Journal of Applied Culinary Arts (JACA)

Journal homepage: https://journal.uny.ac.id/publications/jaca/index
e-ISSN: 3109-3655

SUBSTITUTION OF TARO FLOUR *(Colocasia esculenta)* AND KATUK LEAVES *(Sauropus androgynus)* IN THE MANUFACTURE OF CATFISH DIMSUM

Annisa Dwi Rachmawati[1], Ezra Chica'al Sandya[2], Ngabdul Munif[3], Thyara Mahanani[4]

[1,2,3,4]Applied Culinary Arts, Faculty of Vocational, Universitas Negeri Yogyakarta, 55281, Indonesia

ARTICLE INFO

Article history:
Received: 8 Oct 2025
Received in revised form: 10 Nov 2025
Accepted: 5 Jan 2026
Available online: 15 Jan 2026

ABSTRACT

The increase in consumption of practical foods such as dimsum has not been balanced with optimal nutritional content. The use of local food ingredients such as taro flour and katuk leaves has the potential to increase the nutritional value of products. This research aims to develop dimsum by substituting taro flour and katuk leaves with catfish as a source of protein. This research aims to: (1) find recipes for taro dimsum, katuk leaves, and catfish products; (2) determine the presentation and packaging of taro dimsum, katuk leaves, and catfish products; (3) to find out the level of public preference for dim sum products; (4) to know the composition and nutritional value information of dimsum products; and (5) knowing the selling price and Break Event Point (BEP) of dimsum products. The research method uses (R&D) Research and Development 4D method: Define, Design, Development, and Disseminate. Quantitative descriptive data analysis methods and paired t-test tests. The research was conducted at Yogyakarta State University January 2026 - April 2026. The results of the study showed: (1) The Wiffle recipe used 30g of taro flour, 14g of katuk leaf powder, 56g of wheat flour, and 281g of catfish filling, as well as other complementary ingredients. Processed by steaming technique; (2) The weight of the sacrificial product is 100gr; (3) The level of likability of the product received a score of 4.5 out of 5; (4) Nutritional value per serving: total energy 129 kcal, total fat 26 g, protein 33 g, carbohydrates 70 g, fiber 2 g; (5) Selling price Rp.16,500/4pcs (100gr), BEP product Rp.19.532. The research shows that Dimsum Takatin has the potential to be a nutritious and economically viable local food substitution product.

Keywords:
dimsum, taro flour, katuk leaves, catfish, substitutions

Meningkatnya konsumsi makanan praktis seperti dimsum belum diimbangi dengan kandungan gizi yang optimal. Pemanfaatan bahan pangan lokal seperti tepung talas dan daun katuk berpotensi meningkatkan nilai gizi produk. Penelitian ini bertujuan mengembangkan dimsum dengan substitusi tepung talas dan daun katuk dengan ikan patin sebagai sumber protein. Penelitian ini bertujuan untuk: (1) menemukan resep produk dimsum talas, daun katuk, dan ikan patin; (2) menentukan penyajian dan kemasan produk dimsum talas, daun katuk, dan ikan patin; (3) mengetahui tingkat kesukaan masyarakat terhadap produk dimsum; (4) mengetahui komposisi dan informasi nilai gizi produk dimsum; serta (5) mengetahui harga jual dan Break Even Point (BEP) produk dimsum. Metode penelitian menggunakan (R&D) Research and Development metode 4D: Define, Design, Development, dan Disseminate. Metode analisis

data deskriptif kuantitatif dan uji paired t-test. Penelitian yang dilakukan di Universitas Negeri Yogyakarta Januari 2026 - April 2026. Hasil penelitian menunjukkan : (1) Resep Wiffle menggunakan 30gr tepung talas, 14gr bubuk daun katuk, 56gr tepung terigu, dan isian ikan patin 281gr, serta bahan pelengkap lainnya. Diolah dengan teknik steaming; (2) Berat produk persajian 100gr; (3) Tingkat kesukaan produk mendapat nilai 4,5 dari 5; (4) Nilai gizi per sajian: energi total 129 kkal, lemak total 26 g, protein 33 g, karbohidrat 70 g, serat 2 g; (5) Harga jualRp.16.500/4pcs (100gr), BEP produk Rp 19.532. Penelitian tersebut menunjukkan bahwa Dimsum Takatin mempunyai potensi sebagai produk substitusi pangan lokal yang bergizi dan layak secara ekonomis.

1. Introduction

The consumption of snacks has become part of the lifestyle of modern society along with changes in dietary patterns, increased daily activities, and easy access to various food products. Snacks are chosen as a practical alternative to accompany activities, fill free time, or overcome temporary hunger. This phenomenon is not only occurring in Indonesia, but also globally, which is shown by the increasing trend of snack consumption in various walks of life. This condition reflects the existence of significant market opportunities for the food industry, especially the snack sector.

The *snack* industry in Indonesia shows stable growth and continues to expand. However, the fierce competition in the snack industry demands a deep understanding of people's consumption behaviors and habits. Analysis of snack consumption habits is important as a basis for formulating product development strategies, pricing, distribution, and promotion. In addition, increasing public awareness of a healthy lifestyle has also encouraged the demand for healthy snacks, thus opening up opportunities as well as challenges for business actors to produce products that are not only practical and liked, but also have better nutritional value. [1]

Improving the quality of community nutrition is one of the important efforts to support health, growth, and productivity. Diverse and balanced food consumption plays a role in meeting the needs of macro and micronutrients optimally. Food diversification is one of the strategies that can be carried out to improve the nutritional quality of the community, because the variety of food types allows the fulfillment of nutritional needs more comprehensively and reduces dependence on one type of food. [2]

One of the efforts to improve the quality of community nutrition is through the development of food products that are nutritious, practical, and easily accepted by the community. Food product innovation is expected to be an alternative choice of snacks that are not only preferred, but also contribute to the fulfillment of daily nutrients in a more balanced manner and support better consumption patterns.

The development of dimsum made from catfish with the substitution of taro flour (Colocasia esculenta) and the addition of katuk leaf powder (Sauropus androgynus) was carried out to determine its effect on the nutritional value of the product while utilizing local foodstuffs. However, research related to the development of catfish dim with the combination of these ingredients, especially from the aspects of nutritional value and sensory characteristics, is still limited. Therefore, this research was carried out to fill this gap through the development of catfish dimsum products as an alternative to nutritious snacks.

Takatin products are the result of food development in the form of dimsum with the use of local food ingredients, namely taro flour and katuk leaves on the skin and catfish as fillings. The name "Takatin" stands for Taro Katuk Dimsum Isi Ikan Catin which is given to

reflect the main ingredients used while providing an easy-to-remember product identity. Product development is carried out through the partial substitution of wheat flour with taro flour on the dimsum skin and the addition of katuk leaves as a source of nutrients and natural dyes.

2. Method

This type of research uses R&D (Research and Development) with a 4D development model, namely Define, Design, Develop, and Disseminate. R&D is a systematic process that is carried out to create, develop, or improve products, processes, or services. In the context of this research, R&D aims to produce taro catfish dimsum and katuk leaves as protein-rich snacks. The R&D process involves data collection, analysis, and testing to ensure the product meets the nutritional needs and tastes of consumers.

Preference test data from the sensory test were analyzed using paired t-tests to determine the significant differences in panelist preferences between the two products being compared. This method is done by comparing the assessments of the same group of panelists on several sensory aspects, such as color, taste, texture, and aroma. The design stage is carried out by designing product formulations through the substitution of wheat flour with taro flour at three concentration variations, namely 25%, 30%, and 35%. In addition, at this stage, the design of the concept of presentation and product packaging was also carried out. The product was then tested by semi-trained panelists using sensory test instruments, which included aspects of color, aroma, taste, texture, and overall likability. The entire product development and evaluation process is carried out within the Faculty of Vocational Studies, State University of Yogyakarta, Wates Campus from September 2025 to April 2026.

The purpose of using the t-test in sensory testing is to find out whether the difference in the panelist's assessment or level of preference for the product being tested is significant or not. Thus, the results of the t-test can show whether the differences obtained really reflect the preferences of the panelists

3. Results and Discussion

3.1. Results

a. Determination of the Recipe for Katuk Taro Dimsum Products with Catfish Filling (Takatin)

The determination of reference recipes is carried out by collecting several relevant recipes from reliable sources, then three recipes are selected to be tested. The three recipes are then observed for their characteristics including shape, color, aroma, taste, and texture to obtain a recipe that has characteristics that are closest to the expected product. The three reference recipes used in this study can be seen in Table 1.

Table 1. Dimsum Reference Recipe

Ingredients	Reference Recipes 1	Reference Recipes 2	Reference Recipes 3
Chicken Thighs Fillet (g)	250 gr	250 gr	250 gr
Peeled shrimp (g)	50 gr	100 gr	125 gr
Garlic (cloves)	2		2
Shallots (granules)			2
Egg White (g)	56		56
Tapioca Flour (g)	90		40
Cornstarch (g)		10	
Salt & Pepper (g)	2	1	3
Sugar (g)	2		2
Flavoring (tsp)	1/4		1/2
Saus Tiram (ml)	10		10
Soy Sauce (ml)	10	10	20
Sesame Oil (ml)	10	10	10
Wortel Parut (g)	50		60
Spring Onions (btg)		2	3
Leather Material			
Medium Pro Wheat Flour (g)	135	200	100
Tapioca Flour (g)	10		2 tbsp
Warm Water (ml)	70	100	As needed
Salt (g)	2	2	2
Vegetable Oil (ml)		10	

Table 1 shows three reference recipes for shrimp chicken dimsum products that have different ingredient compositions, especially in the proportion of shrimp, flour, and additives used. Reference recipe (1) uses the dominant composition of chicken fillet with the addition of less shrimp, as well as the use of tapioca flour which is high enough to have an effect on a chewier texture.

The reference recipe (2) has a simpler composition, which is to use chicken and shrimp with the addition of leeks as a complementary ingredient without the addition of other vegetables. In addition, in this recipe, cornstarch is used in small amounts and a larger composition of the skin, so it can affect the texture of dimsum to be lighter.

Meanwhile, the reference recipe (3) uses a higher amount of shrimp than other recipes, as well as the addition of grated carrots as a complement. The flour composition in this recipe is lower than that of the recipe (1), resulting in a softer texture with a richer flavor than the combination of chicken, shrimp, and vegetables.

The differences between these three recipes aim to explore the influence of ingredient variations on the final characteristics of shrimp chicken dimsum products, both in terms of taste, aroma, texture, and appearance, so that the best reference recipe can be obtained before product development with catfish and taro flour substitution.

After determining the reference recipe, a trial is carried out at the *definition stage* to find out the characteristics of each recipe based on sensory parameters. The assessment includes shape, color, aroma, taste, and texture to determine the initial quality of the product. The results of testing the characteristics of the three reference recipes are presented in Table 2.

Table 2. Characteristics of Definition Stage Reference Recipe Trial Results

No	Characteristics of Reference Recipe I	Reference Recipe II	Reference Recipe III
1	Shape	Round	Round	Round
2	Color	Pale white	Pale white	Pale white
3	Taste	Savory	Savory	Most Savory
4	Aroma	Savory	Savory	Savory
5	Texture	Soft	Less soft	Softest
6	Overall	Somewhat preferred	Somewhat preferred	Liked

Table 2 shows the sensory characteristics of the three reference recipes of the test results at the *defined* stage. Based on the data that has been presented, the recipe that is selected at the definition stage is reference recipe 3. This decision was taken because reference recipe 3 has the most savory taste and the softest texture, which results from the use of more complete spices in its composition. By considering these factors and the results of data analysis, reference recipe 3 is the choice of reference recipe that will be used in the next stage, namely *the design* stage.

In addition to the assessment of sensory characteristics, visual observations were made of the product results in each *of the defined* stage reference recipes. This observation aims to see the difference in the appearance of the resulting product as a support for the initial quality evaluation. The product results of the three reference recipes are presented in Table 3.

Table 3. Results of Stage Mold Products *Define*

Product Results

Figure 1. Reference Recipe 1 Figure 2. Reference Recipe 2 Figure 3. Reference Recipe 3

Table 4. Average Results of Assessment of Define Stage Test Products

Sensoris parameters	R1	R2	R3
Shape	4	4,4	4,2
Size	4	4,2	4,2
Color	4	4,4	3,6
Aroma	3,8	4,4	3,6
Taste	2,8	4,2	3,8
Tekstur	3,4	4,2	3,6
Overall	3,8	3,6	4,4

Table 4 shows the average results of sensory assessments of the three reference recipes by the panelists. Based on the data, recipe 3 obtained the highest score with an average of (4.4). Recipe 1 with an average (3.8) and recipe 2 with an average (3.6). Recipe 3 also showed the highest scores on almost all parameters, especially on taste, texture, and overall rating. These results show that recipe 2 is the most preferred formulation by the panelists, so it was chosen as a reference recipe for the next stage of development.

Table 5. Recipe for Taro Flour Ingredient Substitution Design

Material Name	Mold	F1 (25%)	F2 (30%)	F3 (35%)
Wheat Flour (g)	100	75	70	65
Taro Flour (g)	-	25	30	35
Tapioca Flour (g)	20	20	20	20
Salt (g)	2	2	2	2
Warm Water (ml)	20	20	20	20

Products that have been made based on recipe formulations are then subjected to sensory tests to determine the characteristics of the product including shape, color, aroma, taste, and texture. The results of sensory tests on the product are presented in table 6.

Table 6. Design Stage 1 Sensory Test Results

Features	F1 (25%)	F2 (30%)	F3 (35%)
Shape	Round	Round	Round
Color	Pale white	Brownish-white	Brownish-white
Aroma	Savory	Savory	Savory
Taste	Savory	Savory	Savory
Texture	Skin is a bit thick	Soft	Skin is a bit thick

Table 6 shows the sensory characteristics of the product at the *design stage* with taro flour substitution. The results showed that F2 (30%) showed the characteristics that

most closely resembled the reference product, with the corresponding shape, size, color, aroma and texture as well as a perfectly suitable taste. Meanwhile, F1 (25%) also has quite good characteristics, but the taste is still considered somewhat in accordance with the meaning that it can still be improved to the formulation of the percentage above it. F3 (35%) produces dimsum skin that tends to be thick and torn.

Table 7. Product Results Design Stage 1

Figure 4. Substitution 25%

Figure 5. 30% substitution

Figure 6. Substitution 35 %

These results suggest that an increase in the percentage of taro flour substitution may affect the sensory characteristics of the product, especially in aroma, taste, and texture which tend to be stronger and less optimal at higher substitution levels.

Table 8. Recipe Design Substitution of Katuk Leaf Powder Ingredients

Material Name	Mold	F1 (10%)	F2 (15%)	F3 (20%)
Wheat Flour (g)	70	63	59,5	56
Taro Flour (g)	30	30	30	30
Katuk Leaf Powder (g)	0 gr	7	10,5	14
Tapioca Flour (g)	20	20	20	20
Salt (g)	2	2	2	2

Products that have been made based on recipe formulations are then subjected to sensory tests to determine the characteristics of the product including shape, color, aroma, taste, and texture. The results of sensory tests on the product are presented in table 9.

Table 9. Design Stage 2 *Sensory Test Results*

Features	F1 (10%)	F2 (15%)	F3 (20%)
Shape	Round	Round	Round
Color	Dull green	Dull green	Dull green
Aroma	Savory	Savory	Savory
Taste	Savory	Savory	Savory
Texture	Skin is a bit thick	Soft	Skin is a bit thick

Table 9 shows the sensory characteristics of the product at the *design* stage with taro flour substitution. The results showed that F3 (20%) did not show a bitter aftertaste. So it was chosen for the next formula.

Table 10. Product Results Design Stage 2

Figure 7. 10% substitution

Figure 8. Substitution 15%

Figure 9. Substitution 20%

These results suggest that an increase in the percentage of Katuk Leaf substitution can affect the sensory characteristics of the product, especially on the aroma, taste, and texture which tend to be stronger and less optimal at higher substitution levels.

Table 11. Catfish Stuffing Substitution Design Recipe

Material Name	Mold	F1 (50%)	F2 (75%)	F3 (100%)
Chicken Thighs Fillet (g)	250	125	62,5	-
Catfish meat (g)	-	187,5	281,25	375
Peeled shrimp (g)	125	62,5	31,25	-
Shallots (fruit)	2	2	2	2
Garlic (cloves)	2	2	2	2
Egg White (g)	56	56	56	56
Tapioca Flour (g)	40	40	40	40
Salt & Pepper (g)	3	3	3	3
Sugar (g)	2	2	2	2
Flavoring (tsp)	1/2	1/2	1/2	1/2
Saus Tiram (ml)	10	10	10	10
Soy Sauce (ml)	20	20	20	20
Sesame Oil (ml)	10	10	10	10
Wortel Parut (g)	60	60	60	60
Spring Onions (btg)	3	3	3	3

Products that have been made based on recipe formulations are then subjected to sensory tests to determine the characteristics of the product including shape, color, aroma, taste, and texture. The results of sensory tests on the product are presented in table 12.

Table 12. Design Stage 3 Sensory Test Results

Features	F1 (50%)	F2 (75%)	F3 (100%)
Shape	Round	Round	Round
Color	Dull green	Dull green	Dull green
Aroma	Savory	Most Savory	Savory
Taste	Typical earthy taste of catfish	Balanced savory	Typical earthy taste of catfish
Texture	Chewy and dense	Dense and softest	Too mushy

Table 12 shows the sensory characteristics of the product at the *design stage* with taro flour substitution. The results showed that F2 (75%) showed the characteristics most close to the reference product, with the corresponding shape, size, color, aroma and texture as well as a perfectly suitable taste. Meanwhile, F1 (50%) also has quite good characteristics, but the taste is still considered somewhat in accordance with the meaning that it can still be improved to the formulation of the percentage above it. F3 (100%) produces a slightly fishy dimsum skin and a earthy smell.

Table 13. Product Results Design Stage 3

Figure 10. 50% substitution

Figure 11. 75% substitution

Figure 12. 100% substitution

These results suggest that an increase in the percentage of Catfish substitution in fillings can affect the sensory characteristics of the product, especially on aroma, taste, and texture which tend to be stronger and less optimal at higher substitution rates.

Based on the results of development at the taro flour substitution stage, the addition of katuk leaf powder, and the use of catfish, the best formulation was obtained which was then used as the final product of the research. The selected product formulation is a combination of using taro flour by 30%, katuk leaf powder by 20%, and catfish by 75% which produces product characteristics as expected.

b. Determination of Presentation and Packaging of Taro Katuk Dimsum Products with Catfish Filling (Takatin)

After obtaining the best formulation at the previous stage, validation tests are carried out by experts to evaluate the quality of the development product compared to the reference product. The assessment is carried out based on organoleptic parameters which include shape, size, color, aroma, taste, texture, and overall. The results of the organoleptic test at the validation stage I are presented in Table 14.

Table 14. Results of Organoleptic Test Validation Test I

Sensoris parameters	Mold	Development
Shape	4	4,5
Size	4	4
Color	4	4
Aroma	4	4
Taste	3,8	4,5
Texture	3,8	4,3
Overall	3,8	4,5

Table 12 shows the average results of the organoleptic assessment of the development stage, the reference product obtained an average value of 3.9 while the development product obtained an average value of 4.2. These results show that the development product has a better acceptance rate than the reference product.

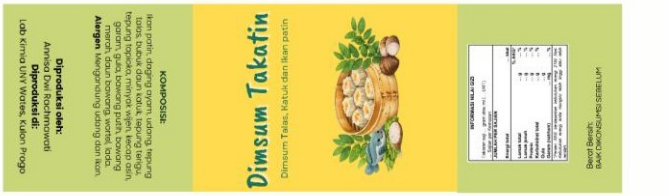

Figure 13. Packaging Labels

INFORMASI NILAI GIZI		
Takaran saji 25 g (4 buah) 1 Sajian per Kemasan		
JUMLAH PER SAJIAN		
Energi Total		**34 kkal**
		%AKG
Lemak total	1 g	1%
Protein	2 g	4%
Karbohidrat total	4 g	1%
Serat	2 g	6%
**persen AKG berdasarkan kebutuhan energi 2150 kkal. Kebutuhan energi anda mungkin lebih tinggi atau rendah.*		

Figure 14. Nutritional Value Information

Figure 15. Product Packaging

c. Analysis of the Level of Public Preference for Taro Katuk Dimsum Products with Catfish Filling (Takatin)

After the product development and validation stage, a preference test is then carried out at the *disseminate* stage to determine the level of public acceptance of the products produced. The test involves untrained panelists who provide assessments based on several sensory parameters, namely taste, aroma, texture, packaging, color, and overall. The results of the sensory test score assessment are presented in Table 15.

Table 15. Average Results of Disseminate Stage Sensory Test (80 Panelis)

Sensoris parameters	Mold	Development
Taste	3,99	4,56
Aroma	3,95	4,53
Tekstur	3,93	4,50
Packaging	3,89	4,56
Color	3,79	4,48
Overall	3,99	4,68

Based on the average table of sensory test results, the development product showed a higher average value of likability than the reference product in all aspects of the assessment which included taste, aroma, texture, color, appearance, and overall.

d. Analysis of the Composition and Information of the Nutritional Value of Taro Katuk Dimsum Products with Catfish Filling (Takatin)

Table 16. Average Results of Proximate Analysis Lab Tests

No	Nutritional Content	Mold	Development
1.	Air	64,67	63,05
2.	Item	1,28	1,19
3.	Protein	9,49	8,44
4.	Fat	3,23	2,93
5.	Carbohydrates	16,85	17,28
6.	Crude Fiber	134,62	129,13
7.	Energy	4,47	7,10

Table 16 shows the results of the proximate tests that have been carried out, it is known that reference dimsum products and development dimsum products have different nutritional content compositions. The components analyzed include moisture content, ash, protein, fat, carbohydrates, energy, and crude fiber. The test results data were obtained from two repetitions for each product so that they could describe the nutritional content of dimsum products more accurately. The results of the analysis showed that the development product had a higher content of carbohydrates and crude fiber compared to the reference product.

Table 17. Results of Paired T-Test Proximate Analysis and Superior Nutrition

Sensory	Properties		Development		P-value	Description
Air	44,33	0,17	57,25	0,15	0,0009	Real differences
Item	0,88	0,11	0,85	0,05	0,8099	No real difference
Protein	5,57	0,51	3,44	0,23	0,0595	Real differences
Fat	8,89	0,15	7,37	0,11	0,0111	Real differences
Crude Fiber	1,85	0,02	2,65	0,15	0,0751	No real difference
Carbohydrates	38,47	0,58	28,45	0,00	0,1425	No real difference
Energy	252,39	1,28	190,91	1,99	0,0052	Real differences

Table 17 shows The results of the analysis show that the development product has a higher carbohydrate and crude fiber content compared to the reference product. The nutritional composition of the product is known after laboratory testing is carried out, then a *t-test is carried out* to determine the difference between the reference product and the development product.

Table 18. Mass and Energy Analysis of Takatin Dimsum

Nutrition	Up to	Bulk	Energy (kcal)
Fat	2,93	1 gr	6,60
Protein	8,44	2 gr	8,44
Carbohydrates	17,28	4 gr	17,28
			32,32

Table 19. Calculation Results of the %AKG of Takatin Products

Nutritional Content	Mass of Nutrients	Total Nutrition Label Reference	
Fat	0,73	67	1%
Protein	2,11	60	4%
Carbohydrates	4,32	325	1%

Table 19 shows the results Based on the results of the calculation of the percentage of the daily Nutritional Adequacy Rate (%AKG), it is known that the contribution of nutrients to reference products and development products is relatively low to daily nutritional needs. The percentage of AKG in development products was obtained as a percentage of protein AKG of 4%, fat of 1%, and carbohydrate of 1%. These results show that the product plays more of a role as an interlude food because its contribution to daily nutritional needs is still relatively small.

The calculation of the percentage of Nutritional Adequacy Rate (%AKG) in dimsum products is carried out by comparing the nutrient content per serving with the daily nutritional reference. The daily nutritional mold for nutrients such as fats, proteins, and carbohydrates refers to the prevailing CGI values.

Information on nutritional value in reference and development products can be seen in table 20 below.

Table 20. Information on the Nutritional Value of Takatin Products

NUTRITIONAL VALUE INFORMATION		
Serving size 25 g (4 pieces) 1 Serving per Package		
AMOUNT PER SERVING **Total Energy 34 kcal**		
		%AKG
Total fat 1 g 1%		
Protein	2 g	4%
Total carbs 4 g 1%		
Fiber 2 g 6%		
**percent AKG based on energy needs of 2150 kcal. Your energy needs may be higher or lower.*		

Nutritional value information per serving shows that Rainer Pancake products contain energy of 32.32 kcal per 25 grams serving. This value shows that the product has a

relatively controlled energy profile and is supported by fiber and carbohydrate content that provides added value for health.

Table 21. Selling Price of Takatin Products

Ingredients	quantity	Pricing
Raw Material (A)		
Wheat Flour	56 gr	1.000
Taro Tuber Flour	30 gr	2.000
Katuk Leaf Powder	14 gr	2.000
Warm Water	Sck	500
Salt	Sck	50
Tapioca Flour	20 gr	500
Paha Ayam Fillet	62.5 gr	2.480
Patin fish meat	281.25 gr	9.800
Peel shrimp	31.25 gr	1.900
Shallots	2 siung	500
Garlic	2 siung	500
Egg White	56 gr	2.500
Tapioca Flour	40gr	500
Garam & Lada	3 gr	100
Gula	2 gr	100
Flavoring	1/2 tsp	100
Oyster Sauce	10 ml	1.000
Kecap Asin	20 ml	1.300
Sesame Oil	10 ml	1.700
Wortel Parut	60 gr	700
Leeks	3 btg	1.000
Variable Cost (A)		**30.230**
Packaging and label costs (B)	5 pcs	**10.000**
Fixed costs (C)		
Wages	15% x BV	4.535
Tool cost	10% x BV	3.023
Gas	5% x BV	1.511
Air	5% x BV	1.511
Total fixed costs		**10.582**
Total production cost (A+B+C)		**50.812**
Fruit production costs	50.812÷16	3.176
***Mark Up* (30%)**	30%×3,176	953
Selling Price	Production cost per piece + *mark up*	4.100

The results of table 21 show Based on the calculation of production costs, one recipe for Takatin products yielded ±16 pieces of dimsum. The product is then packaged with the contents of 4 pieces per package so that 4 packages are obtained in one production. The total production cost obtained is IDR 50,812, so the production cost per piece of dimsum is IDR 3,176. The selling price is determined by adding a mark up of 30% of the production cost per piece. The mark-up is IDR 953 so that the selling price per piece of dimsum is IDR 4,129 which is then rounded to IDR 4,100 per piece. Thus, the selling price per package containing 4 pieces of dimsum is IDR 16,516 which is then rounded up to IDR 16,500 per package.

Table 22. Calculation of *Break Event Point* (BEP) of Takatin Products

Yes	Components	Formula	Results
1	BEP Unit	$= \frac{\text{Biaya Tetap}}{\text{Harga Jual per Unit} - \text{Biaya variabel per unit}}$	2 Units
		=	
		$\frac{10.582}{(16.500-(30.230 \div 4)}$	
2	BEP Rupiah	$= \frac{\text{Biaya Tetap}}{1 - (\text{Biaya variabel per unit} \div \text{Harga Jual per unit})}$	Rp. 19,253
		$\frac{10.582}{1 - (7.558 \div 16.500)}$	

Table 22 shows the results of the selling price that has been set, then a Break Even Point (BEP) calculation is carried out to determine the break-even point of the business. The calculation results show that the BEP unit is 1.18 packages which are then rounded up to 2 packages. Meanwhile, BEP in currency amounted to Rp19,523. This shows that Tatatin's dimsum business will reach a break-even point if sales have reached mi mi nimal 2 product packaging or worth around IDR 19,523.

3.2. Discussion

a. Takatin Product Recipes

The recipe for Katuk Taro Dimsum with catfish filling was obtained through a research and development (R&D) approach with a 4D development model. The first stage in this study is the *dedefine stage*, which is the stage to determine the reference recipe that will be used as the basis for product development. The second stage is the *design* stage The discussion at this stage is the formulation of Takatin products which is the result of development with the use of taro flour by 30%, katuk leaf powder by 20%, and catfish by 75%. The resulting product has the characteristics of a shape similar to dimsum in general with a brownish-green color that tends to be dim due to the use of taro flour and katuk leaf powder. The aroma produced is a typical combination of catfish and spices, with a balanced savory taste.

b. Presentation and Packaging of Takatinn Products

The product developed in this study is dimsum made from catfish with the substitution of taro flour and the addition of katuk leaves on the skin called Dimsum Takatin. This product is in the shape of a round siomay with a size of about 4–5 cm per fruit. The skin of dimsum is greenish-brown due to the use of taro flour and katuk leaves, while the filling is pale white typical of catfish. Takatin dimsum has a savory taste with a soft and chewy texture so that it can be accepted by consumers.

Takatin Dimsum products are packaged using primary packaging in the form of aluminum foil with a clear cover measuring 8 × 6 × 4 cm. This packaging was chosen because it is practical and able to protect the product from contamination during the storage and distribution process. In addition, the clear cover makes it easier for consumers to see the condition of the product directly. Product packaging is equipped with a label that serves as a product identity while providing information to consumers.

The information listed on the label includes the product name, ingredient composition, and other information related to Dimsum Takatin products.

c. The Level of Public Preference for Takatin Products

Takatin Dimsum products were tested for preference to determine the level of consumer acceptance of the developed products produced. The preference test was carried out using a sensory testing method involving panelists from the general public. The products used in the preference test are reference dim sum products and development dim sum products. The test was carried out involving 80 panelists from the general public which was held at the Auditorium of the State University of Yogyakarta (UNY) Wates Campus. Panelists provide an assessment of several sensory parameters which include taste, aroma, texture, color, appearance, and overall rating.

d. Composition and Information on the Nutritional Value of Takatin Products

Based on the results of proximate tests conducted on development dimsum products, there are several changes in nutritional composition compared to reference products. The results of the analysis showed that there was a decrease in several nutritional components, such as protein content and fat content in development products compared to reference products. The decrease in protein content in the development product was relatively small, which was around 1%, which was allegedly influenced by the use of substitute ingredients in the form of taro flour and katuk leaf powder which had a lower protein content than the ingredients in the reference product. In addition, the fat content in the development product also decreased slightly compared to the reference product. This decrease in fat content is likely influenced by changes in the composition of the ingredients in the product formulation. The energy content of development products is also slightly lower than that of reference products because it is influenced by changes in the composition of macronutrients in the product. Despite the decrease in some nutritional components, the development product showed an increase in the carbohydrate and crude fiber content. The carbohydrate content in the development product is slightly higher than that of the reference product, while the crude fiber content has increased significantly. The fiber content in the development product increased from about 4.47% of the reference product to about 7.10%, which represents an almost two-fold increase. This increase in fiber content is suspected to come from the use of taro flour and katuk leaf powder which are plant-based foods rich in fiber.

Thus, Takatin Dimsum development products have advantages in higher dietary fiber content than reference products. This higher fiber content can provide benefits for health, especially in helping the digestive process and supporting healthier food consumption patterns.

e. Selling Price and BEP (Break Even Point) of Takatin Products

In determining the selling price of Dimsum Takatin products, the mark-up pricing method is used. The use of this method aims to make it easier to determine the desired profit percentage by adding the profit value to the total production cost. The selling price of the product is calculated based on the number of products in one package so that it can provide a clearer picture of the price for consumers.

Based on the results of the selling price calculation that has been carried out, Takatin Dimsum products are set at a price of IDR 4,100 per piece or IDR 16,500 per package with

the contents of 4 pcs of dimsum. The pricing has taken into account the cost of production as well as the desired profit percentage.

Comparison of the selling price of development products is carried out by looking at the prices of dimsum products circulating in the market. Dimsum products are generally sold at a price range that varies depending on the size, number of products in the package, and the ingredients used.

4. Conclusion

Based on the results of research, data analysis, and discussions that have been carried out regarding the development of Taktin Dimsum products, it can be concluded as follows:

a. The recipe for Takatin Dimsum products was obtained through a development process by substituting 30% taro and 20% katuk leaves in the manufacture of dimsum skin and using 75% catfish as the main ingredient in the filling. The resulting products have shape, color, aroma, taste, and texture characteristics that are in accordance with the characteristics of dimsum in general.
b. The presentation of Takatin Dimsum products uses food-grade packaging in the form of aluminum foil measuring 8cm x 6cm x 4cm so that it makes it easier to present and distribute products.
c. Based on the results of the test level of public likability, Takatin Dimsum products received good assessments on the aspects of color, aroma, taste, texture, and overall, so that they can be accepted by the public.
d. Based on the results of the proxy test, Dimsum Takatin products contain a nutritional composition that includes moisture content, ash content, protein content, fat content, and carbohydrate content.
e. Based on the results of the calculation of the selling price of Takatin Dimsum products, it has a selling price of 16,500/pack with 4 pieces of dimsum per pack.
f. The Break Even Point (BEP) of the takatin product unit is 2 packages and the BEP is 19,523 rupiahs.

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