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Acceptance of High Protein Nuggets as an Animal Side Dish for Toddlers Wasting

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ABSTRACT

Background. *One of the nutritional statuses of children is wasting. Wasting is a group of undernourished, directly caused by inadequate nutrition and infectious diseases. One kind of food product that can be a high-protein animal side dish as a nutritional value enhancer for children with waste is High Protein Nuggets. High Protein Nuggets are nuggets made from the main ingredient of catfish.*

Research Methods. *This study used experimental research with a complete random design (RAL) non-factorial. In this study, the best formulation was found, namely the formula F3, which included 175g catfish meat, 25g carrots, 80g eggs, 40g wheat flour, 40g bread flour, 15g leeks, 20g coconut milk, and 2g pepper.*

Research Result. *From the effects of analysis of comparable levels, content in the best of high protein nuggets formulation 100 grams contains energy 325,6 kcal, protein 12,75 grams, fat 22,12 grams, and carbohydrates 18,63 grams.*

Conclusion. *Based on organoleptic data, the chosen formula is F3 Nugget, high in protein, with F3 having the most significant average value of each parameter assessment (taste, color, aroma, and texture).*

BACKGROUND

Wasting is a chronic nutritional problem that occurs in a short time. It is characterized by a thin and fragile body condition that exceeds -2 SD below the median weight for height or body length (Badan Penelitian dan Pengembangan Kesehatan RI, 2013).

Consequences of wasting in children under the age of five include a loss of their ability to explore the environment, a lack of friendship, and indifference. Cognitive impairment, poor academic achievement, behavioral problems, and even an increased probability of death are long-term effects of wasting (Insani, 2017).

To overcome the problem and risk of malnutrition wasting due to lack of energy and protein due to increased demand, decreased immune system, and failure to thrive in children, a high-protein, high-energy diet (ETPT) can be given. The ETPT diet is a diet that has a higher energy and protein content than needed (Persagi & AsDi, 2019).

One food product that can be a high-protein animal side dish and add nutritional value for children with wasting is Nugget High Protein. High Protein Nuggets are nuggets made from the main ingredient of catfish (Pangasius). Nuggets are processed meat products, both chicken, beef, and fish, that are molded, cooked, and frozen from a mixture of ground beef, coating materials with or without the addition of other food ingredients that can increase usability and shelf life (Darmadi dkk., 2019).

One of the fish that can be used as raw material for making nuggets is catfish. Catfish is a local food ingredient that can be useful for wasting. The composition of catfish per 100 g of fish meat consists of 74.4%

water, 17% protein, 6.6% fat, and 0.9% ash. From the content of protein and fat composition, catfish are classified as high protein and medium fat fish (Andriani, 2014). Based on this, the researcher wanted to research "High Protein Nugget Acceptance for Wasting."

RESEARCH METHODS

This research is an experimental study using a non-factorial, utterly randomized design (CRD) with four treatments of formula F0 (0 grams), F1 (125 grams), F2 (150 grams), and F3 (175 grams). The process of determining the formulation was carried out at the Food Technology Laboratory, Department of Nutrition, Poltekkes, Ministry of Health, Palembang. The acceptance test was carried out at the Nutritional Campus Laboratory of the Health Polytechnic Ministry of Health in Palembang. The proximate analysis was carried out at the Agricultural Products Technology Laboratory, Faculty of Agriculture, Sriwijaya University, which was carried out on September 17, 2021.

The organoleptic test was carried out by 25 untrained panelists. Panelists were asked to rate their preference for color, aroma, and taste with the criteria for liking the Nugget high proteinlike). While the texture assessment categories are 1 (very hard), 2 (hard), 3 (standard), 4 (soft), and 5 (very soft), which are the results of data analysis from organoleptic tests with statistical analysis to determine the panelist response to formula nugget was carried out through a non-parametric approach, the Friedman test with SPSS application. Data processing begins with the collection of organoleptic test results forms. The results of organoleptic test assessments are arranged in a table and analyzed descriptively based on percentages. Then, the data is processed using SPSS to determine whether there is an effect of treatment on organoleptic tests.

Table 1. High Protein Nugget Formulation

Ingredients	Formulation			
	F0	F1	F2	F3
Catfish Meat	0	125	150	175
Carrot	100	75	50	25
Egg	80	80	80	80
Flour	40	40	40	40
Bread Crumbs	40	40	40	40
Leek	15	15	15	15
Garlic	10	10	10	10
Coconut Milk	20	20	20	20
Sugar	6	6	6	6
Pepper	2	2	2	2

Source: Modification of Processed Fish recipe by Fayza Allya Kallista, 2020 and (Andaruni & Veni Indrawati, 2014)

Making nuggets begins with mixing fish meat separated from the bones and spines with carrots, scallions, salt, shallots, mashed garlic, pepper, eggs, sugar, and liquid coconut milk, and stirring until evenly distributed. Next, add the flour little by little until smooth. Put the dough into the pan and steam for about 30 minutes. Remove, calm, and cut according to taste. Dip nuggets into the egg white until evenly distributed. Coat nuggets with breadcrumbs thoroughly. Nuggets are ready to be fried or stored in the freezer (Kallista, 2020).

RESULTS

Table 2. The Results Of The Acceptance Test Of High Protein Nugget Formula on Taste

Taste Criteria	F0		F1		F2		F3	
	n	%	n	%	n	%	n	%
Very Dislike	1	4	2	8	0	0	1	4
Dislike	5	20	3	12	4	16	1	4
Like	12	48	10	40	12	48	6	24
Very Much Like	6	24	8	32	7	28	9	36
Really Like	1	4	2	8	2	8	8	32
Total	25	100	25	100	25	25	25	100

Based on table 2, the taste criteria are F0. Most of the panelists chose 12 people (48%). For the taste criteria in F1, most of the panelists chose ten people (40%). For the taste criteria in F2, most of the panelists chose 12 people (48%). Moreover, regarding the taste criteria in F3, most of the panelists chose nine people (36%).

Table 3. The Results Of The Acceptance Test Of High Protein Nugget Formula on Aroma

Aroma Criteria	F0		F1		F2		F3	
	n	%	n	%	n	%	n	%
Very Dislike	1	4	1	4	0	0	1	4
Dislike	2	8	7	28	2	8	2	8
Like	15	60	8	32	14	56	8	32
Very Much Like	4	16	6	24	5	20	7	28
Really Like	3	12	3	12	4	16	7	28
Total	25	100	25	100	25	25	25	100

Based on table 3, the aroma criteria in F0, most of the panelists chose 15 people (60%). For the aroma criteria in F1, most of the panelists chose 14 people (56%). For the aroma criteria in F2, most of the panelists chose 14 people (56%). Moreover, regarding the aroma criteria in F3, most of the panelists chose eight people (32%).

Table 4. The Results Of The Acceptance Test Of High Protein Nugget Formula on Color

Color Criteria	F0		F1		F2		F3	
	n	%	n	%	n	%	n	%
Very Dislike	0	0	3	12	0	0	2	8
Dislike	2	8	0	0	2	8	1	4
Like	11	44	10	40	12	48	9	36
Very Much Like	6	24	6	24	6	24	6	24
Really Like	6	24	6	24	5	20	7	28
Total	25	100	25	100	25	25	25	100

Based on table 4, the color criteria at F0, most of the panelists chose liked as many as 11 people (44%). For the color criteria in F1, most of the panelists chose ten people (40%). For the aroma criteria in F2, most of the panelists chose 12 people (48%). Moreover, regarding the color criteria in F3, most of the panelists chose nine people (36%).

Table 5. The Results Of The Acceptance Test Of High Protein Nugget Formula on Texture

Texture Criteria	F0		F1		F2		F3	
	n	%	n	%	n	%	n	%
Very Hard	0	0	1	4	1	4	0	0
Hard	2	8	2	8	0	0	2	8
Average	13	52	7	28	11	44	9	36
Soft	6	24	12	48	12	48	8	32
Very Soft	4	16	3	12	1	4	6	24
Total	25	100	25	100	25	25	25	100

Based on table 5, the texture criteria in F0, most of the panelists chose normal, as many as 13 people (52%). Texture criteria in F1, most of the panelists chose soft 12 people (48%). For the aroma criteria in F2, most of the panelists chose soft 12 people (48%). Moreover, regarding the color criteria in F3, most of the panelists chose nine ordinary people (36%).

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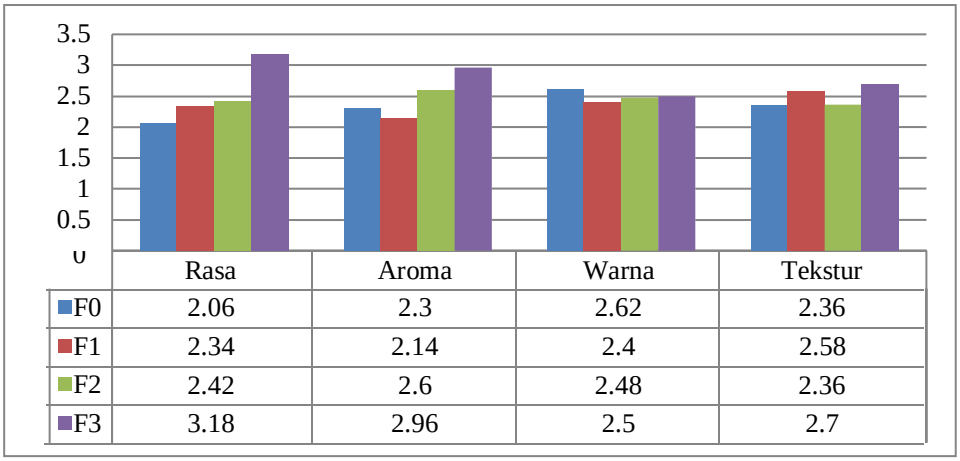
Table 6. Results of Proximate Analysis Selected Formulas of High Protein Nuggets Per 100 grams

Type of Analysis	Composition	Analysis Method
Moisture Content (%)	45,35	SNI 01-2891-1992
Ash Content (%)	1,15	SNI 0-2891-1992
Fat Content (%)	22,12	SNI 01-2891-1992
Protein Content (%)	12,75	SNI 01-2891-1992
Carbohydrate Content (%)	18,63	By difference



	Rasa	Aroma	Warna	Tekstur
F0	2.06	2.3	2.62	2.36
F1	2.34	2.14	2.4	2.58
F2	2.42	2.6	2.48	2.36
F3	3.18	2.96	2.5	2.7

Graph 1. *Mean Rank* Acceptance *Nugget* of High Protein

The graph above shows that the results of the Friedman test in rank obtained the most preferred formula by the panelists. The assessment aspect is formula 3 using 175 grams of catfish meat, 25 grams of carrots, 80 grams of chicken eggs, 40 grams of wheat flour, 40 grams of bread flour, 15 grams of scallions, 10 grams of garlic, and 20 grams of coconut milk.

Table 7. The Relationship Between High Protein Nugget Acceptance

Category	P-*Value*
Taste	0,002
Aroma	0,007
Color	0,758
Texture	0,643

Based on table 7, the acceptability of nuggets made from catfish and carrots, there is a difference between the taste and aroma of the four formulas (p-value <0.05). In comparison, the color and texture criteria have no difference between the four formulas (p-value > 0.05) using the Friedman test statistical test.

DISCUSSION

Taste is a determining factor of consumer acceptance of food products made. From the results of the acceptance test of taste, it was found that the formula that the panelists preferred the most was Formula 3, with an average of 3.88. Friedman obtained a p-value = 0.002, meaning there was a significant difference in the taste of high-protein nuggets. This is because the more addition of catfish, the more catfish will be produced. Vice versa, the more carrots, the less taste of catfish will be produced. This is in line with the results of research by Silaban dkk. (2017) on the manufacture of nuggets with the addition of bamboo shoots that produce a taste with a descriptive score of 2.77-4.13 (fish taste to slightly fish taste and slightly bamboo shoot taste). The taste of catfish in nuggets tends to decrease with increasing the ratio of adding carrots.

The results of the acceptability test for aroma show that the formula most favored by panelists is Formula 3, with an average of 3.68. Friedman obtained an average rank of 2.14-2.96 with p-value = 0.007, meaning there is a significant difference in the aroma of nuggets high-protein. This is because there is a significant

difference between nuggets on aroma acceptance with catfish food ingredients. Because it is suspected that the panelists prefer the aroma, which is still typical of nuggets.

The aroma of catfish in the nuggets is found to be stronger because more amount of catfish is added and fewer carrots are used. Panelists are more likely to feel the distinctive aroma of catfish, so the response to the nuggets produced is more flavorful than the aroma of catfish, in line with the research of Ayu dkk. (2020) on the manufacture of nuggets of young catfish and jackfruit ranging from 2.37-3.03 (scented with catfish to slightly flavored with catfish and jackfruit). The results of this study indicate that when the ratio of catfish is reduced, and the addition of carrots is higher, the panelists' preference for nuggets decreases.

The results of the acceptability test for color showed that the formula most favored by the panelists was Formula 0, with an average of 3.64. Friedman obtained an average score of 2.40-2.62 with p=0,758 means that there is no significant difference in the color of nuggets high-protein panelists' preference for color in the F0 treatment has a bright orange color that comes from carrot food ingredients, and in this F0 treatment without the addition of catfish. Yellow to brownish yellow is the color that is often used in nuggets for high protein color change from yellow to brown occurs during the processing process and the

Nuggets are breaded before frying so that the color of the nuggets produced also has an effect (Ayu et al., 2020). The results of the acceptance test for texture showed that the formula most favored by the panelists was Formula 3, with an average of 3.72. Friedman obtained an average rank of 2.36-2.72 with a p-value = 0.463, meaning there was no significant difference. Significant effect on the texture of nuggets on the acceptability of texture with catfish food ingredients.

The protein contained in Nugget is 12.75 g/100g. Based on the test results, the protein value in the nugget protein content Nugget (SNI 7758:2013). The high protein content in nuggets is due to the food ingredients, namely catfish. The more catfish, the higher the protein content. This is in line with research (Silaban et al., 2017) which states that the more catfish meat is added in making the effect of adding betting bamboo shoots to catfish nuggets, the higher the protein produced, which ranges from 12,12-14,57%.

The fat contained in nuggets is 22.12 g/100g. Based on the test results, the fat value in the Nugget was higher than the quality standard for the fat Content of the Nugget (SNI 7758:2013). The high-fat content in nuggets is due to foodstuffs such as catfish and coconut milk and the frying process. Research (Rosselinda et al., 2015) in the production nuggets of catfish showed that the fat content in catfish tends to increase when the ratio of catfish increases.

Carbohydrates are a source of nutrients, especially rice, a staple food in Indonesia. Carbohydrates are mainly used as an energy source. One gram of carbohydrates produces four calories (Sari dkk., 2020). From the results of laboratory tests, the carbohydrate content in 100 grams nuggets is 18.63 grams.

The value of energy content is calculated by using the conversion of protein, fat, and carbohydrate content into kcal units. The calorie equivalent of one gram of fat is 9 kcal. One gram of carbohydrates and protein is equal to 4 kcal. Nuggets high in protein have an energy content of 324.6 kcal in 100 grams.

CONCLUSIONS

In this study, it can be concluded that the correct formula is the high protein three Nugget. The F3 organoleptic yield has the highest average value of each assessment criteria (taste, color, aroma, and texture) from the laboratory analysis results of the energy content of 324.6 kcal, 12.75 grams of protein, 22.12 grams of fat and 18.63 grams of carbohydrates.

SUGGESTIONS

It is recommended to conduct further research on the effect of giving nuggets high protein wasting.

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