Conference Paper

Acceptance and Nutritional Value of Cookies Substituted with Tuna Fish Meal Madidihang (Thunnus Albacares)

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Abstract

The present research aimed to investigate the acceptance and nutritional value of cookies substituted with tuna fish meal madidihang (thunnus albacares). This was a pre-experiment. Data were collected in the form of primary data, namely the acceptance of cookies using organoleptic assessment including the acceptability of color, taste, aroma, and texture. The nutritional value of cookies is carried out in the nutrition laboratory. The data were analysed by Kruskal Wallis' tests. The research result indicates that the nutritional value of thunnus albacares bone meal per 100 grams carries a calcium content of 19.28%, cabbage is 14.06%, fat 6.52%, protein 23.41%, water 4.49%, and ash 51.52%. There is no difference in the acceptability of color, aroma, and taste of cookies substituted with thunnus albacares at concentrations of 10%, 15%, and 20%. There is a difference in the acceptability of the texture of cookies substituted with Midnight tuna (thunnus albacares) at concentrations of 10%, 15%, and 20% ($p = 0.023$). The preferred texture acceptability is at a concentration of 15%.

Keywords: substitutes for tuna fish bone meal, acceptability, nutritional value

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1. Introduction

The growth of the fetus in the womb is one indicator that determines fetal well-being. An examination of fetal well-being is important during pregnancy to get a healthy baby without complications for the first thousand days of life.[1] Pregnancies with stunted fetal growth (intrauterine growth restriction / IUGR) can have a variety of negative effects, namely stillbirth (stillbirth) of (9.7%), neonatal death, perinatal, cerebral palsy and disease. Low birth weight babies (LBW) are also a major problem in the fetus and are at risk of stunting. The prevalence of LBW in the world is estimated at 15% where 38% occurs mainly in developing countries. Data from the 2013 Riskesdas shows that the percentage of LBW in Southeast Sulawesi is 10%.

Pregnant women need vitamins and minerals to support fetal growth. Calcium needs in pregnant women increase early in pregnancy and will continue to increase until

birth. The recommended amount of intake during pregnancy is 1200mg / day due to increased calcium reabsorption in the digestive tract and calcium requirements for the mother and fetus. If not fulfilled can cause hypoklasemia which causes abdominal cramps resulting in abortion, fetal bone growth is not perfect so that disability occurs, bone loss in pregnant women and fetal development is hampered.[3]

One ingredient that contains high minerals is tuna fish bone meal. Tuna is one type of fish that is found in Southeast Sulawesi which contains a lot of protein and calcium. Tuna is very popular with people in Southeast Sulawesi, but the problem is the increase of tuna fish bone waste. One effort to overcome fisheries processing processing waste is the use of tuna fish bones.[4, 5] The content of calcium and phosphorus in tuna is 39-40%. Tuna fish does not contain does not contain calcium absorption inhibitors so it is absorbed faster by the body with minimal, inexpensive and easily available side effects.[6]

Tuna fish can be processed into a form that can be consumed by pregnant women in the form of flour. Madidihang tuna fish meal (thunnus albacores) is a mineral source that has high calcium and phosphorus. The mineral content of tuna fish meal is calcium (13.19%), phosphorus (0.81%), sodium (0.36%), iron (0.03%).[7] The results of the study indicate that tuna fish bone flour can increase blood calcium. Giving tuna fish flour is expected to meet the mineral needs of pregnant women so that it is useful for bone and tooth formation.[8, 9]

This research is a preliminary study of the utilization of tuna fish bone in the form of flour, so the initial stage of this research is to assess the acceptability and nutritional value of cookies substituted with thunnus albacares.

2. Method

This was a pre-experiment. Data collected in the form of primary data, namely the acceptance of cookies using organoleptic assessment includes the acceptability of color, taste, aroma and texture. The nutritional value of cookies is carried out in the nutrition laboratory. n this study the number of panelists was taken as many as 20 students from the Department of Nutrition, Faculty of Public Health, Unhas. Receiving power was collected through organoleptic tests using form instruments to assess the preference level of panelists then the data was inputted into computerized applications.The data were analysed by Kruskal Wallis' tests.

3. Results

Table 1: Nutritional Value of Tuna Bone Flour.

Sample	Type of Testing					
	% Water	% Ash	% Protein	% Fat	% Karbo	% Ca
Tuna fish meal	4,49	51,52	23,41	6,52	14,06	19,3

Tuna fish bone flour which can be used as a food ingredient for human bone growth.

Table 2: Acceptance of the Color of Cookies Substituted with Tuna Fish Bone Flour.

Criteria	Substituted Tuna Bone Flour Cookies						*X[2]*	*p-value*
	10%		15%		20%			
	n	%	n	%	n	%		
Very Uninteresting	0	0	0	0	0	0	2,760	0,252
Uninteresting	0	0	0	0	0	0		
Neutral	7	35,0	3	15,0	3	15,0		
Interesting	7	35,0	7	35,0	9	45,0		
Very Interesting	6	30,0	10	50,0	8	40,0		
Total	20	100	20	100	20	100		

In table 2, it can be seen that of the 20 most color acceptance panelists, it was very interesting in cookies substituted for tuna fish bone flour of 15% as many as 10 panelists (50.0%). The results of the crucifixion wallis test obtained p = 0.252. This shows that there is no difference in the acceptability of the color of cookies with different concentrations.

Table 3: Acceptance Of The Smell Of Cookies Substituted With Tuna Bone Flour.

Criteria	Substituted Tuna Bone Flour Cookies						*X[2]*	*p-value*
	10%		15%		20%			
	n	%	n	%	n	%		
Very not fragrant	0	0	0	0	0	0	0,871	0,647
Not fragrant	0	0	0	0	0	0		
Neutral	6	30,0	5	25,0	6	30,0		
Fragrant	8	40,0	6	30,0	8	40,0		
Very fragrant	6	30,0	9	45,0	6	30,0		
Total	20	100	20	100	20	100		

In table 3, it can be seen that from the 20 panelists the most aroma acceptance was very fragrant in cookies substituted with tuna fish bone flour of 15% as many as 9 panelists (45.0%). The results of the Crusader Wallis test obtained a p value = 0.647.

This shows that there is no difference in the acceptability of the aroma of cookies with different concentrations.

Table 4: Acceptance of the Taste of Cookies Substituted with Tuna Bone Flour.

Criteria	Substituted Tuna Bone Flour Cookies						*X[2]*	*p-value*
	10%		15%		20%			
	n	%	n	%	n	%		
Very bad	0	0	0	0	0	0	0,669	0,716
Bad	0	0	0	0	0	0		
Neutral	8	40,0	6	30,0	7	35,0		
Delicious	7	35,0	7	35,0	8	40,0		
Very Delicious	5	25,0	7	35,0	5	25,0		
Total	20	100	20	100	20	100		

In table 4, it can be seen that out of the 20 panelists the highest acceptance was neutral in cookies substituted with tuna fish bone meal by 10% as much as 8 panelists (40.0%) and good taste at 20% levels by 8 panelists (40.0%) The results of the crucifix wallis test obtained p = 0.716. This indicates that there is no difference in the acceptability of the taste of cookies with different concentrations.

Table 5: Receipt of Texture Cookies Substituted with Tuna Fish Bone Flour.

Criteria	Substituted Tuna Bone Flour Cookies						*X[2]*	*p-value*
	10%		15%		20%			
	n	%	n	%	n	%		
Very not crispy	2	10,0	0	0	0	0	7,532	0,023
not crispy	2	10,0	0	0	0	0		
Neutral	7	35,0	3	15,0	4	20,0		
crispy	4	20,0	7	35,0	8	40,0		
Very not crispy	5	25,0	10	50,0	8	40,0		
Total	20	100	20	100	20	100		

In table 5, it can be seen that of the 20 panelists the highest texture acceptance was very crunchy in cookies substituted with tuna fish bone flour of 15% as many as 10 panelists (50.0%). The results of the Crusader Wallis test obtained a value of p = 0.023. This shows that there are differences in the acceptability of the texture of cookies with different concentrations.

Based on the average value obtained in table 6 for the four products cookies are known that overall cookies can be accepted by the panelists. Treatment (15%) has the highest value of 4.20.

The conclusion of table 7 is that cookies can be used as one of the food ingredients that can be used for the growth of human bones.

Table 6: Level of Favorite Cookies Based on All Attributes.

Kriteria	Cookies		
	10%	15%	20%
Warna	3,95	4,35	4,25
Aroma	4,00	4,20	4,00
Rasa	3,85	4,05	3,90
Tekstur	3,40	4,35	4,20
Total	15,20	16,95	16,35
Rata-rata	3,80	4,20	4,10

Table 7: Nutritional Value of Cookies Substituted by 15% Tuna Bone Flour.

Sample	Type of Testing					
	% Water	% Ash	% Protein	% Fat	% Karbo	% Ca
Tuna fish meal	7,53	4,48	9,71	2,16	76,12	1,57

4. Discussion

Cookies are one type of snack that is often the choice of most people. Small foods consumed by all age groups, ranging from children, adolescents, adults to people who are elderly. Processed cookies that are found in the community until now have many variations ranging from shape and taste. Cookies as snacks or snack foods are foods that usually accompany tea, coffee or cold drinks by the public. It was served in the morning around 10:00 a.m., afternoon at 4:00 p.m. to 5:00 p.m., sometimes served at night before going to bed. About one snack, someone is enough 1-2 pieces containing 150-200 calories. It is called interlude food because it is served between two main meals, namely breakfast and lunch or lunch and dinner. The results of the study stated that from 100 grams of cookies substituted with tuna fish bone flour calcium content was 1.57%, carbohydrate was 76.12%, fat was 2.16%, protein was 9.71%. Conclusion from the research results that cookies can be used as one of the food ingredients that can be used for the growth of human bones.

Tuna fish meal is a mineral source that has high calcium and phosphorus. To having a high mineral content, the calcium content in tuna, especially in fish bones, forms a complex with phosphorus in apatite or tchylum phosphate. This form that causes tuna fish bone flour is easily absorbed by the body which ranges from 60-70%. The mineral content of Midnightfin tuna flour (Thunnus albacares) is 13.19% calcium, 0.81% phosphorus, 0.36% sodium, 0.03% iron.[7] This is in line with research that the calcium content in tuna fish bones is 39-40%. Tuna fish bone does not contain calcium absorption inhibitors so that it is easily absorbed by the body with little, cheap and easy side effects.[6]

World health organization recommends the recommended amount of calcium per day for adults around 400-500mg, but if consumption of protein is high, it is recommended to consume 700-800 mg, for children and adolescents with higher intake and for pregnant / breastfeeding women it is recommended to consume 1200 mg. Calcium consumption should not exceed 2500 mg a day to avoid hyperkalciura conditions (calcium levels in urine exceed 300 mg / day). Calcium requirements in pregnancy increase in the early pregnancy and will continue to increase until childbirth due to absorption of calcium in the digestive tract along with increasing calcium requirements for the mother and fetus. If this is not fulfilled it can lead to hypocalcemia which is excessive bone resorption so that it can cause abdominal cramps that cause abortion, imperfect fetal bone growth which results in disability, bone loss in pregnant women and late infant development.[3]

References

[1] Kemenkes RI. (2012) *Pedoman Perencanaan Program Gerakan 1000 Hari Pertama Kehidupan.* Jakarta: Kemenkes RI.

[2] Gardosi, J., Giddings, S., Clifford, S., Wood, L., Francis, A. (2013) Association Between Reduced Stillbirth Rates in England and Regional Uptake of Accreditation Training in Customised Fetal Growth Assessment. *BMJ Open;3:e003942.*

[3] Almatsier, S. (2014) *Prinsip Dasar Ilmu Gizi.*. Jakarta: PT.Gramedia Pustaka Utama.

[4] Riewpassa, F. J. S. (2007) Pemanfaatan Limbah Industri Perikanan. *Jurnal Ilmu Pengetahuan dan Teknologi. Vol.2.* Universitas Pattimura.

[5] Maulida, N. (2005) *Pemanfaatan Tepung Tulang Ikan Madidihang (Thunnus albacares) Sebagaik Suplemen Dalam Pembuatan Biscuit (CRACKERS*). *[Skripsi].* Institut Pertanian Bogor, Bogor.

[6] Winarno, F.G. (2008) *Kimia Pangan dan Gizi. Edisi Terbaru.* Jakarta: Gramedia Pustaka Utama.

[7] Ismanadji, I., Djazuli N, Widarto, Istihastuti T, Herawati N, Ismarsudi, Lasmono. 2000. *Laporan Perekayasaan Teknologi Pengolahan Limbah*. Jakarta : Balai Bimbingan dan Pengujian Mutu Hasil Perikanan, Direktorat Jenderal Perikanan.

[8] Zobda, P.R., Pramana, A.P., Padaga, M.C. (2005) Pengaruh Tepung Tulang Ikan Tuna Madidihang (*Tunnus Albacares*) Terhadap Kadar Kalsium dan Fosfor Dalam Darah Tikus Putih (*Rattus Nervegicus*) Model Ovariektomi.

[9] Wijayanti, Supriyana, Bahiyatun (2015) Perbandingan Pengaruh Pemberian Ekstrak Tulang Ikan Tuna Dengan Suplemen Kalk Terhadap Kadar Kalsium Darah Ibu Hamil Pasien Puskesmas. *Jurnal KesmaRiska 2016*.