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Product Innovation of Taro Croquette with Moringa Leaves and Oyster Mushroom Stuffing

Fatimah Nur Hanifah Nasution[1] , Christian H. Rumayar[2], Dias Pratami Putri[1]

[1] Universitas Pendidikan Indonesia, Jl. Dr. Setiabudhi No. 229, Bandung 40154, Indonesia
[2] Politeknik Pariwisata NHI Bandung, Jl. Setiabudhi No. 186, Bandung 40141, Indonesia

** Corresponding Author. E-mail: : fatimahnasution@upi.edu (Fatimah Nur Hanifah Nasution)*

ABSTRACT

Product innovation in food is one aspect of improving an existing food product, especially the health benefits in it so that it can be consumed by anyone without worrying about side effects due to unhealthy food. Croquettes are a potato-based snack filled with various kinds of meat, so croquettes cannot be enjoyed by vegetarians. Therefore, an innovative product of taro croquettes was made with the stuffing of moringa leaves and oyster mushrooms. Croquettes made from taro which is one of the local foods whose products must be reproduced and developed, then using the stuffing of oyster mushrooms and moringa leaves which is one of the superfoods that has very good nutritional value so that it can increase the value of the croquettes,. Therefore, many people can try taro croquettes with moringa leaves and oyster mushrooms as a healthier option. This research employs a quantitative research method through an experimental approach. In the taro croquette product innovation experiment, there were three recipe formulations that were tested by expert panelists and general panelists so that the test results could produce the best recipe formulation among the three formulations that had been made.

Keywords: Product Innovation; Taro Croquette; Moringa Leaves; Oyster Mushroom; Healthy Food.

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1. Introduction

Food cannot be separated from human needs; and it is too simple if food is defined merely as human needs since there are so many meanings in food such as characterizing human lifestyles (Salsabila et al., 2021) . Even in tourism activities, culinary must always run smoothly and pleasantly. Food that can characterize human lifestyle can be seen from the content of the food consumed. So Therefore, it can be seen that the lifestyle they adopt is healthy for people who pay attention to nutrition in the food or drink they consume. Still, on the other hand, some people do not really care about nutrition or what content they consume, so this lifestyle is said to be unhealthy.

It is important to know the nutritional content of food consumed to be able to estimate how many dietary needs have been met or have not been met. The calories needed in one day by adult women (19-30 years) are 2000-2200 calories, while for adult men (19-30 years), the calories needed in a day are 2600-2800 calories with standard activity categories (Rusliyawati et al., 2020).

Determining the calories consumed in a day is essential in implementing a healthy life, but the type of food consumed and its benefits of it are also significant. There are various kinds of healthy foods that can be consumed from a variety of raw materials that grow in this vast nature.

The raw materials used are local raw materials that are easily found, and there are still few processed foods. Besides increasing the existence of local raw materials, the community can also recognize the benefits of these raw materials.

Healthy food is not always about staple foods but can take the form of snacks. Croquettes are one of the snacks that are pretty well known to people because of their delicious taste with meat fillings. However, to find a healthy snack, the content in it must be balanced. Therefore, a croquette product innovation was made that uses nutritious local raw materials, namely croquettes with taro outer layer and stuffing using moringa leaves and oyster mushrooms. It is expected that the innovation of this croquette product will produce nutritional content that can reach the category healthy food and not too many calories.

The purpose of this research on product innovation of taro croquettes with moringa leaves and oyster mushrooms is to find the recipe formulation, calculate the nutritional content of taro croquettes, and the results of organoleptic and consumer acceptance tests.

2. Literature Review

2.1 Product Innovation

An opinion (Myers & Marquis in Kotler & Armstrong, 2017) is that product innovation is a product result that goes through various processes that have been put together and influence each other.

Product innovation results from new product development by a company or industry, both existing and not. Starting from old products that have reached saturation point in the market, innovation is needed to replace the old products. This replacement can be in the form of a replacement product that is entirely new or with the development of old products to make them better and more attractive so that they can continue to increase consumer desires in purchasing decisions (Kojo et al., 2018).

2.2 Healthy Food

Fulfilling good nutrition can be obtained through healthy foods that contain the elements that the human body needs, namely proteins, carbohydrates, fats, vitamins, and minerals; not only that, they also must be protected from germs, or materials that harm the body, food additives (BTP) which are not suitable for the body such as chemical dyes and formalin, contaminants, and others (Puspadewi & Briawan, 2015).

2.3 Croquette

The definition of kroket in the official dictionary of Bahasa Indonesia or KBBI is a food made from the essential ingredients of mashed potatoes and has a meat filling in it, shaped into ovals and then fried. The word kroket is a loan word from the French word croquette. With the development of the era, humans also had high creativity because potatoes are the essential ingredients of croquettes, as stated in the KBBI and they can also use cassava, sweet potatoes, pumpkin, and taro. Stuffing on croquettes can also vary such as chicken, fish, vegetables, and others can (Michalak et al., 2017).

2.4 Taro

In the explanation in the culinary dictionary, taro is a bulbous plant with cloth leaves (Kurniawati et al., 2019). Taro plants or plants are also one of the many kinds of bulbous foods that are quite a lot in Indonesia. Not only that, taro has a high economic value. Many parts of the plant can be used, starting from the midrib, tubers to leaves; some are used as food and food wrappers, even leaves, the rest of the tuber skin and the rest of the tubers can be used as animal feed (Danumarja in Habibah & Astika, 2020).

2.5 Moringa Leaves

The leaves of the moringa plant or another name Moringa Oleifera are one of the plants with rich benefits. Most people already know what moringa leaves are, but still, not many people know the benefits. This moringa plant comes from the plains along the sub-Himalayas, namely India, Pakistan, Bangladesh, and Afghanistan.

Moringa plants are included in the type of long-lived shrubs in the form of shrubs or trees that have a height of 7-12 meters. The stems are woody, erect, ivory white, thin-skinned, and easily broken. The branches are rare in an upright or oblique direction and also tend to grow straight and elongated (Tilong, 2012). Moringa cultivation in Indonesia is spread throughout the region; therefore, moringa plants are known by different names in various regions, such as murong (Aceh), munggai (West Sumatra), kilor (Lampung), kelor (West Java and Central Java), marongghi (Madura), kiloro (Bugis), parongge (Bima), kawona (Sumba), and kelo (Ternate).

Moringa leaf (Moringa Oleifera) is considered a food that has a very high nutritional value and is also considered as a supplement for protein, calcium, and fiber in addition to containing phytochemicals, glucosinolates which are very useful for health such as anti-hypertensive, anti-cancer, antimicrobial (Evivie et al., 2015).

2.6 Oyster Mushroom

Oyster mushroom is one of the many agricultural products in Indonesia which contains many benefits, especially in terms of nutrition and also one of the organic horticultural plants or plants (Achmat in Ginting, 2019).

There are so many benefits to oyster mushrooms that oyster mushrooms are considered a food supplement that has a positive effect on humans, one of which can reduce the risk of chronic disease (Patel et al., 2012).

2.7 Product Innovation of Taro Croquette with Moringa Leaves and Oyster Mushroom Stuffing

Croquette is originally made from potatoes, but to adjust to the existing local raw materials, then taro is used. Moringa which is one of the superfoods as stuffing is good for health, added with oyster mushrooms which are a source of protein and also a substitute for meat so that even vegetarians can try croquettes without worrying about the content of animal meat in it.

Source: (Author's Documentation Year 2022)
Figure 1. Taro Croquette with Moringa Leaves and Oyster Mushroom Stuffing

The figure above is the result of a taro product innovation that has undergone several pre-experiments that are ready to be assessed by six experts and 30 general panelists. The taro croquettes are filled with moringa leaves and oyster mushrooms which have been sauteed with various spices to produce a savory taste with the smell of spices and herbs.

3. Materials and Methods

3.1 Types of Research Methods

This research focuses on product innovation using quantitative research methods with an experimental approach. Experiments carried out on product innovation of taro croquettes with moringa leaf, and oyster mushroom fillings have three recipe formulations to be tested.

3.2 Data Collection Techniques

There are two data collection techniques used, namely the questionnaire method and the documentary method. The questionnaire method here is closed using a Likert scale design. The documentary method used is to record a video of the process at the kitchen project stage (video of the process of making product innovations). There are data collection techniques that have been classified as follows:

a) Primary Data Collection Techniques
Survey Method, Observation Method, Engineering Experiment Method
1. Secondary Data Collection (Literature Study)

4. Results and Discussion

4.1 Recipe Formulation

After conducting research through organoleptic tests and consumer acceptance tests on the innovation of three innovative recipe formulations for taro croquettes filled with moringa leaves and oyster mushrooms with expert panelists and trained panelists, a recipe formulation that has the highest value was found according to the questionnaire assessment using the Likert scale. The result of the evaluation of the highest recipe formulation by expert panelists and general panelists was the product innovation of taro croquettes with moringa leaves and oyster mushrooms stuffed, the taro refining process through frying. The organoleptic test on the product innovation of taro croquettes with moringa leaf and oyster mushroom filling took into account five aspects: taste, texture, color, aroma, and appearance.

The consumer acceptance test uses five aspects of organoleptic testing but with additional packaging and label assessments. The following is the result of the formulation of the taro croquette recipe with the stuffing of moringa leaves and oyster mushrooms:

Tabel 1. Taro Croquette Recipe Formulation with Moringa Leaf Stuffing

No	Ingridient		Descreption
1	Bogor Taro		
2	Corn Starch		
3	Garlic		
4	Shallot		
5	Egg Yolk		
6	Pepper Powder		
7	Salt		
8	Mushroom Powder	Broth	Outer
9	Water		
10	Moringa Leaves		
11	Oyster		
12	Garlic		
13	Onion		
14	Mushroom	Broth	

No	Ingridient	Descreption
	Powder	
15	Salt	
16	Pepper Powder	
17	Cooking Oil	Inner
18	Sugar	
19	Bread Crumbs	Coating
20	Egg	

Source: by Author 2022

In the table of ingredients used in the innovation of the taro croquette product with the stuffing of Moringa leaves and oyster mushrooms, there is also a gramation and explanation for each part of the taro, which consists of the outer, which means the outer part of the croquette is the taro, the inner which means the croquette filling, namely moringa leaves and oysters mushrooms., then coating, which is the final coating on the croquettes consisting of breadcrumbs and eggs.

In addition to determining what ingredients are needed in the product innovation of taro croquettes with moringa leaf and oyster mushroom filling, there must also be a manufacturing procedure for the product innovation. The following is the framework for the innovative process of making taro croquettes with moringa leaves and oyster mushrooms stuffed:

Figure 2 The Process Framework for Making Taro Croquettes Innovation with Moringa Leaf and Oyster Mushroom Filling

The framework in Figure 2 above is the process of making taro croquettes with the stuffing of Moringa leaves and oyster mushrooms. The outline describes the manufacturing process from preparation to serving or storage.

4.2 Calculation of Nutrient Content

Nutritional content is what fills the nutritional composition of food (BPOM, 2013). Generally, the nutritional content is obtained from the food composition table, which contains both macronutrients and micronutrients.

Calculation of nutrient content per serving can be calculated by the following formula:

Weight of one serving/100 grams of BDD x energy content per 100 grams of BDD

Note: The content per 100 grams of BDD can be seen in the food composition table

Tabel 2. Calculation of Nutritional of Taro Croquettes With Moringa Leaf and Oyster Mushroom Filling

No	Ingredient	Many Gr	Energy kkal	Protein gr	Fat gr	Carb gr
1	Bogor Taro	350	378	4.9	1.4	87.5
2	Corn Starch	10	34.1	0.03	0	8.5
3	Garlic (Blended)	30	33.6	1.35	0.06	6.93
4	Shallot (Blended)	40	18.4	0.6	0.12	3.68
5.	Egg Yolk	16	56.8	2.60	5.10	0.11
6.	Pepper Powder (Superindo)	3	10	0	0	2
7.	Salt	5	0	0	0	0
8.	Mushroom Broth Powder	3	1.02	0.15	0	0.09
9.	Moringa Leaves	60	55.2	3.06	0.96	8.58
10.	Oyster Mushroom	500	150	9.5	0.5	27.5
11.	Garlic (Chopped)	30	33.6	1.35	0.06	6.93
12.	Onion (Chopped)	60	25.8	0.84	0.12	6.18
13.	Mushroom Broth Powder	3	1.02	0.15	0	0.09
14.	Salt	4	0	0	0	0
15.	Pepper Powder (Superindo)	3	10	0	0	2
16.	Cooking Oil (Sania)	50	400	0	45	0
17.	Sugar	3	11.82	0	0	2.82
18.	Bread Crumbs	70	259	7.7	1.4	53.2
19.	Egg	50	77	6.2	5.4	0.35
	AMOUNT		**1555.36**	**38.438**	**60.124**	**216.462**

4.3 Organoleptic Test and Consumer Acceptance

The organoleptic test was carried out by the researcher together with six expert panelists and 30 general panelists (Mulyani, 2016). This test is done by filling out a questionnaire with a Likert scale. After doing research and processing the data, the results of the organoleptic test and consumer acceptance test on the innovation of taro croquette products with moringa leaf and oyster mushroom fillings that have the highest value or score is the recipe formulation in the taro croquette experiment, which uses a refining process fried first from in terms of taste, texture, aroma, color, and appearance.

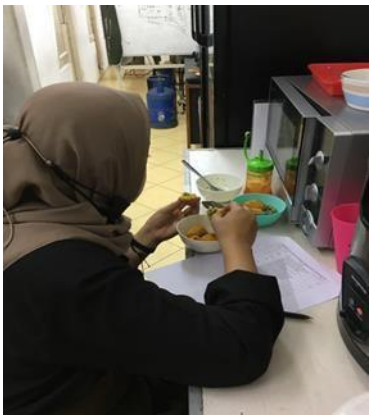

Figure 3 Panelist Assessment Activities on Taro Croquette Innovation with Moringa Leaf and Oyster Mushroom Filling

Figure 3 above is a research activity on product innovation of taro croquettes with moringa leaf and oyster mushroom filling. The panelists first tried the three existing recipe formulations and then fill out the questionnaires that had been provided according to the recipe formulations that had been made.

After all the panelists assessed the taro rocket product with six expert panelists and 30 general panelists, the author would calculate the average score for each product and category so that a product with a prescription formulation was found, which would be passed on to become a patented product.

4.3.1 The Organoleptic Test Results of The Expert Panelists and General Panelists

Conducted research on product innovations of taro croquettes with moringa leaf and oyster mushroom fillings with six expert panelists and 30 general panelists with a Likert rating scale, namely:

Table 1 Organoleptic Test Assessment Characteristics

Criteria	Number Of Digits
Strongly Disagree	1
Don't Agree	2
Quite Agree	3
Agree	4
Strongly Agree	5

The characteristics of the assessment were assessed through five categories of organoleptic test aspects, namely taste, texture, color, aroma, and appearance. After the assessment by the panelists and the average score calculated by the author, the standard deviation of the results is also calculated so that the distribution of the data achieved is also calculated. The following is the average value of the three formulation recipes that have been processed by the author:

Tabel 4. Expert Panelist Assessment Results

Product	Flavor		Texture		Color		scent		Appearance	
	Average Value	Standard Deviation	Average Value	Standard Deviation	Average Value	Standard Deviation	Average Value	Standard Deviation	Average Value	Standard Deviation
TG	3,5	0,76	3,8	1,06	4,17	0,69	3,8	0,89	4,1	0,68
TK	3,5	0,96	4,5	0,76	4,17	1,06	3,6	0,94	4	1,15
TR	3,34	0,74	4	0,81	4,34	0,74	4	1,15	4,3	0,74

Tabel 5. General Panelist Assessment Results

Product	Flavor		texture		Color		Scent		Appearance		Packaging & Labelling	
	Average Value	Standard Deviation	Average Value	tandar	Average Value	Standard	Average Value	tandar	Average Value	Standard	Average Value	tandar
TG	4,43	0,80	4,5	0,67	4,63	0,60	4,6	0,55	4,63	0,48	4,8	0,4
TK	3,6	0,75	3,9	1,01	3,8	0,97	3,86	0,61	4,3	0,69	4,8	0,4
TR	3,7	0,86	3,6	1,05	3,86	1,05	3,7	0,78	4,3	0,64	4,8	0,4

5. Conclusions

5.1 Conclusion

The conclusions that can be drawn from the results of research conducted by the author regarding the product innovation of taro croquettes with moringa leaf and oyster mushroom filling are as follows:

Generally accepted taro croquette is the pre-fried formulation of the taro croquette recipe.

Calculation of the nutritional content of taro croquettes filled with Moringa leaves and oyster mushrooms is considered a healthy snack because healthy foods contain protein, carbohydrates, fats, and minerals in levels that are not excessive to each other so that they are equal or less

In accordance with the organoleptic test components, the taro croquettes with the stuffing of moringa leaves and oyster mushrooms which go through a refining process, are fried the ideal starting from taste, texture, color, aroma, to appearance.

5.2 Suggestions

There are several suggestions given to the community and government, namely:

a) The public needs to know that local ingredients have many advantages, especially in terms of nutrition which will not have a bad effect if consumed or have excessive calories, so that they consume local ingredients more often.
b) It is important for the government to support MSME actors, especially those that produce businesses with healthy

local food ingredients and also many benefits when consumed.

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