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ORGANOLEPTIC TEST AND PHYTOCHEMICAL ANALYSIS OF MORINGA LEAF ANCHOVY NOODLES: FOOD PRODUCT DIVERSIFICATION FOR STUNTING PREVENTION

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Abstract

Stunting in children is a major nutritional problem that still occurs in Indonesia. One of the causes of stunting is unbalanced nutritional intake caused by the mother's lack of knowledge and the family's economy. This research aims to determine the organoleptic and phytochemical tests of Moringa leaf anchovy noodles for food diversification to combat stunting. Analysis of research data was designed using a Completely Randomized Design which was arranged with 1 factor, namely tekor noodle (M): M0 = 0 gr anchovy flour + 0 gr moringa flour + 200 gram flour; M1 = 25 grams of anchovy flour + 15 grams of moringa leaf flour + 200 grams of wheat flour; M2 = 35 grams of anchovy flour + 10 grams of moringa leaf flour + 200 grams of wheat flour; M3 = 45 anchovy flour + 5 grams of Moringa leaf flour + 200 grams of wheat flour. Data analysis uses the Anova statistical test to analyze differences in aroma, taste, texture and color. AnalysisThe phytochemical test is a quantitative test carried out to determine the nutritional content contained in mites. The method used is the Calculation method. The organoleptic test results showed that the panelists' assessment of the tekor noodle product had a very real influence on the color, aroma and texture of the tekor noodle and then had an insignificant influence on the taste of the tekor noodle. The best treatment based on the panelists' assessment was the M3 treatment, namely the addition of 40 grams of anchovy flour + 5 grams of Moringa leaves. Phytochemical analysis results found total energy 158.56 gr, energy from fat 19.62 gr, ash content 1.1%, water content 62%, carbohydrates 26.4%, total fat content 2.18%, protein content 8.3 %, Zinc 1.5 mg, Iron 2.39 mg, Calcium 105.3 mg. The findings of this research show that tekor noodles are a processed food product that, because of their phytochemical content, is good for preventing stunting.

INTRODUCTION

Stunting is a major nutritional problem that still occurs in Indonesia. Stunting has a huge impact on the socio-economic life of society because it is closely related to the growth and development of children's abilities. Nutritional problems are deficient and poor nutritional status, where malnutrition is a condition of malnutrition due to inadequate macro and micro levels. They can cause a very high prevalence of stunted children, which affects one in three children under five as a proportion of health problems according to the criteria of the World Health Organization (WHO, 2019). Stunting is a condition where the body and brain fail to grow due to malnutrition. The stunting rate in Indonesia is quite high. The results of Basic Health Research (Riskesdas) in 2021 show that the prevalence of stunting in Indonesia in 2021 was 24.4% or a decrease of 6.4% from 30.8% in 2018.

In general, malnutrition is caused by insufficient food intake and infectious diseases. There are two main groups of nutrients, namely macronutrients and micronutrients. Macronutrients are nutrients that provide energy for the body and are needed for growth, including carbohydrates, protein and fat. Meanwhile, micronutrients are nutrients needed to carry out other body functions; for example, in producing red blood cells, the body needs iron. This includes vitamins and minerals. Stunting is not only caused by one factor but is caused by many factors, where these factors are interconnected with each other. Three main factors cause stunting, namely unbalanced food intake (related to the nutritional content in food, namely carbohydrates, protein, fat, minerals, vitamins and water), history of low birth weight (LBW) and history of disease. [4].

Lack of energy and protein has a big influence on children's nutritional status. Protein, as a building block, has a role in the growth and development of children. If someone is deficient in protein, there are concerns that they will be susceptible to disease, and growth failure affects children's intelligence. The World Health Organization's recommendation is not to consume more than 55-75% of carbohydrates and protein and not to exceed 10-15% of total energy intake. Nationally, the average intake of carbohydrates is 243.9 grams, fat is 52.9 grams, and protein is 61.2 grams. [5].

If energy intake is less than sufficient energy is required, the energy reserves in the body stored in the muscles will be used. If this lack of intake lasts for a long period, it will result in weight gain and a state of deficiency in other nutrients [6]. Protein is part of all living cells and is the largest part of the body after water. One-fifth of the body is protein, half is in the muscles, one-fifth is in the bones and cartilage, one-tenth is in the skin, and the rest is in other tissues in body fluids. All enzymes, various hormones, transporters of nutrients, intracellular matrices and so on are proteins [5]. Protein intake can help the formation of immunoglobin, often referred to as antibodies, which function to ward off infections caused by viruses or bacteria. Stunting in children can occur due to a deficiency or low quality of protein containing essential amino acids. Children with low protein intake experience more stunting than children with sufficient protein intake. Children who get little protein have an 11.8 times greater risk of stunting [7].

Zinc consumption in the body greatly influences the function of the immune system. Therefore, zinc plays an important role in preventing infections caused by various pathogenic bacteria. Zinc deficiency in childhood can cause stunting and delayed sexual function maturation. Another consequence of zinc deficiency is an increased risk of diarrhea and respiratory infections [8]. Zinc can increase Insulin-like Growth Factor I (IGF I), which accelerates bone growth. IGF I is used to delivering growth hormones, which have a role as growth-promoting factors. Zinc deficiency can reduce immunity, thereby increasing the risk of contracting infectious diseases and triggering increased energy needs. In addition, zinc deficiency can inhibit bone growth [9].

During the growth period, bone formation and strengthening occur continuously, while the human skeleton contains ±99% of the total body calcium in the form of calcium hydroxyapatite crystals, the main producer of hard bone tissue. Calcium metabolism involves various hormones, namely PTH, calcitonin and calcitriol (1, 25-dihydroxyvitamin D), where the role of these hormones is to maintain bone calcium balance. If calcium intake is continuously lacking for a long time, the bone formation process will become unstable. oprimal[10].

Noodles are a staple food for Indonesian people wide Indonesians. Manys on the market are noodlesom wheat flour and have high energy levels. However, these noodles are limited in protein, fiber and mi,nerals such as calcium. Therefore, increasing the nutritional value of noodles is done by food substitution [11].

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Moringa is a shrub with a height of 7-11 meters and grows abundantly from the lowlands to an altitude of 700 meters above sea level. WHO designated it as a superfood ingredient because of its very high nutritional value. Apart from being a superfood, Moringa leaves are also called a functional food ingredient [12]. In Indonesia, moringa leaves are often found as living fences planted along fields or edges of rice fields, and in some areas, they are also used as vegetables for consumption. Moringa leaves have traditionally been widely used as a vegetable; until now, they have been developed into modern food products such as moringa flour, moringa crackers, moringa cakes, moringa candy, moringa leaf noodles and moringa leaf tea. [13]. Moringa leaves (Moringa oleifera) are a type of plant that is rich in nutrients. Moringa is known throughout the world as a nutritious plant, and the World Health Organization has introduced Moringa as an alternative food to overcome nutritional problems. [14]. One hundred grams of Moringa leaves contain 58.6 grams of protein, 5.2 mg of zinc, and 1650 grams of calcium.

Anchovy (Stolephorus sp.) is a type of fish that is produced in quite large quantities in the Indonesian seas. One type of anchovy that is known to the public is the anchovy. One hundred grams of dried anchovies contain 68.7 grams of protein, 5.2 mg of zinc and 1700 mg of calcium. [15].

Based on the above, the author wants to develop a product that is rich in nutrients to reduce stunting, which is a nutritional problem in Indonesia. The product in question is tekor noodles, which is made from high protein food, is liked by children and is easy to make. Anchovies and Moringa leaves are still very rarely used. Anchovies and moringa leaves can be processed into flour to increase the benefits and nutritional value of anchovies and moringa leaves. In this research, anchovy flour and Moringa leaf flour were used as food ingredients, which will later be added to making noodles to increase their nutritional value. [16].

METHODS

Time and place

The location of the organoleptic test for mycorrhiza was carried out at the Food Technology Laboratory, Nutrition Department, Health Polytechnic, Ministry of Health, Medan. In contrast, the phytochemical test was carried out at PT. Saraswanti Indo Genetech Bogor.

Tools and materials

The research used flour-making tools, including scales, basins, knives, an 80-mesh sieve, and a cabinet dryer. Meanwhile, ampia/molding machines, basins, trays, pans, sieves, napkins, scales, and stoves are used to make tekor noodles.

The ingredients used in processing Moringa Leaf Anchovy Noodles are wheat flour, anchovy flour, moringa flour, tapioca flour, eggs, salt and water.

Data analysis

Research data analysis was designed using a Completely Randomized Design (CRD) with 3 treatments and two repetitions. In this research, substitutions were made for the tekor noodle product, anchovy flour in 3 treatments (25, 35, 45 grams), and Moringa flour in 3 treatments (25, 15, 5 grams). There were three experimental units for each treatment test. If there is a significant difference in the analysis of variance (ANOVA), a BNT test will be carried out with a significance level of 5% with the aim of finding out the mean in the treatment. Organoleptic test data were analyzed using the panelists' liking level test (hedonic scale).

Table 1: Distribution of Ingredients and Grams in Making Mitekor

Material Name	Unit	Treatment		
		C	D	E
Flour	grams	200	200	200
Anchovy flour	grams	25	35	45
Moringa flour	grams	25	15	5
Tapioca flour	grams	20	20	20
Egg	item	1	1	1
Salt	Teaspoon	1/2	1/2	1/2
Water	milli liter	50	50	50

Procedure for making TEKOR noodles.

Moringa Flour

Moringa leaves are sorted/separated from yellow Moringa leaves to get green and young Moringa leaves. Then, they are washed using clean water. After washing, they are drained and dried with a cabinet dryer at 100˚C for 6 hours. After drying, they are ground until smooth and then sifted to produce Moringa leaf flour.

Anchovy Flour

The anchovies are sorted, then the heads and stomachs are separated, washed using running water, then drained and then dried in a cabinet dryer at a temperature of 150˚C for 5 hours. After drying, grind them until smooth, then sift them to produce anchovy flour.

TEKOR Noodles.

The recipe for making mitekor uses various modifications. The ingredients to be used are prepared and weighed for making tekor noodles with variations in the addition of moringa flour and anchovy flour, namely 200 grams of wheat flour, 5 grams of moringa flour and 45 grams of anchovy flour. Next, add the wheat flour, moringa flour and anchovy flour into the bowl, then stir until evenly mixed; add 20 grams of tapioca flour, ½ tsp salt solution, one egg and enough water, then stir/knead the dough until it is even and smooth. Let the dough rest for 15-20 minutes. Flatten the dough into a sheet using ampia/molding machine number 1, then flatten it again using ampia/molding machine number 4. Sprinkle the flattened dough with tapioca flour so that the dough does not stick. Insert the dough sheets into the noodle-cutting machine. Place the molded noodles into the tray. Steam the noodles in a pan for 10 minutes. Remove, cool, and drain.

Organoleptic Test

Organoleptic assessment is widely used to assess quality in the food industry and other agricultural product industries. Sometimes, these assessments can provide very thorough assessment results. In some cases, sensory assessment even exceeds the accuracy of the most sensitive tools (Susiwi, 2009). Organoleptic tests were carried out to determine the level of consumer preference for the color, taste, aroma and texture of the purple tekor noodles produced. According to Kartika et al. (1988), a liking test is a test that asks panelists to express their response in the form of whether they

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like or dislike the properties of the material being tested. The favorite testing method used is scoring. The number of panelists required for this test is 30 people.

This research was tested using trained panelists. The panelists are students from the Medan Health Polytechnic, Lubuk Pakam Nutrition Department, with the criteria of having passed the ITP course, not being sick, not smoking, not hungry or thirsty, and willing to carry out organoleptic tests.

Each panelist will be given three samples, which will be tested for their level of liking against 4 test criteria, namely color, taste, aroma and texture (ease of biting and ease of chewing). This test was carried out by randomly coding the samples presented so as not to give rise to certain interpretations by the panelists. The following are the organoleptic test assessment criteria in Table 2 below:

Table 2: Organoleptic Test Assessment Criteria

Hedonic Scale Organoleptic Test Rating Scale				Numerical Scale
Color	**Flavor/Favorite**	**Aroma**	**Texture**	
Very green	Really like	Really like	Very smooth	5
Pretty green	Just like it	Just like it	Quite smooth	4
Less green	Do not like it much	Do not like it much	Not subtle enough	3
Not green	Do not like	Do not like	Not smooth/rough	2
Not very green	Very dislike	Very dislike	Very unpolished/very rough	1

Phytochemical Analysis

Phytochemical analysis was carried out at PT. Saraswanti Indo Genetech Bogor. Phytochemical analysis was carried out to determine the nutritional content of Moringa Leaf Anchovy Noodles. Phytochemical analysis of Moringa Leaf Anchovy Noodles includes analysis of carbohydrates, protein, zinc and calcium. Carbohydrate analysis uses different methods, protein analysis uses the Kjeldahl method, and zinc and calcium analysis uses the spectrophotometric method. The contents of these four nutrients were analyzed by referring to SNI 2987:2015.

RESULTS AND DISCUSSION

Results

Organoleptic Test

Table 3: Organoleptic Test Results with Various Treatments

Organoleptic Properties	Treatment			
	C	**D**	**E**	**p-value**
Color	*2.58*	3.08	3.38	0,000
Texture	2.6	2.9	3.0	0,000
Flavor	2.04	2.46	3.16	0,000
Aroma	2.88	2.9	2.76	0.636
Average	**2.52**	**2.67**	**3.07**	

ANOVA test;) Significant if p-value <0.05*

The results of the color organoleptic test showed that the panelists liked the color of the noodles the most in treatment E (3.38). The color of the Moringa leaf anchovy noodles in treatment C received an average value of 2.58, and the color of the Moringa leaf anchovy noodles in treatment D received an average value of 3.08. According to the panelists, the color of the Moringa leaf anchovy noodles in treatment E was a bright light green color. The results of the organoleptic test assessment for texture showed that the panelists liked the texture of the noodles the most in treatment E (3.0). The texture of the Moringa leaf anchovy noodles in treatment C received an average value of 2.6, and the texture of the Moringa leaf anchovy noodles in treatment D received an average value of 2.9. According to the panelists, the texture of the Moringa leaf anchovy noodles in treatment E was chewier, softer, and did not break easily.

The organoleptic test results showed that the panelists really liked the taste of Moringa anchovy noodles in treatment E (3.16). The taste of Moringa leaf anchovy noodles in treatment C received an average value of 2.04, and the taste of Moringa leaf anchovy noodles in treatment D received an average value of 2.46. According to the panelists, the taste of the noodles in treatment E was tastier than the taste of the noodles in treatments C and D.

The results of the organoleptic aroma test on Moringa leaf anchovy noodles showed that the panelists liked the noodles' aroma the most in treatment D (2.9). The aroma of Moringa leaf anchovy noodles in treatment C received an average value of 2.88, and the aroma of Moringa leaf anchovy noodles in treatment E received an average value of 2.76. According to the panelists, the aroma of the Moringa leaf anchovy noodles in treatment D has a distinctive anchovy aroma combined with Moringa.

Based on the results of the organoleptic mycorrhiza test, it was found that the lowest treatment value was C (2.04) with the liking category characterized by a dark green color, a slightly soft texture, less elasticity, the noodles broke easily, a slightly unpleasant taste and a pleasant aroma from the Moringa leaves and anchovies. Meanwhile, the highest treatment value was found in treatment E (3.38) with the category of really liking the characteristics of light green color, chewier, softer texture, not easily broken, savory taste and distinctive aroma of anchovies combined with the aroma of moringa.

Phytochemical Test

Phytochemical content in mites to determine some of the nutritional content. The phytochemical examination was carried out by repeating two times. The mycorrhea content is listed in Table 3.

Table 2: Mythorous phytochemical content

Parameter	Mitekor Formulation			
	Deuteronomy 1	**Deuteronomy 2**	**Average**	**Unit Method**
Total energy	*160.29*	156.83	158.56	gr Calculation
Energy from fat	*19.89*	19.35	19.62	gr Calculation
Ash Content	*1.08*	1.12	1.12	% SNI point 6.1
Water content	*61.61*	62.36	62	% SNI point 5.
Total Fat Content	*2.21*	2.15	2.18	% Weibull
Carbohydrate	*26.93*	25.91	26.42	Gr Calculation
Proteins	8.17	8.46	16.63	% Titrimetry
Zinc	1.45	1.47	1.46	Mg ICP QES
Calcium	104.69	105.87	105.28	Mg ICP QES

Source PT. Saraswanti Indo Genetech

Table 3 shows that tekor noodles have an average total protein content of 26.42%, 16.63% protein, 1.46 mg zinc, and 105.28 mg calcium. The following explanation explains how the phytochemical content in mites can be provided as an alternative to prevent stunting.

DISCUSSION

Based on table 2 shows that from each color assessment result, the highest average organoleptic test value was in treatment E, namely 3.38, and the lowest was in treatment c, namely 2.58. The highest taste assessment results were found in treatment E; The highest aroma assessment results were in treatment E, while the texture assessment results were in E. The difference in values showed that, on average, the panelists preferred the tekor noodles in treatment E, namely 45 gr anchovy flour + 5 gr moringa + 200 gr flour.

Tekor Noodles Color

The color of tekor noodle products tends to be green. Color is the first impression that appears and is assessed by the panelists. According to Winarno (1997), color is the first organoleptic parameter in presentation. Color is the first impression because it uses the sense of sight. Attractive colors will invite the tastes of panelists or consumers to taste the product. The results of the variance analysis can be seen in Table 3, showing that the panelists prefer the color light green. This is because the green color in treatment E seems fresher and not too thick like the noodles in treatments C and D. This shows that the ingredients for making the noodles contain more anchovy flour, which makes the green color of the moringa lighter. Tekor noodles are made without dangerous ingredients such as preservatives, colorings and flavors; the green color comes from the natural green color of Moringa leaves; because they do not use synthetic dyes, these tekor noodles are healthier than other instant noodles so these tekor noodles are very suitable for school children.

Tekor Noodle Flavour

Taste is one of the factors that can determine whether a product is acceptable to consumers. Taste is something that is received by the tongue. In human taste sensing, there are four main tastes: sweet, bitter, sour, and salty, and there are additional responses if modifications are made (Zuhra, 2006). Analysis of variance showed that purple tekor noodles had no significant influence on the taste/liking of tekor noodles.

The results of the assessment of the taste of tekor noodles were delicious and savory, possibly because Mitekor uses anchovies which make the food even tastier because anchovies are a natural flavor enhancer. Apart from that, Mitekor also has a chewier texture and does not soften quickly, making it delicious for making fried noodles. Apart from its delicious taste, this tekor noodle also contains many phytochemicals and uses simple ingredients, including Moringa leaves, anchovies, eggs, oil, salt and Moringa leaves, all of which are ingredients that are readily available in the community. The advantage of this tekor noodle is that it has animal and vegetable protein compared to some instant noodles, which are usually high in carbohydrates.

The Aroma of Tekor Noodles

Aroma is one of the parameters used to test sensory properties (organoleptic) using the sense of smell. The aroma is acceptable if the material produced has a specific aroma (Kusmawati, et al, 2000). Furthermore, aroma is a subjective sensation produced by smelling. Constituents that can cause aroma are volatile compounds (which can be isolated from food, usually less than 100 ppm) (Santoso and Murdijati G, 1999). The results of the fingerprint analysis of this very distinctive aroma variety were obtained from the savory taste of Mitekor, making the aroma of Mitekor even more distinctive, which makes many people like it. Tekor noodles are not only consumed boiled or fried; they can also be served with various toppings such as omelets, boiled eggs, fried shrimp, chopped chilies, tomatoes, etc. This topping is enough to increase the enjoyment of mi tekor, making the taste buds even more stimulated to enjoy mi tekor.

According to Zuhrina (2011), the aroma emitted by food is a very strong attraction and is able to stimulate the sense of smell, thus arousing the appetite. The emergence of food aromas is caused by the formation of volatile compounds as a result of reactions due to the work of enzymes or can also be formed without the help of enzyme reactions. Then, the aroma component is closely related to the concentration of the aroma component in the vapor phase of the mouth. The volatile properties of the aroma itself also influence this concentration. Another factor is the natural interaction between aroma components and nutritional components in the food, such as carbohydrates, proteins and fats, as well as their very relative consumer acceptance.

Tekor Noodle Texture

Texture is a sense associated with touch or touch. Sometimes texture is also considered as important as smell, taste and aroma because it affects the image of food. The texture is the most important element in soft and crunchy foods. The characteristics most often referred to are hardness, cohesiveness, and water content (De Man, 1997). Test the texture of the tekor noodles by paying attention to the noodles' level of elasticity. The texture of noodles that are not easily broken will be more accepted by consumers.

The results of the average texture assessment of tekor noodles showed that the texture in treatment E had a higher average value (3.0) compared to treatments C (2.6) and D (2.9), with the content of moringa flour, anchovy flour, and also 5 g, 45 g and 200 g of wheat flour. The function of the binder is to improve the stability of the emulsion, reduce shrinkage due to cooking, give a bright color, increase product elasticity, form a dense texture, and attract water to the dough. Generally, binders are added to food mixtures. According to Aptindo (2012), wheat flour contains protein in the form of gluten, which plays a role in determining the elasticity of foods made from wheat.

Mythecoral Phytochemical Content

Proteins

The protein content in Mie Tekor per 100 grams is 8.31 grams, which is equivalent to 1 chicken egg. The protein content in Tekor Noodles is very good for children's growth and development. Protein also functions to form new tissue, maintain and repair damaged tissue, and provide amino acids to form digestive and metabolic enzymes. If a child experiences a long-term protein deficiency, it will hinder height growth (stunting).

Carbohydrate

The carbohydrate content in Mie Tekor per 100 g is 26.42 g, which is equivalent to 1½ slices of white bread. The carbohydrate content in Tekor Noodles is useful as a source of energy. Children generally do physical activity very regularly. Therefore, adequate carbohydrate intake is needed so that children can avoid growth and development disorders.

Zinc

The zinc content in Mie Tekor per 100 g is 1.4 grams. Zinc plays a very important role in preventing stunting. The zinc content in Tekor Noodles can accelerate growth, improve the immune system, and increase appetite. If a child is deficient in the mineral zinc, it will have an impact on the growth of the toddler (stunting).

Calcium

The calcium content in Mie Tekor per 100 grams is 105.28 grams. Calcium is a nutrient that is useful for bone formation. Therefore, children's calcium needs should be met according to their age to avoid stunting.

CONCLUSION

Based on the results of the organoleptic test it shows that the panelists' assessment of the tekor noodle product has a very real influence on the color, aroma, texture and taste. The organoleptic test showed that the most preferred content of tekor noodles in the organoleptic test was anchovy flour 45 grams + moringa 5 grams. Phytochemical analysis of tekor noodles found that 100 grams contained 26.42 g of carbohydrates, 8.31 grams of protein, 1.4 grams of zinc and 105.28 grams of calcium. These findings provide an innovative processed food product for stunting prevention that children will like a child.

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Reference

1) WH Organization, Child Growth Standards. 2019.
2) A. Mutia, "2nd Highest Prevalence of Stunting in Indonesian Toddlers in Southeast Asia," 2021.
3) Eriyahma, "Efforts to Utilize Moringa Leaves: Moringa Leaf Pudding to Prevent Stunting,"National Service Journal, vol. 03, no. 02, pp. 45–49, 2023.
4) UNICEF, “Study Summary: Maternal and Child Nutrition,” 2012.
5) CE Hutabarat,The Relationship Of Carbohydrate And Protein Intake With The Incident Of Stunting In State School Children 054901 Sidomulyo Stabat District, Langkat District. 2019.
6) L. Gibney , M., Margetts, B., Kearey , J., Arab, “Public Health Nutrition. Jakarta: EGC Medical Book Publishers," 2008.
7) H. Anshori, "Risk factors for stunting in children aged 12-14 months (Study in East Semarang sub-district). Diponegoro University," vol. Vol.2 No., 2013.
8) S. Wiyonoet al., "Nutritional Intake, Infection and Sanitation with Stunting in Three Year Old Children in Rural Areas," Journal of Nutrition Research, vol. 8, no. 2, pp. 65–75, 2020, doi: 10.31983/jrg.v8i2.6270.
9) EK Dewi and TS Nindya, "The Relationship between Adequate Levels of Iron and Zinc with the Incident of Stunting in Toddlers 6-23 Months,"Amerta Nutrition, vol. 1, no. 4, p. 361, 2017, doi: 10.20473/amnt.v1i4.7137.
10) G. Lanhami New, Susan A, Hakim, Ohood, Goulding, Alisa and Andrea, “Main Minerals Calcium and Magnesium,” 2012.

11) H. Ferazuma, SA Marliyati, and L. Amalia, "Substitution Of Dumbo Catfish Head Meal (Clarias Gariepinus Sp) To Increase The Calcium Content Of Crackers,"Journal of Nutrition and Food, vol. 6, no. 1, p. 18, 2011, doi: 10.25182/jgp.2011.6.1.18-27.

12) F. Winarno, "Moringa oleifera: Nutritional Value, Benefits and Business Potential," 2018.

13) M. Sanjaya, G. Yulianingsih, and ..., "Wet Noodle Substitution for Moringa Leaf Flour in Efforts to Prevent Stunting,"… : Indonesian Journal …, vol. 01, no. 02, pp. 178–185, 2022.

14) D. Ilham and W. Laila, "Determinant Factors of Stunting Incidents in School Children and Their Influence on Learning Achievement at Sdn 09 Nanggalo, Padang City in 2017,"PERINTIS HEALTH JOURNAL (Perintis's Health Journal), vol. 5, no. 1, pp. 30–38, 2018, doi: 10.33653/jkp.v5i1.91.

15) Sutarno, "Determination Of Protein Content Of Dried Animal Fish (Stolephorus Sp) Sold At The Kemiling Farmers Market, Bandar Lampung Using The Kjeldahl Method,"Gender and Development, vol. 120, no. 1, pp. 0–22, 2018.

16) A. Billina, S. Waluyo, and DD Suhandy, "Study of the physical properties of wet noodles with the addition of seaweed. Study of the physical properties of wet noodles with the addition of seaweed,"Lampung Agricultural Engineering Journal Vol, vol. 4, no. 2, pp. 109–116, 2014.

17) L. Nurhayati, W. Mardiah, and D. Setyorini, "Nutritional Status and Macronutrient Intake of Stunted and Non-Stunted Children 1-3 Years,"Health Journal, vol. 11, no. 2, pp. 83–92, 2020, doi: 10.38165/jk.v11i2.206.

18) Mulyasari and DA Setiana, "Risk Factors for Stunting Among Under 5 Years Old Children,"No, vol. 8, no. 20, pp. 160–167, 2016.

19) RW Hidayati, S. ST, M. KM, F. Rohmah, and S. Kes, "Literature Review of the Relationship between Knowledge Level and the Incidence of Anemia in Adolescents," 2020.

20) WC .Burckhardt P, Dawson-Hughes B, “Nutritional Influences on Bone Health. New York: Springer,” 2010.

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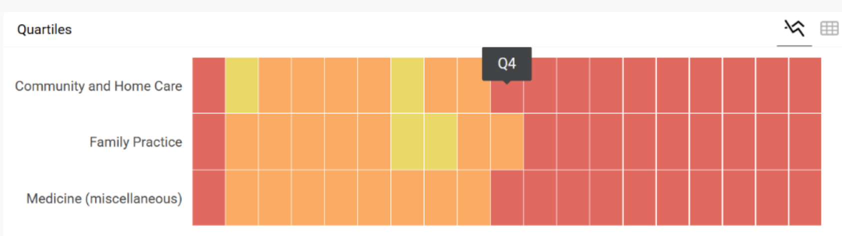

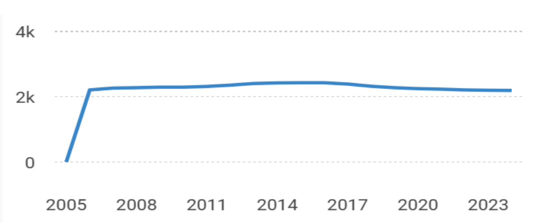

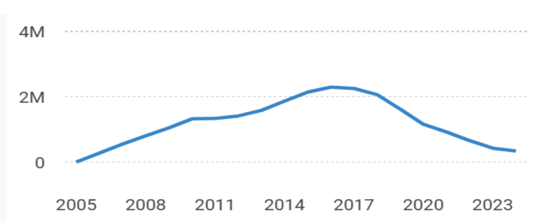

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