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The Organoleptic Test Formulations Snakehead Fish Flour Based Functional Cookies as An Alternative Snack For Stunting Toddlers

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A B S T R A C T

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The substitution of Snakehead fish flour to make the cookies have the function of increasing nutrient. This study analyzes the effects of Snakehead fish flour on the sensory characteristics of cookies. This experimental study used a completely random design. The first step of the study was to characterize and develop snakehead fish flour. The second step was to determine functional cookie formulation with four treatments: 0%, 10%, 15%, and 20% snakehead fish flour. Cookies were then evaluated for their hedonic evaluation. As the results, the organoleptic study in the form of a hedonic test for 30 semi-trained panelists showed all categories except taste were not significantly different at $p>0.05$. The highest acceptance percentage for adding snakehead fish flour was 20% in taste significantly. In conclusion, the acceptability in the taste of respondents showed that snakehead fish flour treatment had a significant effect ($p<0.05$)

INTRODUCTION

The case of stunting in Indonesia is a fairly large case and has become a strategic issue at the national and regional levels. Stunting is a problem of chronic malnutrition due to lack of nutritional consumption in the long term, which causes developmental disorders with the condition of children being short (short stature) than their age standards[1]. The prevalence of stunting at the world level touched 24.5%, and Indonesia was ranked fifth. According to the 2013 Basic Health Research *(Riskesdas)* data, the stunting rate in infants increased to 37.2% and decreased in 2018 to 30.8% (MOH, 2013). West Sumatra is one of the provinces *with* a stunting prevalence lower than the national level, which is 26.4% (Litbang, 2019). However, considerable efforts are needed to reduce stunting rates in Indonesia (MOH, 2013).

The government has made a policy to provide food support programs *(PMT*) for underweight toddlers, school children, and KEK pregnant women in biscuit intervention. The results of the 2016 evaluation in Indonesia showed that the implementation of the *PMT* program had not been maximized. The provision of *PMT* was not equipped with specific technical guidelines for targets. The accuracy of targeting children under five receiving *PMT* was only 35.1%, with compliance of 70.1%. The distribution of *PMT* to the target has not been distributed effectively and efficiently. Not all officers provide nutrition and health counseling when distributing *PMT*. There is no special room for storing *PMT* at the Public Health Center *(Puskesmas),* and excess content of total energy, protein, fat, and nutrients in the form of total sugar content according to the recommendations Ministry of Health (Hermina, 2016).

Infants and young children need appropriate assistance for their age and developmental needs to ensure that they consume adequate amounts of *PMT*. The proper number of feedings depends on the energy density of the local foods and the usual amounts consumed at each feeding (Helmizar,2019).

Based on this, local food ingredients can contribute and play an important role as an alternative in efforts to overcome malnutrition. One of the local food ingredients

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that can be used for the manufacture of MP-ASI is snakehead fish (Channa Striata). Snakehead fish production in Indonesia increased from 2015 to 6,490 tons, increasing in 2019 to 21,987 tons (Nauly, 2020). West Sumatra Province is one of the provinces with the highest fish consumption in Indonesia, although it is still below the national consumption of 41 Kilograms/kg. per capita per year (Elfisha, 2019). Processing of local food ingredients in the form of flour is one of the efforts to diversify intermediate processed products.

Some research results have shown a significant increase in nutritional levels of foods that are added with snakehead fish meal, including the results of Arza's research in 2017, which showed an influence on the color, texture, aroma, and taste of biscuits with the addition of pumpkin and cork fish meal. The best formulation for biscuits for color and texture is in the treatment without the addition of pumpkin and Snakehead fish. On the contrary, the best formula for aroma and taste is in the treatment of adding pumpkin and Snakehead fish with a content of 10 grams. The highest protein content is in biscuits with the addition of Snakehead fish and pumpkin with a content of 30 grams (Arza, 2017). This research aims to analyze the effects of Snakehead fish flour on the sensory characteristics of cookies

METHOD

Materials:
The ingredients used in making the snakehead fish biscuit formula for this research were obtained from snakehead fish food and local food ingredients from corn, red beans, and soybeans. Furthermore, these materials are processed into flour. Meanwhile, refined sugar, margarine, egg yolks, wheat flour, and cornstarch are other supporting materials used. Next, the ingredients are mixed according to the predetermined biscuit-making procedure.

Methods :
Preparation of Snakehead's flour :
Adapted from Arza (2017), which is modified.
Preparation of Corn powder :
Adapted from Halil (1995).
Preparation of Red Bean flour :
Adapted from Ruben (2010), which is modified.
Preparation of Soy Bean flour;
Adapted from Marlina (2012), which is modified

Experimental design:
Four formulations have been developed for our study :

Table.1 Formulation of Biscuit

Ingredient	Weight (g)			
	F0 (0%)	F1 (10%)	F2 (20%)	F3 (30%)
Cork Fish Flour	0	8	16	24
Wheat flour (g)	10	10	10	10
Corn flour (g)	30	30	30	30
Red bean flour (g)	20	20	20	20
Soy flour (g)	18	18	18	18
Corn (g)	4	4	4	4
Refined sugar (g)	34	34	34	34
Egg yolk (g)	30	30	30	30
Margarine (g)	40	40	40	40
Total	**186**	**194**	**202**	**210**

Sensory analysis
The acceptability assessment of the four formulations of the Biscuit was carried out on students at Andalas University. The samples were labeled with three-digit numerals and presented monadically to consumers following a complete randomized block design. Consumers evaluated the overall acceptance of formulations using a hedonic-structured scale of 7 points.

Proximate Analysis Content
The snakehead fish biscuit product was tested for its nutritional content, namely the proximate test consisting of a water content test using the thermogravimetric or oven method. Analysis of ash content using the oven method. Analysis of fat content using the method of testing total fat content or Soxhlet. Analysis of protein content using the total nitrogen or Kjeldahl method. While the analysis of carbohydrate content using the difference method.

Data Processing And Analysis
Organoleptic results data consisting of hedonic test and hedonic quality test were processed descriptively using Microsoft Excel 2010 and analyzed using SPSS. Data that were normally distributed ($p>0.05$) used the ANOVA (Analysis of Variance) test if the results showed a significant difference ($p<0.05$), followed by Duncon's New Multiple Range Test at the 5% level. However, if the data is not normally distributed ($p < 0.05$), then use the i test if the results show a significant difference ($p < 0.05$), followed by the Mann-Whitney test. Furthermore, the percentage of acceptance and the results of the analysis of the nutritional content of the selected snakehead fish biscuit formula were processed descriptively using Microsoft Excel 2010. The data from the results of the shelf life test were presented in a table and analyzed descriptively using Microsoft Excel 2010.

RESULTS AND DISCUSSION

Sensory analysis of Biscuit

Based on the Hedonic Scale Test of Colour, flavor, taste, texture, and overall acceptability of biscuit with or without the addition of snakehead fish flour in Table 1 is generally accepted by panelists. The highest mean level of treatment showed that the color of a biscuit without the addition of snakehead fish flour was more acceptable to panelists with a score of 5,53; waffles with the addition of 30% of snakehead fish flour less acceptable by panelists with a mean score of 5,20. The color of the control sample was lighter and more yellow than any of the other Biscuits.

The texture of Biscuits without the addition of snakehead fish flour is more acceptable to panelists with a 4,8 average score. Biscuits with the addition of 30% of snakehead fish flour are less received by panelists with a

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score of 4,1. The flavor of biscuits without the addition of snakehead fish flour is more acceptable to panelists with a 5,47 average score. Biscuits with the addition of 30% of snakehead fish flour are less received by panelists with a score of 4,87. The taste of biscuits without the addition of snakehead fish flour is more acceptable to panelists with a 5,33 average score. Biscuits with the addition of 30% of snakehead fish flour are less received by panelists with a score of 4,13. The texture of Biscuit without the addition of snakehead fish flour is more acceptable to panelists with a 4,8 average score. Biscuits with the addition of 30% of snakehead fish flour are less received by panelists with a score of 4,1.

Table 2. Sensory characteristics of waffle prepared with various levels of snakehead fish flour and oyster mushroom powder

Variables	Formula 0%	Formula 10%	Formula 20%	Formula 30%	P
	Mean (SD)				
Color	5,53 (1,1)[a]	5,40 (1,2)[a]	5,40 (1,0)[a]	5,20 (1,0)[a]	0,483
Flavor	5,47 (0,8)[a]	5,13 (0,9)[a]	5,17 (1,2)[a]	4,87 (1,0)[a]	0,090
Taste	5,33 (0,9)[a]	4,50 (1,1)[b]	4,63 (1,3)[c]	4,13 (1,1)[d]	0,002
Texture	4,80 (0,9)[a]	4,73 (1,2)[a]	4,40 (1,3)[a]	4,10 (1,1)[a]	0,059
Overall	5,3 (0,9)[a]	4,94 (1,1)[a]	4,90 (1,2)[a]	4,57 (1,1)[a]	0,158

Color, flavor, taste, texture, and overall acceptability of Biscuit by adding snakehead fish flour and oyster mushroom powder were evaluated, and the results are presented in Table 1. In sensory evaluation, all categories except taste were not significantly different at $p>0.05$. Overall the Biscuit without adding snakehead fish flour showed high sensory scores and preferable acceptability in color, texture, odor, flavor, and overall acceptance.

Some comments from panelists said that the decrease in acceptability after the addition of snakehead fish flour is due to the increasingly hard texture, not good odor, flavor, and not a good color. This may be due to the snakehead fish flour, which has its own unpleasant odor. The lower hedonic score for this Biscuit after adding snakehead fish flour was similar to the research by Sari et al. (2014), who found that the acceptability of respondents showed that snakehead fish flour treatment had no significant effect ($p>0.05$) on biscuit odor, flavor, color and overall [12].

Fish meal concentration in functional biscuit processing showed significant differences between biscuit taste specifications treatments. Determination of the selected formula was based on the results of organoleptic tests, which showed that the addition of 10% snakehead fish flour gave the panelists preferred color, flavor, and texture compared to the addition of 20% and 30%. At the same time, the panelists preferred the taste with the addition of cork fish as much as 20%.

Nutrient Content in Snakehead fish Biscuit Formulation

Nutrient Content in Snakehead fish Biscuit Formulation results is presented in Table 3. The snakehead fish biscuit product was tested for its nutritional content, namely the proximate test consisting of a water content test using the thermogravimetric or oven method. Analysis of ash content using the oven method. Analysis of fat content using the method of testing total fat content or Soxhlet. Analysis of protein content using the total nitrogen or Kjeldahl method and the analysis of carbohydrate content uses the difference method.

Table 3. The proximate composition of the biscuits

Proximate	Biscuit Quality Requirements*	Content
	Per 100 g	
Moisture	Maximum 5	7,44
Ash	-	0,715
Energy	Minimum 400	420
Protein	8-12	12,51
Fat	10-18	24,785
Carbohydrate		54,55
Fiber	Maximum 5	
Sucrose	Maximum 20	

*** Minister of Health (MOH) Regulations Number 51, 2016**

The nutritional content of catfish fluor biscuits is in 100 g of ingredients containing 7,44% water, 0,715% ash, 12,51% protein, 24.9% fat, 54,55% carbohydrates. Functional biscuits with 20% snakehead fish powder substitution gave the panelists preferred color, aroma, and texture compared to other formulas. In contrast, in terms of taste, the panelists preferred adding 20% catfish meal significantly.

CONCLUSIONS

The acceptability in the taste of respondents showed that snakehead fish flour treatment had a significant effect ($p<0.05$). The nutritional content of snakehead fish meal biscuits meets Biscuits (SNI 2973:2011); as for the nutritional content of biscuits in 100g, the material contains water 7.44%, ash 0.7%, protein 12.51%, 24.8% fat, 54.55% carbohydrates. Functional biscuits with the addition of 20% snakehead fish give the panelists a taste of preference compared to 10% and 30%.

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REFERENCES

Arza PA, Asmira S. Pengaruh Penambahan Labu Kuning (Cucurbita Moschata) dan Ikan Gabus (Ophiocephalus Striatus) Terhadap Mutu

Organoleptik, Kadar Protein dan Vitamin A Biskuit. Nutr J Gizi, Pangan dan Apl. 2017;1(1):58.

Dinas Kesehatan Republik Indonesia. Riset Kesehatan Dasar. Diabetes Mellit. 2013;87–90.

Elfisha M. Konsumsi Ikan di Sumbar naik sejak 10 tahun terakhir. 2019;1.

Hermina dkk. Evaluasi Pelaksanaan Program Pemberian Makanan Tambahan (PMT) Untuk Balita Kurus dan Ibu Hamil KEK. In Kementrian Kesehatan RI; 2016. p. 1–5. Kementerian Kesehatan RI. Laporan Riskesdas 2018. Lap Nas RIskesdas 2018 [Internet]. 2018;53(9):181–222. Available from: http://www.yankes.kemkes.go.id/assets/downloads/PMK No. 57 Tahun 2013 tentang PTRM.pdf

Helmizar, Resmiati, Yuliwarni. Producing Biscuit as Complementary Food Enriched With Local Food *Dadih* for Stunted Children Aged 12-24 Months. Proceedings of the Third Andalas International Public Health Conference, AIPHC 2019, 10-11th October 2019, Padang, West Sumatera, Indonesia. http://dx.doi.org/10.4108/eai.9-10-2019.2297240

Litbangkes, kementrian Kesehatan RI. Studi Status Gizi Balita Di Indonesia Tahun 2019.

Nauly yacob. Ikan Gabus Komoditas Unggulan Berbasis Lokal. 2020;3–4.

Marlina, Lina., Miranti, Mira dan A. Kedelai Dengan Basis Tepung Mocaf Sebagai Pangan. 2012;

Pembuatan tepung jagung. 1995;

Pusat Data dan Informasi KKR. Situasi Balita Pendek (Stunting) di Indonesia. Kementrian Kesehatan RI; 2018. 7 p.

Ruben. 2010. Tempe T, Merah K. Studi sifat fisik, kimia dan fungsional tepung kacang merah dan tepung tempe kacang merah (.

Sari, D. K., Marliyati, S. A., Kustiyah, L., Khomsan, A., & Gantohe, T. M. (2014). Uji organoleptik formulasi biskuit fungsional berbasis tepung ikan gabus (Ophiocephalus striatus). *Agritech: Jurnal Fakultas Teknologi Pertanian UGM*, *34*(2), 120-125.

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