



Analysis of the Nutritional Content of Processed "TOKEN" for Pregnant Women with CED and Anemia

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Abstract: Malnutrition in pregnant women often occurs in developing countries, including chronic energy deficiency (CED) and micronutrient deficiencies. The aim of this research is to analyze tuna and potato content using proximate analysis and acceptance testing using sensory testing. This type of research is Research and Development, namely the method used to produce certain products and increase the effectiveness of these products. This development research uses a quantitative approach in collecting and analyzing data on mixed tuna and potato. Addition tuna flour and potato flour with the highest average value of 3.84 (like) at the treatment level with the addition of tuna flour and potato flour (25:15%). With a nutrient content of 62.6% water, 4.7% ash content, 9.28% protein, 10.64% fat, 12.75% carbohydrates, and 13.2% Fe content. The high of nutrient, protein, and Fe can be used as a protein source for pregnant women With CED and Anemia

Keywords: Anemia; High Fe; High Protein; TOKEN; Women CED

Introduction

Pregnant women are a group that is vulnerable to experiencing health problems, including malnutrition. Malnutrition in pregnant women often occurs in developing countries which includes chronic energy deficiency (CED) and micronutrient deficiencies (Dewi & Surya, 2018). Research conducted in Eastern Ethiopia on 575 pregnant women showed the prevalence of pregnant women who had Upper Arm Circumference (LILA) values below 23 cm by 44.7% (Adawyah et al., 2022).

The NTB Province Riskesdas data shows that the average LILA is 21.50 cm, whereas in Central Lombok, East Lombok, Bima, West Sumbawa and Mataram City it is still below the LILA of 23.5 cm. CED in pregnant women can cause problems for the mother and fetus. Risks and complications for the mother include anemia, the mother not gaining weight normally, bleeding, and being susceptible to infectious diseases. Pregnant women with CED can affect the fetal growth process and can cause miscarriage, low birth weight (LBW)

babies, neonatal death, anemia in babies and intrapartum asphyxia. Babies born LBW have a risk of disruption to their growth and development and experience malnutrition (Ardana & Eliska, 2023).

The results of the 2014 Total Diet Survey (TDS) show that more than half of pregnant women in urban and rural areas experience a lack of energy and protein intake. Based on this, PMT which focuses on fulfilling adequate macronutrients and micronutrients in pregnant women is very necessary to prevent LBW and short toddlers (stunting) (Adawyah et al., 2022).

Potatoes contain anthocyanins, these pigments are present in potatoes flesh (Hernández, Hernández, Gómez, & Artés F, 2017). Having a link with health promotion, in the form of red and purple color, the anthocyanins are naturally sourced by fleshy potatoes (Lachman J et al., 2009). Instead of this, potato tubers also contain some quantities of phytonutrients like phenolic compounds, flavonoids and carotenoids which is reduced the risk of heart diseases and also acts as an anti-inflammatory, antioxidant, cytotoxic and anti-tumor (Chung WS et al., 2016). As compared to the

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other more consuming vegetables, the unique one is potato. In products like fresh fries, almost 60% of potatoes are used at the industrial level. For home preparations and fresh food service applications, the remaining 40% of potatoes are used (Furrer A, Cladis DP, Kurilich A, Manoharan R, & Ferruzzi MG, 2017). Chips and shoestrings are important products of potatoes (12%), frozen French fries (30%), dehydrated items (12%), table stocks (31%) and other uses (15%). Globally, daily, more than 1 billion people consume potatoes (Silveira AC, Oyarzún D, Sepúlveda A, & Escalona V, 2017).

Tuna fish is a source of protein and is also recognized as a functional food which is important for health because it contains long chain unsaturated fatty acids (especially those classified as omega 3 fatty acids), vitamins and macro and micro minerals (Awuchi et al., 2022). Plus, potato skin contains; Glycoalkaloids and cell wall polysaccharides can be used as natural antioxidants, steroid hormone precursors and dietary fiber (Ardana & Eliska, 2023).

The antioxidant in potato skins is chlorogenic acid (Rasheed, Ahmad, & Bao, 2022). Chlorogenic acid has antioxidant activity to prevent the occurrence of free radicals. The total phenolic content in the extract was determined by UV-visible spectrophotometry using the Folin-ciocalcu method and calculated as equivalent to gallic acid (Rasheed et al., 2022).

The aim of this research is to analyze the content using proximate analysis and acceptability testing using sensory testing. This combination was chosen because both contain high levels of protein and iron which are needed by pregnant women. This research will carry out formulation tests on processed potato cobs and skins, looking at the protein, calcium, zinc and iron values. The acceptance test involved 50 respondents, including; appearance, texture and taste.

Method

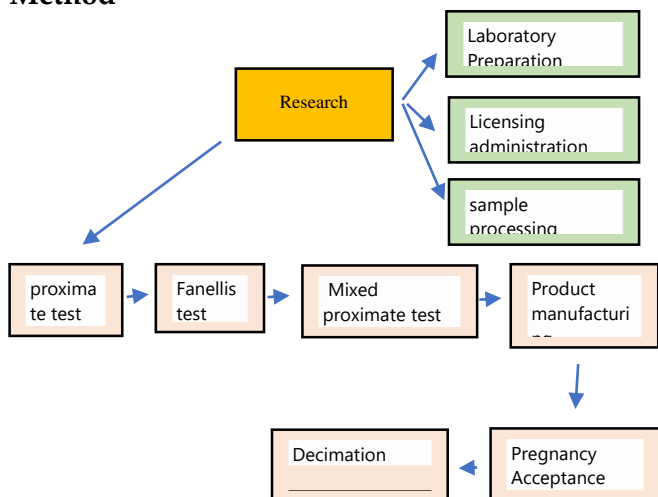


Figure 1. Research flow

This type of research is Research and Development, namely the method used to produce certain products and increase the effectiveness of these products (Notoatmodjo, 2018)(Sabri & Sutanto, 2020). This development research uses a quantitative approach in collecting and analyzing data on mixed tuna and potato starch products (Sugiyono, 2017).

The tools and materials used are: scales or analytical balance 1; beaker glass 400ml 1; beaker glass 100 ml 30; test tube 30; measuring pipette 3; measuring cup 50 ml 1; hot plate string buffer 1; knife; balur salted fish 2 grams; spicy salted fish 2 grams; anchovy salted fish 2 grams; distilled water; hot water; Balur salted fish samples; tuna and potato, fehling A and fehling B (Budimarwanti, 2011) .

Provide 30 samples of salted fish to be tested. Ask the panelists to carry out an organoleptic test by feeling the texture, smelling the aroma and seeing the color of the salted fish that has been provided (Sumarni, 2020). Next, panelists can fill out the questionnaire that has been provided. The data that has been obtained will later be analyzed descriptively.

Result and Discussion

Organoleptic properties of nuggets: Tuna fish flour and potato flour were carried out to determine the level of panelists (If'all, Gobel, Fahmi, & Pakaya, 2018). Preference for the research product, namely the addition of tuna fish flour and potato flour. Testing the panelists' level of preference for fish nuggets in this study included assessing aspects of texture, color, aroma, taste and chemical tests on the product (Mukhlisah, Mahi, & Yudita, 2022). The organoleptic test results of tuna fish flour nuggets and potato flour can be seen in Table 1.

Table 1. Average organoleptic test of tuna flour nuggets and potato flour.

Treatment	Average Organoleptic Test Tuna Fish Meal Nuggets and Potato Flour				Overall
	Texture	Color	Aroma	Flavor	
T1 (25:15)	4.10b	4.10b	3.53a	3.63a	3.84ab
T2 (35:30)	3.83b	3.83b	3.67a	3.43a	3.69b
T3 (45:45)	3.13a	3.13a	3.23a	3.30a	3.19a

Source: Primary data 2023

The nugget texture produced in this research is a texture that is easily crushed. Nuggets with a ratio of tuna flour and potato flour of 25%: 15% produce a fairly soft or normal texture, in line with nuggets in general. In contrast, nuggets have a ratio of tuna flour and

potato flour of 45%: 45%, which produces a slightly crumbly texture. According to the characteristics of potato flour are yellowish white color, smooth texture, slightly sweet taste, fragrant aroma typical of potatoes, and dry (Sidabalok, Salihat, Farid, & Fitria, 2024). The potato tubers used in making potato flour are yellow potato tubers of the granola variety. Because of the fine texture, adding potato starch at a higher concentration causes the characteristics of these nuggets to become slightly crumbly (Adawyah et al., 2022).

The color of the nuggets produced is yellow on the outside and slightly pale on the inside. The yellow color is obtained from the coating with breadcrumbs and also the length of frying time (Nairfana, Nikmatullah, Sarjan, & Kisman, 2021). A ratio of tuna flour and potato flour of 25%: 15% produces a color that is not pale compared to other treatments. This is because the higher the ratio of tuna flour and potato flour used, the less or paler the color intensity of the nuggets produced (Suryono, Ningrum L, & Dewi TR, 2018).

According to BSN (2019) in SNI no. 7758:2013 concerning Fish nugget standards, color parameters are not explained in detail. Color affects the acceptance of a food ingredient because generally the first thing to see when accepting an ingredient is the color. Attractive colors can increase product acceptance. Color may change during cooking. This can be caused by the loss of some pigment due to the release of cell fluid during cooking or processing, the color intensity decreases (Ardana & Eliska, 2023).

The dominant aroma of Nugget is the typical aroma of tuna and a slight aroma of potatoes (Zhang, 2020). The higher the ratio of tuna flour and potato flour used, the higher the aroma of tuna and potato that will be smelled in the nuggets (Cokrowati, Nurâ, & Mukhlis, 2020). Based on observations of product characteristics, all nuggets produced are in accordance with SNI no. 6683 on the Nugget Standard.

According to BSN (2019) in SNI no. 7758:2013 concerning Nugget Standards, the quality requirement for nuggets is that they have a normal aroma, no disturbing aroma (Retnati, Andriani, & Fauza, 2009). The distinctive aroma produced does not only come from fish meat but is also influenced by other additional ingredients, such as potato starch and various kinds of spices. According to (Ardana & Eliska, 2023): Different types of flour cause differences in aroma, because the aroma is caused by the presence of volatile components that are formed during the heating process of the main ingredients and spices. In this case, the four treatments use the same main ingredients, spices and processing processes (Wijana, Pandit, & Darmadi, 2018) (Zeng et al., 2019).

Based on Table 1, it shows that each treatment produces nuggets with different taste intensities. Nuggets with a ratio of tuna flour and potato flour of 25%: 15%, 35%: 30%, 45%: 45%, and respectively produce a slight taste of tuna and a slight potato taste, a taste of tuna and a potato taste, the tuna tastes very good and tastes quite typical of potatoes. As the ratio of tuna flour and potato starch increases, the resulting nugget taste produces nuggets with the typical taste of tuna fish and a potato starch taste appears.

Based on observations of product characteristics, all the nuggets produced is in accordance with SNI no. 7758:2013 concerning fish nugget standards. According to BSN (2019) in SNI no.7758:2013 concerning Fish Nugget Standards, the quality requirement for fish nuggets is that they have a normal taste, that is, they do not taste foreign. Overall, these nuggets are dominated by a distinctive and savory taste that comes from tuna and other additional ingredients, such as potato flour, spices and flavoring ingredients. Flavoring ingredients such as garlic, pepper, sugar, and salt provide the desired delicious taste in the product. The added flavoring ingredients can provide a distinctive taste due to the volatile content in them

Table 2. Nutrient content of tuna fish meal nuggets and potato flour

treatment	Nutrient content					
	KH (%)	Proteins (%)	Fat (%)	Water (%)	Ash (%)	Fe (mg)
T1	12.75	9.28	10.64	62.6	4.7	13.2
T2	16.29	10.8	9.62	57.5	5.76	10.5
T3	12.74	11.14	8.64	61.9	5.48	7.09

Source: Mataram University Laboratory 2023

The nutritional value content tests carried out in this research were tests for water content, ash content, fat, protein, carbohydrates and Fe content. Data from the analysis of proximate nutritional value and Fe content are presented in Table 2.

Analysis of the water content in the selected tuna fish flour and potato flour nugget products is 62.6%, the quality requirements for fish nuggets according to SNI 7758:2013, the maximum water content of fish nugget is 60%. The water content of the tuna flour nugget and potato flour in this study was higher than the SNI quality standard for biscuits (Sormin, Gasperz, & Woriwun, 2020). The water content in food affects the stability or durability of food. Generally, the higher the water content in a food, the more easily the food will spoil, either due to microbiological damage or chemical reactions (Ardana & Eliska, 2023).

The ash content of fish nuggets is a maximum of 2.5%, while the results of the analysis of the ash content of selected products obtained by this research are 4.7%

higher than the quality standard for fish nuggets. Ash content is an inorganic residue from the ashing process and usually the components contained in natural inorganic compounds are potassium, calcium, sodium, iron, magnesium and manganese, the higher the ash content of a food item indicates the high mineral content of the material (Asrawaty & If'all, 2018).

The protein content of fish nuggets is a minimum of 5%, while the results of analysis of the protein content of nuggets with the selected formula obtained by this research are 9.28% higher than the quality standard for fish nuggets. The high protein content in tuna fish flour nuggets and potato flour is caused by the addition of tuna flour and flavorings in the nugget making process. The more tuna flour added to the nugget mixture, the protein content tends to increase (Rananda, Jumsurizal, & Putri, 2023).

The quality requirements for fish nuggets according to SNI 7758:2013, the maximum fat content of fish nuggets is 15%. The results of the analysis of the fat content of nuggets using the selected formula showed that the fat content of tuna flour and potato starch nuggets was 10.64%. The fat content is lower than the nugget quality requirements. This is due to the use of a type of tuna that has a low fat content. Fats in food serve to improve the physical structure of food, add nutritional value and calories, and provide a savory taste to food (Asrawaty & If'all, 2018).

The carbohydrate content of tuna fish meal nugget and potato flour with the formula selected in this study obtained a carbohydrate content of 12.75%. Nugget processing generally uses tapioca flour and wheat, but the texture is quite hard and tough. To reduce the elasticity of the texture, try replacing it with potato starch. Potatoes are the main source of carbohydrates. As the main source of carbohydrates, potatoes are very useful for increasing energy in the body (Ardana & Eliska, 2023) (Alyensi, Aryani, & Susanti, 2023).

The Fe content of tuna fish flour nugget and potato starch with the formula selected in this study was 13.2 mg. The high iron content in fish nugget products is a ratio of tuna flour and potato flour (25:15 gr). The role of iron is very important for children's growth. Iron deficiency can cause anemia resulting in fatigue, weakness, lethargy, irritability. Iron can also affect brain development in children, if they suffer from anemia, it can cause long-term cognitive development problems (Ruaida & Soumokil, 2020).

Conclusion

Tuna flour and potato flour with the highest average value of 3.84 (like) at the treatment level with the addition of tuna flour and potato flour (25:15%).

With a nutrient content of 62.6% water, 4.7% ash content, 9.28% protein, 10.64% fat, 12.75% carbohydrates, and 13.2% Fe content.

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Conflicts of Interest

The researcher declares that he has no affiliation or involvement in any organization or entity with any financial interest or non-financial interest such as personal or professional relationships, affiliations, knowledge or beliefs in the subject matter or materials discussed in this manuscript.

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