



## RESEARCH PAPER

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## Acceptability of squash seeds (*Cucurbita maxima*) kropek

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### Abstract

People often discard the seeds found in vegetables and fruits, unaware of the high nutritional value they possess. Squash seeds may be tiny, but they are densely packed with useful nutrients, nutraceuticals and valuable minerals. The current situation of the squash seeds is underutilized, less acknowledged by people and frequently discarded as waste. In response, this study aimed to assess the acceptability of squash seed kropek in terms of color, aroma, taste, flavor, and general acceptability. An experimental design was employed, with treatments consisting of 100 g, 150 g, and 200 g of squash seeds. Additionally, a descriptive design using a rating sheet as the data collection instrument was implemented. The study involved 30 purposively selected respondents from various schools in the Municipality of Calape, Bohol. Results revealed that squash seeds kropek exhibited off-white color, a noticeable aroma, appropriate saltiness, and a distinct flavor. The general acceptability among the respondents was highly favorable. Furthermore, one-way ANOVA indicated no significant difference in acceptability among the three treatments. The results of the study indicate good potential for a community extension program to introduce and promote squash seeds kropek for public consumption, as well as an additional source of income.

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## Introduction

Food is one of the most important basic needs of human life for survival and well-being. Everyone must have access to safe, nutritious, and culturally appropriate food in sufficient quantity and quality to sustain a healthy and dignified lifestyle. Eating vegetables is an effective way to improve health. They are low in calories and high in fiber, vitamins, and minerals.

Vegetables also contain antioxidants that help to protect against diseases. A diet rich in vegetables may help prevent chronic diseases and make people healthy and fit.

The Philippines is one of the richest countries in agriculture, and is abundant in tropical fruits and vegetables. Considering its geographic location, the country is surrounded by abundant natural resources. Many Filipinos who live in remote places are traditionally engaged in growing all kinds of vegetables because of the tropical weather in the country. Often, people throw away the seeds they find in vegetables and fruits and are completely unaware of the high nutritional value of what they are discarding. For instance, vegetable-like squash is available all year. Many people discard the seeds and favor only flesh. The flesh of the squash is consumed fresh, processed, and used in culinary recipes.

The current situation of the squash seeds is underutilized, less acknowledged by people and frequently discarded as waste. Squash seeds are scattered and not used productively, aside from being planted again in another squash plant. This misleads people about the fact that squash seeds have considerable nutritional benefits and are a potential food product. Currently, Filipinos are exposed to the production of synthetic foods, such as processed foods, which are unhealthy and much more dangerous to human health.

As observed, the squash seeds were only roasted or eaten as a whole. Only a few products had been made from squash seeds. Such aforementioned reasons

prompted the researchers to develop nutritional snacks out of squash seeds to promote their utilization. Researchers want to add value and provide the potential of squash seeds to form a new product like "Squash Seeds Kropek".

Given the few existing products made from squash seeds, there is an opportunity to add value and transform these seeds into a more appealing and versatile snack. The creation of "Squash Seeds Kropek" represents a novel approach to elevate the utilization of squash seeds. The term "Kropek" is associated with a popular and widely consumed snack, adds a touch of cultural relevance and making it a familiar format for introducing this innovation to the community. Kropek is known for its versatility and can be made from various ingredients. This makes it a suitable medium for incorporating squash seeds, allowing for creative experimentation with flavors.

## Statement of the problem

This study primarily aimed to determine the acceptability of Squash Seeds (*Cucurbita maxima*) Kropek in terms of color, taste, aroma, flavor, and overall acceptability during the school year 2022-2023 as a basis for a proposed technology guide at Bohol Island State University Calape, Campus, Calape, Bohol.

Specifically, this study sought to answer the following questions:

1. What is the acceptability level of squash seeds kropek with different treatments: 100 grams of squash seeds, 150 grams of squash seeds, 200 grams of squash seeds in terms of the following sensory attributes:
  - 1.1 Color,
  - 1.2 Aroma,
  - 1.3 Taste,
  - 1.4 Flavor, and
  - 1.5 General acceptability?
2. Is there a significant difference in the acceptability of the three treatments of squash seeds kropek in terms of color, aroma, taste, flavor, and general acceptability?

3. What is the cost description of squash seeds kropek with different treatments: 100 grams of squash seeds, 150 grams of squash seeds, 200 grams of squash seeds?
4. What extension program can be proposed to utilize squash seeds as an alternative food product?

#### *Statement of hypothesis*

There is no significant difference in the acceptability of the three treatments of Squash seeds (*Cucurbita maxima*) kropek in terms of color, aroma, taste, flavor, and general acceptability.

### **Materials and methods**

#### *Design*

The researchers used both descriptive and experimental survey design in conducting the study. Descriptive research design is a powerful tool used by scientists and researchers to gather information about a particular group or phenomenon. This type of research provides a detailed and accurate picture of the characteristics and behaviors of a particular population or subject. An experimental design was also used in this study, is the process of carrying out research in an objective and controlled fashion so that precision is maximized and specific conclusions can be drawn regarding a hypothesis statement. Generally, the purpose is to establish the effect that a factor or independent variable has on a dependent variable (Bell, 2009).

Different treatments were manipulated, such as Treatment (1) 100 grams Squash Seeds, Treatment (2) 150 grams Squash Seeds, Treatment (3) 200 grams Squash Seeds Kropek. Respondent's acceptability was collected in terms of sensory attributes such as color, aroma, taste, flavor, and general acceptability. A rating sheet was used to record the sensory evaluation of the respondents in order to get the results.

#### *Environment and respondents*

The study was conducted in the municipality of Calape, Bohol, Philippines. A total number of thirty (30) respondents were involved in this study who

rated the acceptability of the food product. The selected respondents were the T.L.E Teachers (5) and T.V.L-H. E Teachers (8) from Calape National High School, Mayor Anunciacion R. Tuazon School of Fisheries (2), TLE Teachers of Bohol Province Institute (3), Selected BSIT-FPST OJTs (5), Food Technology Instructors (2), and 2<sup>nd</sup> year Students of BSIT-FPST Technology (10). They were chosen because they have the expertise about food and the ability to distinguish the acceptability levels of the three different treatments.

#### *Research instrument*

The researchers utilized the rating sheet which has been constructed to obtain the necessary data. The researchers used a 9-point hedonic scale to identify respondents' sensory preferences as a way of evaluating the product. Researchers have also used coding descriptors. In the sample code, to be able to randomize the experimentation, researchers used a highly experimental approach to gather data in each sample for each treatment. The questionnaires measured the sensory attributes, such as the color, aroma, taste, and flavor of each attribute's description. The gathered data served as a basis for statistical analysis, evaluation, and interpretation of the acceptability of this product. The researchers used the 9-point hedonic scale since it has been used routinely in food science since 1945 (Lawless and Heymann, 1998).

#### *Research procedure*

##### *1. Permission to conduct the study*

The process of conducting the research started by asking permission from the Campus Director and Dean of the College of Technology and Allied Sciences and to the different school principal to allow the researchers to conduct the study. Once approved, the researchers made a self-constructed questionnaire and submitted it to the research adviser and critic for correction and revision before the final administration. The rating sheets were distributed personally to the selected respondents. After due time, the rating sheets were retrieved, and the data are being gathered, tallied, analyzed, and interpreted.

## *2. Preparation of ingredients tools and equipment, and procedure*

In preparation for making the squash seeds kropek, there were three (3) which have been applied: T1 with 100 grams of squash seeds, T2 with 150 grams of squash seeds, and T3 with 200 grams of squash seeds. The tools and equipment that were used in this study include mixing bowl, blender, sifter, rolling pin, weighing scale, cookie cutter, baking sheet, measuring cups and spoons, kitchen shears, steamer, and net. Researchers ensured that the ingredients and materials used in making the Squash Seeds Kropek were clean.

## *3. Steps in making the production of kropek derived from squash seeds*

1. Preparing and gathering the squash seeds, then washing them.
2. Placing it on the baking sheet and covering it with a net.
3. Drying the squash seeds under the sun for 1–2 days.
4. Measuring the seeds: T1 – 100 grams of seeds; T2 – 150 grams of seeds; and T3 – 200 grams of seeds.
5. Boiling it for 5 minutes, until tender.
6. Blending the squash seeds thoroughly using a blender.
7. Adding 3 tsp. salt, 3 tsp. pepper, and 3 tsp. of sifted baking powder and mixing it with 3 cups of cassava flour in a clean bowl, then kneading until smooth.
8. Flattening the kneaded dough and placing it on a clean banana leaf. Steaming it for 45 minutes, then leaving until hardened.
9. Cutting into circular pieces and placing them under the sun to dry. Frying and putting them in a stand-up pouch and then finally sealing the treatments.

## *4. Tasting and evaluating the formulated kropek*

After the preparation and making of Squash Seeds Kropek with three (3) treatments, the researchers tested the products first before distributing them to the respondents for tasting. The researchers

approached the respondents in their respective areas for the distribution of the survey questionnaires and for the tasting of the product. In the tasting process, the participants were provided with water to rinse their mouths before and after tasting each treatment.

## *5. Distribution of questionnaires*

Questionnaires were given to the respondents, then the researcher briefly introduced the study and guided them on how to promptly answer the questionnaires; afterwards, sample products were served. They were given enough time to answer the questionnaires after examining every treatment. The one-way ANOVA was used to determine the difference in acceptability of the different the treatments of Squash Seeds Kropek.

## *Statistical treatment*

To be able to attain scientific evidence and answers to the research problems, the following statistical tools were used. Frequency (*f*) and percent (%) are used to determine the sensorial description of the Squash Seeds Kropek such as color, aroma, texture, and taste. Mean (*M*) was used to ascertain the description of the acceptability of Squash Seeds Kropek in terms of appearance, aroma, taste, flavor, and overall acceptability. It is interpreted as follows:

One-way analysis of variance applying bootstrapping with 95% bias corrected accelerated was used to test if there is significant difference on the acceptability of the three treatments of Squash Seeds Kropek in terms of color, taste, aroma, taste, flavor, and general acceptability. Bootstrapping is robust estimation method for reducing bias associated with normality, homogeneity of variance, and sampling. Explicitly, the F-statistic with corresponding between and within group degrees of freedom was determined which is defined as the ratio of the between-group variability to the within-group variability. Moreover, probability values (*p*) are compared at .05 level of significance. The P-value indicates the probability that an observed result (or one more extreme) could have occurred by chance, assuming that the null hypothesis is true. If the probability is  $\leq$  the pre-

decided significance level (e.g.,  $\leq 1$  in 20,  $p \leq 0.05$ ), the null hypothesis is rejected, which supports the complementary hypothesis that there is a true difference between the groups. The IBM SPSS Statistics Trial Version was used in data analysis (Duncan, 1995; Bower, 2013; Tabachnick and Fidell, 2018; Myles, 2002; IBM Corp, 2022).

## Results and discussion

### Color

Table 1 shows the description and acceptability of squash seed kropek in terms of color. Color evaluation is an important aspect of sensory evaluation because it can significantly influence consumer acceptance and purchase decisions for a product (Jaeger *et al.*, 2018). The Table 1 shows that 100 g of squash seeds ( $f = 15$ ,  $\% = 50.0$ ), 150 g of squash seeds ( $f = 20$ ,  $\% = 66.7$ ), and 200 g of squash

seeds ( $f = 15$ ,  $\% = 50.0$ ) had an off-white color. Moreover, in terms of acceptability, 100 g of squash seeds ( $M = 7.63$ ), 150 g of squash seeds ( $M = 7.63$ ), and 200 g of squash seeds ( $M = 7.37$ ) were liked very much by the respondents.

The color of the three treatments was perceived as "off-white." The off-white color of the squash seed kropek was likely due to the combination of cassava flour and squash seeds used in the recipe. The natural colors of these ingredients contribute to the overall appearance of the kropek. Cassava flour, being off-white itself, contributes to the color of the final product, the kropek. A study conducted by Iwag *et al.* (2016) showed that the type of flour used affects the whiteness of white products. According in the study, rice flour produces a whiter product than corn flour.

**Table 1.** Color description and acceptability of squash seeds kropek ( $n = 30$ )

Color		Treatments					
		100 grams		150 grams		200 grams	
		f	%	f	%	f	%
Description	White	5	16.7	4	13.3	12	40.0
	Off-white	15	50.0	20	66.7	15	50.0
	Light brown	10	33.3	6	20.0	3	10.0
Acceptability	Mean	7.63		7.63		7.37	
	Interpretation	Like very much		Like very much		Like very much	

Description: Description with the highest f and % is used as descriptor for the treatment.

Acceptability: 8.12-9.00 = Like extremely, 5.45-6.33 = Like slightly, 2.78-3.66 = Dislike moderately, 7.23-8.11 = Like very much, 4.56-5.44 = Neither like nor dislike, 1.89-2.77 = Dislike very much, 6.34-7.22 = Like moderately, 3.67-4.55 = Dislike slightly, 1.00-1.88 = Dislike extremely

Shrimp flour was used to produce brown kropeks. Similarly, the mild flavor and off-white color of cassava flour produced an off-white color. The type of flour or starch used to make a cracker is known to affect its quality (Tawee, 2011).

In addition, the color of the squash seeds aids the appearance of kropek. The seeds are flat and asymmetrically oval, with a white outer husk, which is called the seed coat, and the kernel is light-green in color. The seed coat structure observed in *Cucurbita* species is referred to as the chlorenchyma, parenchyma, sclerenchyma, hypodermis, and epidermis (Li *et al.*, 2013). Moreover, the color of the

half-finished or intermediate product of squash seed kropek, which is unpuffed, is pale green and turns off-white in color once it is deep-fried, which displays the final appearance of the kropek.

Moreover, color is one of the major attributes that affects consumers' perception of quality (Hutchings, 2005), holds a preeminent position in food acceptance, and can be a predictor of non-sensory attributes such as moisture content, over-processing, and pigment content (Moyano *et al.*, 2008; Melendez-Martinez *et al.*, 2008). Thus, the three treatments had the same color result, indicating that the amount of squash seeds added had a similar effect in terms of color.

**Table 2.** Aroma description and acceptability of squash seeds kropek (n = 30)

Aroma		Treatments					
		100 grams		150 grams		200 grams	
		f	%	f	%	f	%
Description	No distinct squash seeds kropek aroma	1	3.3	0	0	0	0
	Slightly perceptible squash seeds aroma	12	40.0	8	26.7	6	20.0
	Well-blended squash seeds aroma	5	20.0	10	33.3	6	20.0
	Moderately perceptible squash seeds aroma	7	23.3	7	23.3	12	40.0
	Very perceptible squash seeds aroma	4	13.1	5	16.7	6	20.0
Acceptability	Mean	7.27		7.43		7.17	
	Interpretation	Like very much		Like very much		Like moderately	

Description: Description with the highest f and % is used as descriptor for the treatment.

Acceptability: 8.12-9.00 = Like extremely, 5.45-6.33 = Like slightly, 2.78-3.66 = Dislike moderately, 7.23-8.11 = Like very much, 4.56-5.44 = Neither like nor dislike, 1.89-2.77 = Dislike very much, 6.34-7.22 = Like moderately, 3.67-4.55 = Dislike slightly, 1.00-1.88 = Dislike extremely

### Aroma

Table 2 shows the description and acceptability of the squash seed kropek in terms of its aroma. Aroma is a critical aspect of sensory evaluation, as it plays a key role in determining the overall acceptability of a product and can greatly influence consumer preferences" (Lawless and Heymann, 2010). Table 2 shows that 100 g of squash seeds (f = 12 % = 40.0) had a slightly perceptible squash seed aroma, 150 g of squash seeds (f = 10 % = 33.3) had a well-blended squash seed aroma, and 200 g of squash had a moderately perceptible squash seed aroma (f = 12 % = 40.0). Moreover, in terms of acceptability, 100 g of squash seeds (M = 7.27) and 150 g of squash seeds (M = 7.43) liked very much. Meanwhile, 200 g of squash seeds (M = 7.17) were liked moderately by the respondents.

The increase in the perceptibility of aroma as more grams of squash seeds were added is likely related to the concentration of volatile compounds present in the seeds. Squash seeds contain various compounds such as aldehydes, ketones, esters, and other aroma-active molecules. The volatiles dominating raw pumpkin seeds are lipid aldehydes, ethyl acetate, 2,3-butandione, and dimethylsulfide (Bowman and Barringer, 2012). This explains why, as the quantity of seeds increases, more of these compounds are released, resulting in a stronger and more pronounced aroma that is easily detectable. According to Yang *et al.* (2021), the perception of aroma, which pertains to the sense of smell, is

dependent on the volatile aroma compounds released from the food, and olfactory sensation linked with aroma perception is simulated by volatile aroma compounds released from the food. Additionally, compounds smelled by olfaction are called aroma-active compounds in food (Yu *et al.*, 2021).

In general, aroma plays a vital role in determining consumers' choices, perceptions, and acceptance of food. It also contributes to 80% of pleasure in food (Yu *et al.*, 2021). Thus, the results revealed that, as the grams of squash seeds increased, they became more perceptible in terms of their aroma. However, it can also be seen that the respondents preferred the aroma of squash seeds, which was not overpowering.

### Taste

Table 3 shows the description and acceptability of squash seed kropek in terms of taste. Taste is essential in sensory analysis, as it provides valuable information about the flavor profile and overall acceptability of a product, and can help manufacturers optimize product formulations to meet consumer preferences" (Jaeger *et al.*, 2018). Table 3 shows that 100 g of squash seeds (f = 12, % = 40.0), 150 g of squash seeds (f = 16, % = 53.3), and 200 g of squash seeds (f = 14, % = 46.7) had the right saltiness. Moreover, in terms of acceptability, 100 g of squash seeds (M = 7.57), 150 g of squash seeds (M = 7.43), and 200 g of squash seeds (M = 7.60) were liked very much by the respondents.



**Table 3.** Taste description and acceptability of squash seeds kropek (n = 30)

Taste		Treatments					
		100 grams		150 grams		200 grams	
		f	%	f	%	f	%
Description	Bland taste	0	0	0	0	0	0
	Just the right saltiness	12	40.0	16	53.3	14	46.7
	Slightly salty	7	23.3	8	26.7	6	20.0
	Moderately salty	10	33.3	3	10.0	6	20.0
	Very salty	1	3.3	3	10.0	4	13.3
Acceptability	Mean	7.57		7.43		7.60	
	Interpretation	Like very much		Like very much		Like very much	

Description: Description with the highest f and % is used as descriptor for the treatment.

Acceptability: 8.12-9.00 = Like extremely, 5.45-6.33 = Like slightly, 2.78-3.66 = Dislike moderately, 7.23-8.11 = Like very much, 4.56-5.44 = Neither like nor dislike, 1.89-2.77 = Dislike very much, 6.34-7.22 = Like moderately, 3.67-4.55 = Dislike slightly, 1.00-1.88 = Dislike extremely

All the treatments were perceived as “just the right saltiness.” The saltiness of kropek is influenced by the concentration of salt and other seasonings in the recipe. While the amount of squash seeds added varied, consistent levels of salt, black pepper, baking powder, and minced garlic ensured a uniform measurement across all treatments. Food saltiness is detected in the mouth when Na<sup>+</sup> ions react with taste receptor cells located on taste bud cells. An epithelial sodium channel (ENaC) in the taste cell wall allows sodium cations to enter cells (Cagim, 2023).

The amount of saltiness achieved is likely due to the balance of the seasoning it brings to the overall taste of all three treatments. Too little salt can make the kropek bland, whereas too much salt can overpower the flavors. According to Lindemann (2001), salty perception may trigger both attraction and repulsion towards a source. At high concentrations, saltiness usually results in a negative reaction, whereas at low to moderate concentrations, it is attractive.

The difference in squash seed quantity did not significantly affect overall taste. The scientific explanation lies in the way our taste buds perceive flavor. Our taste receptors are sensitive to relative concentrations; therefore, even with varying amounts of squash seeds, the balanced ratios maintain the desired level of saltiness. According to Tawee (2011), the sensory perception of taste is a key quality factor, and it does not constitute a major engineering and scientific problem in terms of well-

defined measurable quantities. In conclusion, the three treatments had the same result in taste, which is just the right saltiness, and it shows that the amount of squash seeds added has a similar effect in terms of taste.

#### Flavor

Table 4 shows the description and acceptability of the squash seed kropek in terms of flavor. Flavor is essential in sensory analysis, as it provides valuable information about the taste and aroma components of a product, and can help manufacturers optimize product formulations to meet consumer preferences" (Jaeger *et al.*, 2018). Table 4 shows that 100 g of squash seeds (f = 10, % = 33.3) had a slightly perceptible flavor, 150 g of squash seeds (f = 12, % = 40.0) had a well-blended flavor, and 200 g of squash seeds (f = 16, % = 53.4) had a very perceptible flavor. Moreover, in terms of acceptability, 100 g of squash seeds (M = 7.57), 150 g of squash seeds (M = 7.57), and 200 g of squash seeds (M = 7.70) were liked very much by the respondents.

The increase in the perceptibility of flavor as more grams of squash seeds are added is likely related to the concentration of volatile compounds present in the seeds (Mulu *et al.*, 2022). It can be noted that, squash seeds contain volatile compounds that contribute to their aroma. As more seeds were added, the concentration of these volatile compounds increased, leading to a stronger aroma. Our sense of taste is heavily influenced by our smell, so a stronger

aroma can enhance the overall flavor perception. This explains why volatile compounds can reach the olfactory epithelium through one of two routes: orthonasal (via the nostril) or retronasal (via the nasopharynx) (Negoias *et al.*, 2008). Additionally, taste or aroma not only affects the perceived flavor as an independent modality but the combination of

taste and aroma can also change both the intensity and quality of the perceived flavor as a result of cross-modal association (Wallace, 2015). Congruent taste and aroma modalities, when presented together, increase the perceived flavor intensity more than the sum of the independent taste and aroma (Hewson *et al.*, 2009).

**Table 4.** Flavor description and acceptability of squash seeds kropek (n = 30)

Flavor		Treatments					
		100 grams		150 grams		200 grams	
		f	%	f	%	f	%
Description	No distinct squash seeds kropek flavor	0	0	0	0	0	0
	Slightly perceptible squash seeds flavor	10	33.3	3	10.0	6	20.0
	Well-blended squash seeds flavor	7	23.3	12	40.0	1	3.3
	Moderately perceptible squash seeds flavor	8	26.7	8	26.7	7	23.3
	Very perceptible squash seeds flavor	5	16.7	7	23.3	16	53.3
Acceptability	Mean	7.57		7.57		7.70	
	Interpretation	Like very much		Like very much		Like very much	

Description: Description with the highest f and % is used as descriptor for the treatment.

Acceptability: 8.12-9.00 = Like extremely, 5.45-6.33 = Like slightly, 2.78-3.66 = Dislike moderately, 7.23-8.11 = Like very much, 4.56-5.44 = Neither like nor dislike, 1.89-2.77 = Dislike very much, 6.34-7.22 = Like moderately, 3.67-4.55 = Dislike slightly, 1.00-1.88 = Dislike extremely

**Table 5.** Test of hypotheses on the differences of the acceptability of squash seeds kropek (n = 30)

Sensory attributes	F	p	Decision	Result
Color	.638	.531	Retain Ho	Insignificant difference
Aroma	.797	.454	Retain Ho	Insignificant difference
Taste	.236	.790	Retain Ho	Insignificant difference
Flavor	.196	.823	Retain Ho	Insignificant difference
General acceptability	.301	.741	Retain Ho	Insignificant difference

F-value is determined with 2 degrees of freedom between groups and 87 degrees of freedom within groups. F-value is based on Bias corrected and accelerated bootstrap 95% confidence intervals. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples.

If "Reject Ho", statistic is significant since  $p \leq 0.05$ . If "Failed to Reject Ho", statistic is insignificant since  $p > 0.05$ .

To summarize, flavor perception is a combination of multisensory modalities, of which aroma and taste are the two primary drivers (Auvray and Spence, 2008)). As the number of squash seeds increased, the flavor became more noticeable or perceptible. Larger quantities of seeds release a greater amount of flavor when chewed or consumed, leading to a more pronounced flavor experience. Thus, the results reveal that as the grams of squash seeds increase, they become more perceptible in terms of flavor. This shows that respondents preferred more squash seeds for kropek.

#### General acceptability

General acceptability evaluation is essential in sensory analysis, as it provides valuable information about consumer preferences and can help manufacturers optimize product formulations to meet these preferences" (Jaeger *et al.*, 2018). In food acceptance tests, it is typical for respondents to rate a product on overall acceptability and on a series of product attributes. In terms of general acceptability, 100 g of squash seeds, 150 g of squash seeds, and 200 g of squash seeds are described as "Like Very Much." The 100 g squash seeds got the highest rating of 7.73,



followed by 200 g squash seeds with a rating of 7.70. Finally, 150 g of squash seeds got the lowest rate (7.57). The results revealed that 100 g of squash seeds is more acceptable and preferred by respondents in terms of general acceptability.

Table 5 shows the results of One-way analysis of variance test of significant difference on the acceptability of Squash Seeds Kropek in terms of color, aroma, taste, flavor, and overall acceptability.

The results revealed that color,  $F(2,87) = .638$ ,  $p = .531$ ; aroma,  $F(2,87) = .797$ ,  $p = .454$ ; taste,  $F(2,28) = 7.904$ ,  $p = .021$ ; taste  $F(2,87) = .236$ ,  $p = .790$ ; flavor,  $F(2,87) = .196$ ,  $p = .823$ ; and general acceptability,  $F(2,87) = .301$ ,  $p = .741$  exhibited no statistically significant differences among the three treatments of squash seeds kropek. This implies that the amount of squash seeds in the three treatments did not affect the acceptability of squash seeds kropek across all sensory attributes such as color, aroma, taste, flavor, and general acceptability.

### Conclusion

Based on the findings, the researchers conclude that 100g, 150g and 200g of squash seeds are sensory suitable for making Kropek. Furthermore, all treatments are deemed acceptable and marketable as vegetarian snacks, without specifically mentioning their nutritional benefits to human health. This versatile Kropek is considered valuable; turning what was once considered waste into a product containing essential nutrients for the body. It represents an opportunity for extension program to inform the public about its viability for home consumption and as an additional source of income.

### Recommendations

Based on the findings and conclusions drawn from the study, the following recommendations are forwarded:

1. It is advisable to product comprehensive storage studies aimed determining the shel-life of squash seeds kropek. This will provide crucial insights into

the products stability overtime, aiding in establishing appropriate storage condition and informing potential distribution strategies.

2. To enhance to product's nutritional profile and provide valuable information for consumers a detailed nutritional analysis is recommended.

3. Given the significant roles of aroma in consumer acceptance, it is recommended to undertake a focused study on methods to optimize and potentially reduce the aroma of squash seed kropek.

4. To further understand the physical characteristics of squash seed kropek during processing, a study on linear expansion is proposed. This research can provide valuable data on how the product expands during frying, aiding in process optimization and quality control.

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