



Analysis of Nutritional Content and Power Receive Chicken Liver Nuggets, Green Beans, and MOCAF Flour

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Abstract

One of lots of food loved by children is a nugget. Nugget is product processed food made from meat chicken mill and ingredients complement others. Nuggets are classified as food ready serving because can frozen and has been undergoing a cooking process partially (precooked). This is an experimental study that aims to determine the nutritional content and power receive of Nugget. The research implementation

started in April 2025 and continued until it was finished. Based on results research, the results of the acceptance test on taste, aroma, color, and texture of nuggets show that the taste, aroma and texture indicators of H2 nuggets are most preferred compared to other nuggets while the color indicator of H3 nuggets is the most preferred with nutritional content, namely protein 20.7%, total fat 10.5 %, iron 42.6 mg, carbohydrates 62.8%. Based on the results of the acceptance test on the four nugget indicators, it can be interpreted that there are significant differences in taste and texture between H1, H2 and H3 nugget. Content nutrition per 100 grams of liver nuggets chicken, beans green and MOCAF flour contains 20.7 % protein, iron, iron of 42.6 mg, carbohydrates of 62.8%, and total fat of 10.5%. Children preschool recommended for consume nutrient rich food like nuggets made from heart chicken, beans green, and MOCAF flour.

keywords : anemia, preschool children; iron; nuggets

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Introduction

Malnutrition happens because of imbalance intake of substances for nutrition, including lack of nutrition, advantages of nutrition and deficiency of substances for nutrition micro (Fouad et al., 2023). Deficiency of substances for nutrition micro covering essential mineral intake (such as substances of iron, zinc, iodine) and vitamins that are not sufficient. Deficiency of substances for nutrition micro like substances of iron and vitamin C can cause anemia. According to Kristin et al. (2022), the substance of iron plays a role important in formation of hemoglobin in red blood cells. Intake of substances of iron daily that is not adequate will drain the substance of iron in the liver, which can bother hemoglobin synthesis. Vitamin C supports absorption of substances of iron in the body.

Nugget is a food product made from meat, chicken, mill, and ingredients complemented by others. Nuggets are considered as food ready to serve because they can be frozen and have been through the cooking process partially (cooked more over formerly).

Anemia is a health problem for society that can influence various age groups, including children, pregnant mothers and postpartum, teenagers, and middle-aged women. High-income countries, low and medium to lower income countries bear the highest burden of anemia, especially in rural areas, among poor families, and in individuals who do not have access to formal education. Globally, anemia affects about 40% of children aged 6 to 59 months, 37% of pregnant females, and 30% of women aged 15–49 years (WHO, 2023).

The impact of anemia varies globally, but in children, anemia can cause delayed development and disorders of motor development, which can be continued until maturity and influence quality of life. According to Indrawan and Wijoyo (2020), development of cognitive ability at age four until six-year increase in a way significantly, from 50% to 80%. In pregnant mothers, anemia increases the risk of premature birth, low birth weight baby, and death of mother (WHO, 2024).

Anemia is also one of the factors that cause obstruction of growth, because it reduces delivery of oxygen to the body, including the brain. In toddlers, the supply of oxygen that is not adequate to the brain can hinder development and cause cognitive disturbance.

Substance of iron is one of the substances for nutrition the most important micro, especially for moderate children and teenagers to grow. Substance of iron plays a role important in transport of oxygen through the flow of blood as part of red blood cells and also important for the function of the immune system. Substance of iron can be found in affordable and easy-to-obtain animal products like chicken heart.

Nutritional status is not only rated through anthropometric measurements like weight, height, arm circumference, and head circumference. Nutritional status can also be rated using biochemical methods, which are used to diagnose nutrition problems like vitamin A deficiency, malnutrition, energy-protein, anemia, and obesity (measured through indicators like blood analysis, urine, and feces).



In developing countries, iron deficiency anemia is generally caused by intake of iron substance that is not sufficient. Prevention of anemia can be done by fulfilling the need of iron substance daily through consumption of nutrient-rich foods and iron supplementation (TDD) for teenager daughter. Source of iron substance among others is heart chicken, shellfish, eggs, meat cow, beans, soybeans, green beans, spinach, red, mushroom, oysters, etc. For increased absorption of iron substance, especially from vegetable sources, it is recommended to consume fruits rich in vitamin C such as Orange and guava seed.

One of the efforts to reduce the prevalence of anemia in children preschool is with increased hemoglobin (Hb) levels in children who are already suffering from anemia. Taking advantage of local material is one of effective strategies, such as using cassava flour (MOCAF (Modified Cassava Flour)) as the base product of food, together with green peanut and heart chicken. MOCAF flour has a number of advantages, namely as a source of good energy, supportive immune system, smooth digestion, improves nerve and brain function, as well as healthy bones. Besides that, MOCAF can also become a choice for food diversification because it can be used as a replacement flour.

Heart chicken is an internal organ meat that is rich in nutrition and known for its high iron content. The price is more affordable and available in a wide range compared to other heart animal products, such as heart cow or heart pig. The content of nutrition in 100 grams of heart chicken covers about 27.4 grams of protein and 15.8 milligrams of iron substance. Research conducted by Annisa and Suryaalamasyah (2023) used heart chicken in making cake dry, so the product has an iron substance content as much as 6 mg per 100 grams of cake dry.

Heart chicken is also used as a material complement in nugget formulation. A research by Sunarto et al. (2023) combined heart chicken with meat chicken and spinach, resulting in nuggets containing 5.7 mg of iron substance per 100 grams. Luthfi et al. (2022) reported an improvement in significant hemoglobin levels in the mother pregnant in the second trimester who consumed heart chicken during four weeks. Similarly, Rain et al. (2024) found that giving cake enriched with heart chicken and beans soya bean to teenager daughter for 30 days may cause an improvement in significant Hb levels.

Peanut green is another affordable and easy food obtained with high nutritional value. Every 100 grams, green peanuts contain 22.9 grams of protein, 56.8 grams of carbohydrates, 10 mg of vitamin C, and 7.5 mg of iron. In traditional, green peanuts are processed into porridge and served to children, especially during the supplementary feeding program (PMT) at *integrated health posts* for children with poor nutritional status. Besides porridge, green beans can be processed into other products, including nuggets.

One of the favorite foods for children is a nugget because it tastes delicious. Nuggets are usually made from ground meat chicken and complementary ingredients, formed into a checkered shape, and often made into



side dishes. In this study, the researchers develop version innovative nuggets made from heart chicken, beans green and flour mocaf.

The researchers pushed for develop product innovative in the form of nuggets made from base MOCAF flour, peanuts green, and heart chicken. Before developed, carried out calculation simple using data table Composition Indonesian Food (TKPI) for estimate content nutrition product. Based on Ingredients and measurements, formulated nuggets contain of 11 g protein, 10 g fat, and substances iron 8 mg per 100 grams. This formulation expected can help fulfil need intake substance nutrition, especially substance iron, in children preschool. For know power receive heart nuggets chicken, beans green and flour mocaf the so power test conducted received by 30 panelists that is USU FKM students for know in detail power accept based on organoleptic indicators.

Method

Study This is study experimental purpose for know Power receive and content Nugget nutrition made from heart chicken, beans green and MOCAF flour. Research done start April 2025 to with done . Power test accept includes 4 indicators namely taste, aroma, color and texture with use hedonic scale. This research using 3 treatments namely nuggets H1, H2 and H3. The difference from the three nuggets that is amount use heart chicken and beans green . Nuggets H1, H2 and H3 use heart chicken and beans green each with proportion namely H1 (90:10), H2 (80:20) and H3 (70:30) with use flour mocaf on the third treatment which is 50 grams. The tools used in the process of making nuggets, among others, containers, spoons, frying pans, bowls, blenders, baking sheets, steamers, strainers, and molds. The materials used in study is MOCAF flour, peanuts boiled green, liver chicken, flour tapioca, salt, pepper powder, onion white, oil sesame, and carrots grated.

Table 1. Ingredients and Measurements for Liver Nuggets Chicken with Peanut Green and MOCAF Flour

Material	Size
<i>Mocaf</i> Flour	50 grams
Mung beans	20 grams
Chicken Liver	80 grams
Tapioca flour	50 grams
Pepper	½ tsp
Salt	1 tsp
Sesame oil	1 tbs
Egg	1 grain
Carrot	¼ fruit



Stages Study

Making process MOCAF Flour

MOCAF (Modified Cassava Flour) is flour made from cassava that has been undergoing a fermentation process. Cassava peeled moreover first and washed with running water, then cut small-small. Fermentation done for 12–72 hours to meet SNI 7611-2011 standard. After fermentation, cassava washed return for remove characteristic the acid, drained, then dried in the oven with temperature 70°C for four up to five hours. Cassava that has been dry then ground use machine grinder. For get desired texture, the resulting flour sifted use 80 mesh and 100 mesh sieves. In this study, MOCAF flour is obtained from online store selling ready MOCAF use with 100% cassava composition fresh.

Boiling Process Peanut Green

The process started with choose peanut green intact which is not broken, then washed clean. Next, add 300 ml of water, and peanuts. green boiled with fire small for 30 minutes. After the beans fluffy and soft, nuts drained and set aside.

Processing Heart Chicken

Heart chicken obtained from the market cleared moreover first, then boiled with addition leaf orange lime and lemongrass for remove the pungent smell. Heart boiled during not enough more than 30 minutes. After boiling, the liver drained and cooled.

Process of Making Nuggets from Heart Chicken, Beans Green and Flour Mocaf



Nuggets are made use mixture MOCAF flour, liver chicken, and beans green, with heavy each nugget is about 50 grams. The manufacturing process is as following:

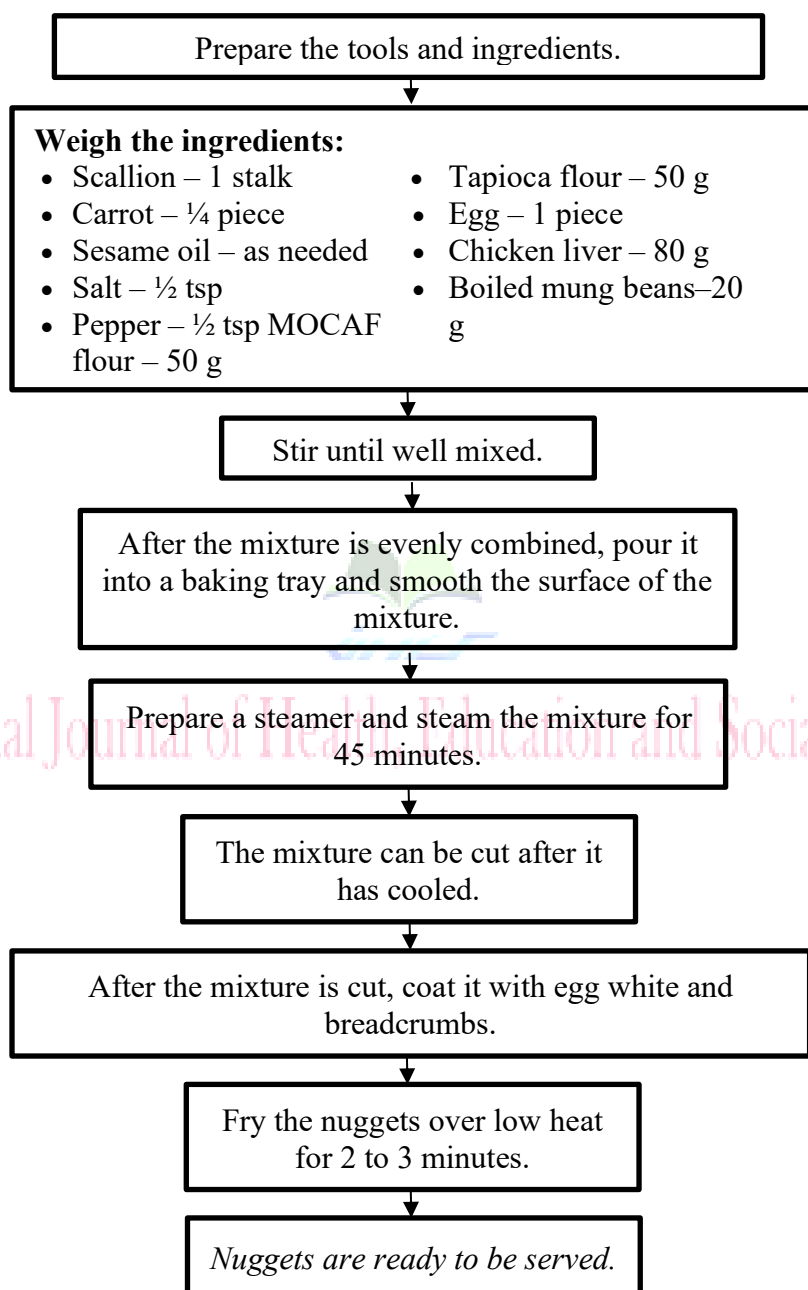


Figure 1. Flowchart of the Process of Making Nuggets Using Liver Chicken , Peanuts Green and Flour Mocaf



Analysis of the nutritional content of nuggets will be carried out at the Medan Industrial Standardization and Service Center to determine the levels of carbohydrates, protein, iron (Fe), and fat.

Power Accept Chicken Liver Nuggets with Green Beans and MOCAF Flour

Power test accept conducted at the USU Faculty of Public Health with 30 panelists, namely 30 USU FKM students.

Results

Nutritional Content of Chicken Liver Nuggets with Green Beans and MOCAF Flour

Results of nutritional content analysis per 100 grams of chicken liver nugget, green beans and MOCAF flour among them that is:

Table 2. Contents Liver Nugget Nutrition Chicken, Beans Green and MOCAF Flour

Substance Nutrition	Contents Nutrition
Protein(%)	20.7
Carbohydrates (%)	62.8
Substance Iron (mg)	42.6
Total Fat (%)	10.5

Power Accept Chicken Liver Nuggets with Green Beans and MOCAF Flour

As for results power receive heart nuggets chicken, beans green and flour mocaf against 4 indicators evaluation namely taste, aroma, color and texture as following:

Table 3. Results of Power Test Analysis Accept Chicken Liver Nugget Flavor, Green Beans and Flour Mocaf On Panelists

Flavor	H1			H2			H3		
	Panelists	Score	%	Panelists	Score	%	Panelists	Score	%
Like	4	12	13.3 %	27	81	90 %	11	33	36.7 %
Less Like	18	36	60 %	2	4	6.7 %	18	36	60 %
Do not like	8	8	26.7 %	1	1	3.3 %	1	1	3.3 %
Total	30	56	100%	30	86	100%	30	70	100%

On the nugget taste indicator 90% or 27 panelists state like to taste and 60% or 18 panelists state not enough love the taste of H1 and H3 nuggets.



Table 4. Results of Power Test Analysis Receive the Aroma of Chicken Liver Nuggets, Green Beans and Flour Mocaf On Panelists

Aroma	H1			H2			H3		
	Panelists	Score	%	Panelists	Score	%	Panelists	Score	%
Like	17	51	43.3 %	20	60	33.7%	18	54	60%
Less Like	13	26	56.7%	10	20	6.7%	12	24	40 %
Do not like	0	0	0%	0	0	3.3 %	1	1	0%
Total	30	77	100%	30	80	100%	30	79	100%

In the nugget aroma indicator, H2 nuggets have highest score namely 80 and the score lowest owned on the H1 nugget.

Table 5. Results of Power Test Analysis Accept Color Chicken Liver Nuggets, Green Beans and Flour Mocaf On Panelists

Color	H1			H2			H3		
	Panelists	Score	%	Panelists	Score	%	Panelists	Score	%
Like	12	36	40%	12	36	40 %	17	51	56.7%
Less Like	18	36	60 %	18	36	60%	13	26	43.3%
Do not like	0	0	0%	0	0	0%	0	0	0%
Total	30	72	100%	30	72	100%	30	77	100%

On the indicator nugget H3 color has highest score which is 80 and the scores on nuggets H1 and H2 have same score namely 72.

Table 6. Results of Power Test Analysis Accept Texture Chicken Liver Nuggets, Green Beans and Flour Mocaf On Panelists

Texture	H1			H2			H3		
	Panelists	Score	%	Panelists	Score	%	Panelists	Score	%
Like	11	33	36.7%	20	60	66.7%	12	36	40%
Less Like	16	32	53.3%	9	18	30%	18	36	60 %
Do not like	3	3	10%	1	1	3.3 %	0	0	0%
Total	30	68	100%	30	79	100%	30	72	100%

On the indicator H2 nugget texture has highest score which is 79 and the score lowest owned by nugget H1 which is 68.

Discussion

Contents Liver Nugget Nutrition Chicken with Peanut Green and MOCAF Flour

Nugget products made from heart chicken, beans green, and MOCAF flour shows strong potential as food rich in functionality nutrition important. Power results accept show that liver nugget product chicken, beans green and flour mocaf can accepted by various group age



Good children and adults. At 100 grams of product, content its nutrition includes 20.7% protein, 42.6 mg of iron iron, 62.8% carbohydrates, and 10.5% total fat. Content the protein relatively high, considering Number Adequacy Nutrition (RDA) for child preschool (ages 4–6) is around 25–35 grams per day. This is make nuggets as alternative food protein rich promising height for support growth and development network in children.

Component the most prominent nutrition is content substance iron —42.6 mg per 100 grams —which is much exceed need substance iron daily for children preschool, which is estimated of 7–10 mg/ day. Content substance high iron This play a role important in prevent and treat deficiency anemia iron, which is still be one of challenge nutrition main among toddlers in Indonesia. In addition to that, substance iron that comes from from heart chicken is substance heme iron, which is more easy absorbed by the body compared to with substance non-heme iron found in source vegetable.

Material addition like peanut green and MOCAF flour also donate content carbohydrates and fiber in products This carbohydrate content 62.8% functioning as source energy main, while total fat content of 10.5% helps absorption of water- soluble vitamins in fat and support development brain in children.

In conclusion, this nugget liked by various group the age and formulation of these nuggets show strong potential as food a safe, nutritious, and beneficial addition — especially for intervention targeted nutrition child age preschool. Adequate protein intake support hemoglobin synthesis (Salsabil & Nadhiroh, 2023), and research by Chyntia (2019) confirms that intake substance iron related close with hemoglobin levels.

Conclusion

Based on results Power accept liver nugget product chicken, beans green and flour mocaf can accepted by various group age Good children and adults. Analysis content nutrition, liver nuggets chicken with peanut green and MOCAF flour contains, per 100 grams, 20.7% protein, 42.6 mg of iron iron, 62.8% carbohydrates, and 10.5% total fat. Children preschool pushed for consume food like these nuggets, which are made from nutrient rich ingredients like heart chicken, beans green, and MOCAF flour. In addition to that, authority health can consider for utilise easy ingredients obtained like heart chicken and beans green as part from intervention nutrition for children with hemoglobin (Hb) levels below normal, for help prevent anemia.



Reference

- BSN National Standardization Agency. 2011. SNI 2973:2011. Nugget Quality Requirements.
- Fouad, H. M., Yousef, A., Afifi, A., Ghandour, A. A., Elshahawy, A., Elkhawass, A., ... and Shalaby, S. (2023). Prevalence of malnutrition and anemia in preschool children; a single-center study. *Italian Journal of Pediatrics* , 49 (1), 75.
- Indrawan, I., and Wijoyo, H. (2020). Preschool education. Purwokerto: Penapersada
- Irwan, H. (2021). Effectiveness of giving mocaf biscuits (modified cassava flour) with the addition of spinach (*spinacia oleracea*) and anchovies (*stolephorus* sp) on increasing hemoglobin levels in pregnant women.
- Kristin, N., Jutomo, L., and Boeky, DL (2022). The Relationship between Iron Nutrient Intake and Hemoglobin Levels in Adolescent Girls. *Sehat Rakyat: Journal of Public Health* , 1 (3), 189-195.
- Oppusunggu, R., and Masthalina, H. (2019). Giving Sprouted Corn Flour and Red Bean Nuggets to Anemic Toddlers.
- Putri, TF, and Fauzia, FR (2022). Relationship between Consumption of Iron Sources and the Incidence of Anemia in Junior High and High School Girls in Bantul Region. *Journal of Nursing and Midwifery* , 13 (2), 400-411.
- WHO Anemia Fact Sheet 2025. Retrieved 11 February 2025, from <https://www.who.int/news-room/fact-sheets/detail/anemia>