.T Laboratories located at Lapasan Highway, Cagayan de Oro City.

Respondents of the Study

The study used simple random sampling with a strategic approach. The respondents of the study were composed of Semi-trained food individuals. Semi-Trained individuals are those people who have undergone training related to food courses, this includes students who took Food related courses and Teachers who are handling Food related Subjects. Random selection was done in each subgroup in the sampling in order to achieve the representation of the respondents using the same procedure.

The respondents of the study are composed of 30 Semi-Trained individuals directly coming from University of Science and Technology of Southern Philippines-CDO Campus, specifically comprising of Teachers and students. 10 were students, 20 were teachers handling Food Technology, Food Processing and any related Food courses. The said respondents were served with samples while properly observing the principle for hygiene and sanitation.

Data Gathering Procedure

The researcher secured permission to Dr. Oliva O. Canencia, Dean, College of Science and Technology Education, University of Science and Technology of Southern Philippines -Cagayan de Oro Campus, C.M. Recto, Lapasan, Cagayan de Oro City, Misamis Oriental to conduct experiments and the production of the squid innovated products.

The researcher performed the cooking procedure in the USTP culinary laboratory. Testing and Evaluation was conducted in the same venue. The researcher clearly explained the objectives and purpose of the study, and personally distributed the questionnaire and the Squid innovated product in different formulations following the number indicated in the master sheet.

The survey questionnaires were then collected, tabulated and were analyzed based on the research design employed.

Sensory Evaluation

The sensory evaluation of the Squid innovated product was conducted at University of Science and

Table 1. Nutritional Analysis of Squid Powder

Parameter	Squid Powder	Test Method
Crude protein, % (%Nx6.25)	75.4	Kjeldahl
Copper,mg/kg	5.84	Atomic Absorption Spectrophotometry
^b selenium,ppm	Less than 0.10**	Inductively-Coupled Plasma-OES
Phosphorous %	0.599	Colorimetry
Iron	46.2	Atomic Absorption Spectrophotometry
Potassium	0.258	Atomic Emission Spectrophotometry

Technology of Southern Philippines – Cagayan de Oro Campus. The researcher prepared the food samples with the variations of Pasta, Squid ball and empanaditas and each having four formulations: 1) 30% Squid Powder with 70% All purpose flour; 2) 45 % Squid Powder with 55% All Purpose Flour; 3) 60% Squid Powder with 40% All purpose Flour, and 4) 100% Squid Powder with 0% All Purpose flour. The researcher asked each respondent to taste each sample, and to write his or her answers on the box, using the 9- point Hedonic Scale. The tasting of the samples was done by three batches of 10 persons, and the researcher then analyzed and tabulated the result according to the design employed.

Statistical Tool Used

The study utilized descriptive statistics: mean, standard deviation, frequency, percentage and percentage distribution on the level of acceptability of the squid innovated products using squid powder in different formulation.

RESULTS and DISCUSSIONS

Problem 1. What are the product innovations of Squid Powder?

Squid Pasta, Squid ball and Squid empanaditas were the three food variations where squid powder was seen most applicable.

To justify this in the context of steaming and frying, the above mentioned food variation all fit in the manner of cooking chosen in this study. Further, considering the process of producing the powdered form makes the three the most logical variants, as they are all purpose flour-based foods. Although, all the formulation for Pasta had the same measurement in terms of other ingredients such as 1.25 g olive oil; 1.25g salt; 90g Egg; all the formulation in Squid Ball had the same measurement in terms of other ingredients such as 5g garlic; 15g onion; 20g; carrot; 15g egg;.62g salt; 31.25 g Cornstarch; 1tsp; white pepper; 4tbsp Pineapple, and all the formulation in empanaditas had the same measurement in terms of other ingredients such as 0.62g salt; 15g Egg; 31.25 evap milk; 28.3 butter; 1/2 cup sugar; 2 tbsp pineapple Juice.

Problem 2. What is the nutritional content of Squid Powder?

Table 1 showed that the squid powder is rich in crude protein, it has 75.4%(Nx6.25), it was tested using

Kjeldahl Testing Method, Other parameters like copper and iron were tested using atomic absorption spectrophotometry and it was found to have 5.84 mg/kg while having 46.2 mg/kg of Iron, the potassium is 0.258 % and it was tested using Atomic Emission spectrophotometry Test method. A parameter selenium is less than 0.10** and the test method was inductively-Coupled Plasma-OES, while phosphorous is 0.599% using the Colorimetry testing method.

Problem 3. What is the level of acceptability (appearance, taste, aroma, texture, and color) of the product innovation (Empanaditas, Squid Ball and Pasta) in the different product formulations: 30% squid powder, 45% squid powder, 60% squid powder, and 100% squid powder.

Table 2 shows that majority (53%) of the respondents like very much to like extremely the Empanaditas in 30% squid powder formulation. The over-all rating was like very much (mean 7.71). The standard deviation of 0.86 indicates that the respondents' evaluation of the Empanaditas in 30% squid powder formulation varied a lot from each other.

Table 3 shows that majority (67%) of the respondents like very much to like extremely the Empanaditas in 45% squid powder formulation. The over-all rating was like very much (mean 7.59). But the standard deviation of 1.03 indicates that the respondents' evaluation of the Empanaditas in 45% squid powder formulation varied a lot from each other.

Table 4 shows that majority (83%) of the respondents like moderately to like very much the Empanaditas in 60% squid powder formulation. The over-all rating was like moderately (mean= 7.41). But the standard deviation of 0.97 indicates that the respondents' evaluation of the Empanaditas in 60% squid powder formulation varied a lot from each other.

Table 5 shows that majority (57%) of the respondents like moderately to like very much the Empanaditas in 100% squid powder formulation. The over-all rating was like moderately (mean= 6.51). But the standard deviation of 1.75 indicates that the respondents' evaluation of the Empanaditas in 100% squid powder formulation varied a lot from each other.

Table 6 shows that the highest over-all acceptability in the empanaditas recipe was with the 30% squid powder. It also gained highest in terms of appearance, aroma, taste. But the 45% squid powder was highest in terms of color and texture.

Table 2. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of Empanaditas in 30% squid powder and 70% All-purpose flour

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	7	23.33%
Like Very Much	7.5 - 8.4	9	30.00%
Like Moderately	6.5 - 7.4	13	43.33%
Like Slightly	5.5 - 6.4	0	0.00%
Neither Like or Dislike	4.5 - 5.4	1	3.33%
Dislike Slightly	3.5 - 4.4	0	0.00%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.71 (like very much)
Standard Deviation 0.86

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	12	7	10	12	9
Like Very Much	8	7	10	8	11	7
Like Moderately	7	3	6	9	5	10
Like Slightly	6	4	4	2	1	2
Neither Like or Dislike	5	4	3	0	1	2
Dislike Slightly	4	0	0	1	0	0
Dislike Much	3	0	0	0	0	0
Dislike Very Much	2	0	0	0	0	0
Dislike Extremely	1	0	0	0	0	0

Table 3. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of Empanaditas in 45% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	5	16.67%
Like Very Much	7.5 - 8.4	15	50.00%
Like Moderately	6.5 - 7.4	6	20.00%
Like Slightly	5.5 - 6.4	2	6.67%
Neither Like or Dislike	4.5 - 5.4	2	6.67%
Dislike Slightly	3.5 - 4.4	0	0.00%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.59
Standard Deviation 1.03

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	6	7	8	10	8
Like Very Much	8	10	11	10	9	12
Like Moderately	7	7	7	6	6	6
Like Slightly	6	6	4	4	3	2
Neither Like or Dislike	5	1	1	1	0	0
Dislike Slightly	4	0	0	0	2	2
Dislike Much	3	0	0	1	0	0
Dislike Very Much	2	0	0	0	0	0
Dislike Extremely	1	0	0	0	0	0

Table 4. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of Empanaditas in 60% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	3	10.00%
Like Very Much	7.5 - 8.4	11	36.67%
Like Moderately	6.5 - 7.4	14	46.67%
Like Slightly	5.5 - 6.4	1	3.33%
Neither Like or Dislike	4.5 - 5.4	0	0.00%
Dislike Slightly	3.5 - 4.4	1	3.33%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.41
Standard Deviation 0.97

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	8	8	3	9	8
Like Very Much	8	8	5	10	7	7
Like Moderately	7	10	13	7	8	11
Like Slightly	6	1	2	7	5	2
Neither Like or Dislike	5	1	1	1	0	1
Dislike Slightly	4	2	1	2	0	0
Dislike Much	3	0	0	0	1	1
Dislike Very Much	2	0	0	0	0	0
Dislike Extremely	1	0	0	0	0	0

Table 5. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of Empanaditas in 100% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	1	3.33%
Like Very Much	7.5 - 8.4	8	26.67%
Like Moderately	6.5 - 7.4	9	30.00%
Like Slightly	5.5 - 6.4	5	16.67%
Neither Like or Dislike	4.5 - 5.4	3	10.00%
Dislike Slightly	3.5 - 4.4	2	6.67%
Dislike Much	2.5 - 3.4	1	3.33%
Dislike Very Much	1.5 - 2.4	1	3.33%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 6.51

Standard Deviation 1.75

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	1	4	4	6	3
Like Very Much	8	7	8	11	8	7
Like Moderately	7	7	3	4	8	6
Like Slightly	6	7	6	4	2	8
Neither Like or Dislike	5	4	3	3	1	2
Dislike Slightly	4	0	2	2	3	2
Dislike Much	3	1	1	1	0	0
Dislike Very Much	2	2	2	1	1	2
Dislike Extremely	1	1	1	0	1	0

Table 6. Distribution of statistic over-all level of acceptability of empanaditas in different formulation

Empanaditas	30% squid powder	45% squid powder	60% squid powder	100% squid powder
Appearance	7.63	7.47	7.50	6.13
Color	7.47	7.63	7.47	6.27
Aroma	7.77	7.53	7.03	6.80
Taste	8.07	7.67	7.53	6.87
Texture	7.63	7.67	7.50	6.50
OVER-ALL	7.71	7.59	7.41	6.51

Table 7. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of squid ball in 30% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	1	3.33%
Like Very Much	7.5 - 8.4	11	36.67%
Like Moderately	6.5 - 7.4	13	43.33%
Like Slightly	5.5 - 6.4	4	13.33%
Neither Like or Dislike	4.5 - 5.4	1	3.33%
Dislike Slightly	3.5 - 4.4	0	0.00%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.30

Standard Deviation 0.77

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	5	7	4	4	4
Like Very Much	8	11	6	11	7	11
Like Moderately	7	9	13	8	9	7
Like Slightly	6	5	3	3	8	5
Neither Like or Dislike	5	0	1	3	1	1
Dislike Slightly	4	0	0	1	1	2
Dislike Much	3	0	0	0	0	0
Dislike Very Much	2	0	0	0	0	0
Dislike Extremely	1	0	0	0	0	0

There was a decrease in the level of acceptability, as the percentage of squid powder increases. This is because the empanaditas is a traditional Filipino Dish that uses common All purpose flour as dough. Traditionally, its flavor comes from the content or inside of the empanaditas. The strong flavor of the squid powder, may supersede the flavor of the content of the empanaditas, which in most instances is what a traditional taster or consumer is looking for in empanaditas.

Table 7 shows that majority (80%) of the respondents like moderately to like very much the squid

ball in 30% squid powder formulation. The over-all rating was like moderately (mean= 7.30). And the standard deviation of 0.77 indicates that the respondents' evaluation of the squid ball in 30% squid powder formulation was considered to be different from each other.

Table 8 shows that majority (53%) of the respondents like moderately to like very much the squid ball in 45% squid powder formulation. The over-all rating was like moderately (mean= 6.93). And the standard deviation of 1.27 indicates that the respondents'

Table 8. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of squid ball in 45% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	3	10.00%
Like Very Much	7.5 - 8.4	8	26.67%
Like Moderately	6.5 - 7.4	8	26.67%
Like Slightly	5.5 - 6.4	6	20.00%
Neither Like or Dislike	4.5 - 5.4	5	16.67%
Dislike Slightly	3.5 - 4.4	0	0.00%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 6.93

Standard Deviation 1.27

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	6	4	8	4	6
Like Very Much	8	5	7	7	7	8
Like Moderately	7	9	8	5	5	8
Like Slightly	6	7	7	4	7	0
Neither Like or Dislike	5	2	3	5	4	4
Dislike Slightly	4	1	1	0	1	3
Dislike Much	3	0	0	0	0	0
Dislike Very Much	2	0	0	1	1	0
Dislike Extremely	1	0	0	0	1	1

Table 9. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of squid ball in 60% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	0	0.00%
Like Very Much	7.5 - 8.4	14	46.67%
Like Moderately	6.5 - 7.4	8	26.67%
Like Slightly	5.5 - 6.4	3	10.00%
Neither Like or Dislike	4.5 - 5.4	5	16.67%
Dislike Slightly	3.5 - 4.4	0	0.00%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.01

Standard Deviation 1.10

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	6	5	7	3	0
Like Very Much	8	11	12	5	6	12
Like Moderately	7	8	7	8	7	7
Like Slightly	6	2	2	6	7	5
Neither Like or Dislike	5	3	3	3	3	4
Dislike Slightly	4	0	1	0	1	1
Dislike Much	3	0	0	1	2	0
Dislike Very Much	2	0	0	0	0	0
Dislike Extremely	1	0	0	0	1	1

evaluation of the squid ball in 45% squid powder formulation varied a lot from each other.

Table 9 shows that majority (73%) of the respondents like moderately to like very much the squid ball in 60% squid powder formulation. The over-all rating was like moderately (mean= 7.01). And the standard deviation of 1.10 indicates that the respondents' evaluation of the squid ball in 60% squid powder varied a lot from each other.

Table 10 shows that majority (73%) of the respondents like moderately to like very much the squid ball in 100% squid powder formulation. The over-all rating was like moderately (mean= 7.31). But the standard deviation of 0.85 indicates that the respondents' evaluation of the squid ball in 100% squid powder formulation was still categorically different from each other.

Table 11 shows that the highest over-all acceptability of the squid ball recipe is with the 100% squid powder. It

also gained highest in terms of aroma and taste. But the 30% squid powder was highest in terms of appearance, color and texture.

A taster or consumer will always be looking for the squid accent when eating a squid ball. Perhaps this is the reason why the 100% squid powder gained the highest over-all acceptability, also in aroma and in taste.

However, since 100% squid powder is traditionally not used in squid ball, respondent may have other traditional preference on how a squid ball should be in terms of appearance, color and texture. This may explain why the higher percentage of All-purpose flour, gained better acceptability in terms of appearance, color and texture. Basically the taster, consumer is accustomed to the presence of All-purpose flour in squid ball.

Table 10. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of squid ball in 100% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	2	6.67%
Like Very Much	7.5 - 8.4	12	40.00%
Like Moderately	6.5 - 7.4	10	33.33%
Like Slightly	5.5 - 6.4	6	20.00%
Neither Like or Dislike	4.5 - 5.4	0	0.00%
Dislike Slightly	3.5 - 4.4	0	0.00%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.31

Standard Deviation 0.85

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	3	3	11	9	5
Like Very Much	8	9	10	7	6	7
Like Moderately	7	7	7	4	10	9
Like Slightly	6	11	8	5	2	8
Neither Like or Dislike	5	0	2	2	2	1
Dislike Slightly	4	0	0	1	1	0
Dislike Much	3	0	0	0	0	0
Dislike Very Much	2	0	0	0	0	0
Dislike Extremely	1	0	0	0	0	0

Table 11. Distribution of statistic over-all level of acceptability of squid ball in different formulation

Squid Ball	30% squid powder	45% squid powder	60% squid powder	100% squid powder
Appearance	7.53	7.10	7.50	7.13
Color	7.50	6.97	7.37	7.13
Aroma	7.23	7.13	7.10	7.57
Taste	7.07	6.53	6.40	7.50
Texture	7.20	6.90	6.67	7.23
OVER-ALL	7.30	6.93	7.01	7.31

Table 12. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of Pasta in 30% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	5	16.67%
Like Very Much	7.5 - 8.4	13	43.33%
Like Moderately	6.5 - 7.4	7	23.33%
Like Slightly	5.5 - 6.4	4	13.33%
Neither Like or Dislike	4.5 - 5.4	0	0.00%
Dislike Slightly	3.5 - 4.4	1	3.33%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.41

Standard Deviation 1.12

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	12	13	7	6	6
Like Very Much	8	6	10	6	8	8
Like Moderately	7	6	2	8	9	9
Like Slightly	6	3	3	5	3	5
Neither Like or Dislike	5	1	0	0	1	0
Dislike Slightly	4	2	2	2	3	2
Dislike Much	3	0	0	2	0	0
Dislike Very Much	2	0	0	0	0	0
Dislike Extremely	1	0	0	0	0	0

But what is more important in this study, is that it was able to reveal that the aroma, and taste were more important than appearance, color and texture, for a formulation to gain higher over-all acceptability.

Table 12 shows that majority (60%) of the respondents like very much to like extremely the Pasta in 30% squid powder formulation. The over-all rating was like moderately (mean= 7.41). And the standard deviation of 1.12 indicates that the respondents' evaluation of the Pasta in 30% squid powder formulation varied a lot from each other.

Table 13 shows that majority (53%) of the respondents like very much to like extremely the Pasta in 45% squid powder formulation. The over-all rating was like moderately (mean= 7.41). And the standard deviation of 1.16 indicates that the respondents' evaluation of the Pasta in 45% squid powder formulation varied a lot from each other.

Table 14 shows that majority (77%) of the respondents like moderately to like extremely the Pasta in 60% squid powder formulation. The over-all rating was like moderately (mean= 7.12). And the standard deviation of 1.05 indicates that the respondents'

Table 13. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of Pasta in 45% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	6	20.00%
Like Very Much	7.5 - 8.4	10	33.33%
Like Moderately	6.5 - 7.4	8	26.67%
Like Slightly	5.5 - 6.4	4	13.33%
Neither Like or Dislike	4.5 - 5.4	2	6.67%
Dislike Slightly	3.5 - 4.4	0	0.00%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.41

Standard Deviation 1.16

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	12	5	7	7	9
Like Very Much	8	8	13	11	5	8
Like Moderately	7	7	6	3	9	6
Like Slightly	6	3	5	6	2	3
Neither Like or Dislike	5	0	0	1	3	2
Dislike Slightly	4	0	1	2	2	1
Dislike Much	3	0	0	0	0	1
Dislike Very Much	2	0	0	0	1	0
Dislike Extremely	1	0	0	0	1	0

Table 14. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of Pasta in 60% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	3	10.00%
Like Very Much	7.5 - 8.4	5	16.67%
Like Moderately	6.5 - 7.4	15	50.00%
Like Slightly	5.5 - 6.4	4	13.33%
Neither Like or Dislike	4.5 - 5.4	3	10.00%
Dislike Slightly	3.5 - 4.4	0	0.00%
Dislike Much	2.5 - 3.4	0	0.00%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.12

Standard Deviation 1.05

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	4	5	10	8	5
Like Very Much	8	8	4	7	8	7
Like Moderately	7	7	13	5	3	9
Like Slightly	6	6	3	6	6	4
Neither Like or Dislike	5	4	3	1	4	3
Dislike Slightly	4	1	2	1	0	2
Dislike Much	3	0	0	0	0	0
Dislike Very Much	2	0	0	0	0	0
Dislike Extremely	1	0	0	0	1	0

evaluation of the Pasta in 60% squid powder formulation varied a lot from each other.

Table 15 shows that majority (67%) of the respondents like moderately to like extremely the Pasta in 100% squid powder formulation. The over-all rating was like moderately (mean= 7.47). And the standard deviation of 1.30 indicates that the respondents' evaluation of the Pasta in 100% squid powder formulation varied a lot from each other.

Table 16 shows that the highest over-all acceptability of the Pasta recipe was with the 100% squid powder. It also gained highest in terms of aroma, taste and texture. This is because the consumer tasted it as pasta with squid flavor. Traditionally when a consumer eats pasta, it does not have a flavor so it needs an additional sauce to enhance its taste. This is the reason 100% squid powder formulation gained the highest in terms of aroma, taste and texture, because it can be eaten alone without an additional sauce as condiments.

There is a variation on color and appearance, the 45% squid powder gained the highest acceptability in color, but the 30% squid powder gained the highest in terms of appearance.

Problem 4. Which formulation gained the highest acceptability per recipe?

Table 17 shows that the highest acceptability in empanaditas recipe was with the formulation 30% squid powder and 70% All-purpose Flour. However in the Squid Ball and Pasta recipe the highest acceptability was with the 100% squid powder formulation

CONCLUSIONS

Based on the results the squid innovated products with different formulation are acceptable to the evaluators and consumers. Squid Powder can be used as an alternative for flour. The squid innovated products can be sold in a form of snack. The different formulation

Table 15. Distribution of statistics Frequency, percentage distribution, mean and standard deviation of Pasta in 100% squid powder

Response	Range	Frequency	Percentage Distribution
Like Extremely	8.5 - 9.0	4	13.33%
Like Very Much	7.5 - 8.4	16	53.33%
Like Moderately	6.5 - 7.4	5	16.67%
Like Slightly	5.5 - 6.4	1	3.33%
Neither Like or Dislike	4.5 - 5.4	3	10.00%
Dislike Slightly	3.5 - 4.4	0	0.00%
Dislike Much	2.5 - 3.4	1	3.33%
Dislike Very Much	1.5 - 2.4	0	0.00%
Dislike Extremely	1.0 - 1.4	0	0.00%

Mean 7.47

Standard Deviation 1.30

Response	RATE	Appearance	Color	Aroma	Taste	Texture
Like Extremely	9	8	8	8	11	11
Like Very Much	8	9	7	9	12	6
Like Moderately	7	7	8	7	2	5
Like Slightly	6	2	2	5	1	4
Neither Like or Dislike	5	1	3	0	3	2
Dislike Slightly	4	2	1	0	0	1
Dislike Much	3	1	1	1	1	1
Dislike Very Much	2	0	0	0	0	0
Dislike Extremely	1	0	0	0	0	0

Table 16. Distribution of statistic over-all level of acceptability of Pasta in different formulation

Pasta	30% squid powder	45% squid powder	60% squid powder	100% squid powder
Color	7.63	7.97	6.97	7.37
Appearance	7.90	7.50	6.97	7.27
Aroma	7.03	7.37	7.53	7.53
Taste	7.20	6.80	7.13	7.77
Texture	7.30	7.40	7.03	7.43
OVER-ALL	7.41	7.41	7.13	7.47

Table 17. Distribution of statistic highest acceptability in formulation in different recipe

Highest Acceptability Per Recipe	30% squid powder EMPANADITAS	100% squid powder SQUID BALL	100% squid powder PASTA
Color	7.63	7.13	7.37
Appearance	7.47	7.13	7.27
Aroma	7.77	7.57	7.53
Taste	8.07	7.50	7.77
Texture	7.63	7.23	7.43
OVER-ALL	7.71	7.31	7.47

vary from the preference of the consumers. It is important that this variety can be supplied to the consumer. 100% squid powder can be utilized in the food industry, specifically on production of appetizers.

But fundamentally the Squid innovated product is acceptable most specially the 100% of Squid Powder for Pasta and Squid Ball.

RECOMMENDATIONS

Considering the findings, the following recommendations are presented.

The Local Food Producers and Entrepreneurs should consider the squid Innovated Products a good source of income and could double their marketability since the raw material is abundant in supply.

Consumers can enjoy the Squid innovated Product that is beneficial to the health of the individual for squid is also high in protein, copper, iron, potassium an exceptional nutrition combination that is extremely beneficial to human body.

Investors should be informed of the results of the analysis, so they may consider the innovation a potential investment in the future particularly to food industry and develop innovations of food particularly meals and snacks utilizing Squid Powder into Empanaditas, Squid Ball and Pasta.

Future Researchers may be useful in the future as future reference in pursuing further studies in utilizing Squid Powder as raw material.

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