

Original Research

**Biscuit Based On Purple Sweet Potatoes As MP-ASI Processing Innovation**

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**ABSTRACT**

**Background:** Postpartum birth control is one of the family planning programs that still have low coverage. Midwives have a big role in increasing postpartum family planning coverage. Postpartum mothers will often contact the midwife so that the midwife can advise the postpartum mother to use postpartum birth control. The aim of this study is to evaluate the role of midwives and postpartum mothers in the use of postpartum family planning in the Asahan regency

**Methods:** This study used a cross-sectional design, the location study was Asahan regency, and the population was 81 postpartum mothers in Asahan Regency. The researcher used purposive sampling with the criteria of giving birth in the last one month and having more than two children. The instrument used was a questionnaire. This research will conduct cross-tabulation distribution.

**Results:** The results of the cross-tabulation showed that 24 birth control users at the midwife's clinic gave birth at a midwife clinic, 18 people gave birth at a midwife clinic (22.2%), and 21 people had postnatal health checks (25, 9%), received advice on using postpartum family planning as many as 15 people (18.5%) and received family planning counselling after delivery as many as 14 people (17.3%). This study indicated that postpartum family planning was carried out in the midwife clinic as many as 18 people (22.2%) and in the hospital or public health centres as many as nine people (11.1%).

**Conclusion:** Postpartum mothers who do postpartum health checks to midwives are more likely to use postpartum family planning than postpartum mothers who do not undergo postpartum health checks. Postpartum mothers who advised to use postpartum family planning from a midwife will have a greater risk of using postpartum FP than postpartum mothers who do not receive postpartum FP.

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**INTRODUCTION**

Infancy and childhood is the most important period in human development, because infancy and childhood growth and development occurs which determines the

quality of human resources in the future. Lack of nutrients so that they are susceptible to disease (Rezki Ananda, 2018). UNICEF in The State of the World's Children 2019 on Children, Food and Nutrition reported that 49.9% of children aged 0–59 months who experienced poor growth were in South Asia. North America is the part that has the lowest stunting rate, which is 11.8% (UNICEF, 2019).

The results of the 2018 Basic Health Research stated that the percentage of malnutrition in children aged 0-59 months in Indonesia was 3.9%, while the percentage of malnutrition was 13.8% with the 2018 target of 17.7%. The percentage of underweight is 6.7%, very thin is 3.5% and the percentage of fat is 8.0% (Riskasdas, 2018).

According to data from the West Sumatra Health Office in 2020, the percentage of children under five who are underweight is 9.43%, who is wasting is 6.1%, and who is stunted is 14.295%. The highest percentage experiencing underweight, wasting and stunting is in Sijunjung Regency (West Sumatra Health Office, 2020). The prevalence of nutritional status in the City of Bukittinggi is 4.44% underweight, 13.3% stunting and 4.2% wasting. There are 7,181 children under five in Bukittinggi City in 2019 (Bukittinggi City Health Office, 2019).

Nutritional problems do not only occur in Indonesia, but also occur in other developing countries and are a double burden. Provision of breast milk substitutes (MP-ASI) is expected to have an important role in overcoming the problem of malnutrition in infants. Food intake in the amount and content of very important nutrients is needed for the growth and development of infants and toddlers. After the baby is six months old, the nutritional content of breast milk is no longer sufficient because the baby's energy needs increase compared to the needs at the age of 3-5 months (Wirdani, 2018).

In Deby Rezki Ananda's research, there are data from the World Health Organization (WHO) in 2016 that the provision of complementary feeding for breast milk (MP-ASI) in the world did not reach the target, which was only 38% of the 50% target. In Indonesia in 2016 based on data from the Ministry of Health of the Republic of Indonesia in 2017, 54% of infants received MP-ASI with a national target of 80% (Kemenkes RI, 2017). Complementary foods for breast milk (MP-ASI) are foods or drinks that contain nutrients that need to be given to babies after 6 months of age to increase their nutritional needs. The basic ingredients of MP-ASI are rice, carrots, beans, and sweet potatoes, one of which is purple sweet potato which is a good food source as a complementary food ingredient for breast milk.

Eating purple sweet potatoes can help with nutritional needs because purple sweet potatoes have a very complex nutritional content. The nutritional content of sweet potatoes is 1.8% protein, 27.9% carbohydrates, 0.7% fat, 68.5% water, 0.4% sugar content, 123 Cal calories, 1.2% crude fiber (Balitkabi, 2011). One example of complementary foods for breast milk that can be given to children is biscuits. Biscuits are products produced from baking dough made of wheat flour and the addition of other foods and with or the addition of permitted food additives.

In nutritional status of problems and in the high on his nutrition of the sweet potato purple beneficial to the baby hence writers want to make an innovation manufacture of basic made sweet sweet purple as food a companion place. Purpose of study is to determine the nutritional levels and organoleptic tests on biscuits substituted with purple sweet potato flour.

## MATERIALS AND METHODS

Experimental research by making a treatment of making MP-ASI biscuits substituted with purple sweet potato flour and then seeing its effect on nutritional levels and organoleptic tests. This research has been approved by the ethics committee with no 126/KEPK/V/2021. This research was conducted in two places, namely the working area of the Nilam Sari Public Health Center, Bukittinggi City and the Padang Industrial Research and Standardization Center which was held from May to August 2021.

The research population is all mothers and babies aged 6-12 months in the working area of the Nilam Sari Health Center as many as 293 people. The sample of this study was 10% of the population, namely 29 infants 6-12 months and 29 mothers of infants aged 6-12 months. The tools used in the research: oven, basin, 80 mesh sieve, blender and scales. Materials used in the study: purple sweet potato, Na-metabisulfite, wheat flour, egg yolk, margarine, powdered milk, powdered sugar and developer.

Making purple sweet potato flour: choose fresh purple sweet potato, clean and cut into thin slices. Soak with 0.1% Na-metabisulfite solution for 15 minutes then drain, then dry in an oven preheated to 90° C for 4 hours. After that cool and then floured using a blender. The purple sweet potato flour is sifted through an 80 mesh sieve. Then the flour is stored in a container ready to be used for making purple sweet potato biscuits.

Making purple sweet potato biscuits: prepare the tools and materials needed according to the dose. Mix margarine and powdered sugar with a mixer for 2 minutes and add the egg yolks. Combine the flour and purple sweet potato flour along with the other dry ingredients then stir. After the dough is ready to print according to taste and then put in the oven at 140° C for 40 minutes. After that the biscuits are ready to be served.

Charging process form: the form is given to the baby's mother. The organoleptic form contains a test of the level of preference for color, taste, color, and aroma and an acceptance form to assess the likes or dislikes of biscuits by babies. In conducting this research, researchers will assess the nutritional content of purple sweet potato biscuits, namely water content, carbohydrates, energy, fat, and protein which will be carried out at the Laboratory of Research and Industrial Standardization of Padang. Organoleptic test to test the level of liking or acceptance using the Smiley Method and the percentage of the number of biscuits consumed. Smiley Method is divided into two categories, namely likes and dislikes.

This acceptance is said to be good if more than 80% give an expression of liking. Organoleptic tests were carried out on four parameters, namely color, aroma, taste, and texture because consumers liked or disliked a product. This study will test the level of preference for purple sweet potato biscuits in infants aged 6-12 months and to determine the color, aroma, taste, and texture will be determined by the baby's mother.

## RESULTS

### Laboratory test

Parameters tested on flour and purple sweet potato are carbohydrates, protein, fat, calories, and water content

**Table 1.** Laboratory test results

Nutrient content	Unit	Flour	Biscuits
Carbohydrate	%	66.4	46.8

<b>Nutrient content</b>	<b>Unit</b>	<b>Flour</b>	<b>Biscuits</b>
Protein	%	2.60	3.85
Total fat	%	0.27	23.7
Calories	Kcal	270	416
Water content	%	10.1	4.26

### *Carbohydrate*

Carbohydrates are the main energy source with an energy value of 4 Kcal/gram which contains the largest energy in a balanced menu. From the results of the analysis of carbohydrate content there is a decrease, this is due to the use of high temperatures which can damage carbohydrate molecules resulting in a decrease in nutritional value, then processing involving high temperatures in carbohydrates will experience caramelization or browning (Rezki Ananda, 2018). According to the average nutritional adequacy rate required per day by the Indonesian Ministry of Health in 2019, 105 grams of carbohydrates are needed for infants aged 6-12 months (Ministry of Health RI, 2019). This shows that consuming 100 grams of purple sweet potato biscuits can fulfill carbohydrates in infants aged 6-12 months by 44.5%.

### *Protein*

Protein is part of all living cells and is the largest part of the body after water. This protein has the function of forming new cells, replacing damaged tissue cells, regulating water balance, and as an energy source (Rohman, 2018). From the analysis of the nutritional value of protein there is an increase, this is because in the process of making biscuits there are ingredients that contain protein such as milk powder and egg yolk. The average nutritional adequacy rate (RDA) required per day at the age of 6-12 months is 15 grams of protein (Ministry of Health RI, 2019). This explains that if a baby consumes 100 grams a day, it can meet the protein needs of babies aged 6-12 months by 25.6%.

### *Fat*

Fat in food has a very important role as a source of energy. Fat can produce greater energy, namely 1 gram of fat obtained 9 Kcal compared to protein and carbohydrates. From the results of laboratory test analysis, purple sweet potato flour is very low because according to Mentari research in 2015 that purple sweet potato naturally has low fat properties. However, the results of the analysis of the fat content in purple sweet potato biscuits increased, this was influenced by the composition of other ingredients, namely butter and egg yolk (Nur, 2017).

According to the RDA, the average daily requirement for fat at the age of 6-12 months is 35 grams (Ministry of Health RI, 2019). So if the baby consumes 100 grams of purple sweet potato biscuits in a day, it can meet the body's fat needs of 67.7% of the 35 grams that the baby's body needs 6-12 months.

### *Calories*

Calories are the energy needed to be able to do activities and carry out their functions properly for the body. Calories can be likened to fuel from an engine to move and carry out its duties. Every food we eat contains a number of calories or energy that the body needs to work. The calories contained in the food are provided by carbohydrates, protein, and fat.

In the process of making purple sweet potato flour biscuits, there are additional calories from the biscuit-making ingredients with the total nutritional calories in wheat flour 364Kcal, refined sugar 389Kcal, butter 716Kcal, egg yolk 55Kcal , milk powder 495Kcal (USDA, 2020). According to the number of nutritional adequacy needed per day, children aged 6-12 months need 800 kcal of calories or energy (Ministry of Health RI, 2019) so that if the baby consumes as much as 100 grams a day of sweet potato biscuits it can meet the calorie needs of 52% per day.

#### *Water content*

Moisture content is one of the determinants of the quality of a food, including the quality of biscuits, where if the water content in the biscuit is low then it makes the biscuit more durable so it has a high shelf life, whereas if the water content in a product is high it can cause the product or food to not stand. Over time it affects the taste of food, texture, and causes odors and mold quickly. This is caused by the ease of bacteria or microbes to multiply rapidly in products that have high water content. This explained that there was a decrease in the water content of purple sweet potato after it was processed into flour and purple sweet potato biscuits.

The cause of the decrease during processing of sweet potato flour, apart from heating in the oven, the decrease in water content of purple sweet potato flour was also caused by soaking purple sweet potato in 0.1% sodium metabisulfite solution. According to research, sodium metabisulfite solution is absorbing or binding water, that is, the longer the material is immersed in the metabisulfite solution, the more water is bound and forms bonds with sodium metabisulfite (Lastari et al., 2016).

#### **Organoleptic Test**

Organoleptic test is a test that asks respondents or panelists to express their responses in the form of liking or disliking the properties of the material being tested (Lamusu, 2018). Organoleptic tests were carried out on four parameters, namely color, aroma, taste, and texture which would be determined by the respondent's mother for infants aged 6-12 months and the level of preference or acceptance test which would be determined by infants aged 6-12 months.

#### *Baby Acceptance Test 6-12 months*

Acceptance of purple sweet potato biscuits was measured through the smiley method and the percentage consumed in infants aged 6-12 months. As many as 93% of infants aged 6-12 months gave an expression of liking and categorized the acceptance of purple sweet potato biscuits as good. Meanwhile, 7% of infants who showed dislike expressions were found.

#### *Color*

Color plays an important role in determining the level of consumer acceptance of a product, although the product has high nutritional value, good taste, and good texture, if the color is not attractive it will cause the product to be less attractive. This is based on the first step that consumers do when they want to choose a particular product, namely by observing the color appearance of the product (Utami, 2016).

The color of purple sweet potato biscuits tends to be brownish purple after being baked using the oven. This is in accordance with Lidiasari's 2006 research, the brown color of the biscuits is caused by the baking process causing the Maillard reaction,

namely the browning reaction that occurs between carbohydrates, especially reducing sugars with primary amine groups (Lamusu, 2018).

**Table 2.** Percentage level of respondent's preference for biscuit color MP-ASI made from purple sweet potato flour

Variable	Levels of pleasure			
	Really like	Like	Normal	Do not like
Purple sweet potato biscuits	38%	55%	7%	0%

The highest level of preference for the color of MP-ASI biscuits made from purple sweet potato flour was 55% (like) and the lowest level of preference for purple sweet potato biscuits was 0% (dislike).

#### *Flavor*

Taste is an important element in determining consumer acceptance of a food product and is the second factor that affects the taste of food after the color of the product (Utami, 2016). According to Wahidah in 2010 the complexity of a taste is produced by the diversity of scientific perceptions. Taste is influenced by three factors, namely smell, taste, and oral stimulation.

**Table 3.** Percentage level of respondent's preference for biscuit taste MP-ASI made from purple sweet potato flour

Variable	Levels of pleasure			
	Really like	Like	Normal	Do not like
Purple sweet potato biscuits	55%	45%	0%	0%

The highest level of preference for the taste of MP-ASI biscuits made from purple sweet potato flour was 55% (very much like) and the lowest level of preference for purple sweet potato biscuits was 0% for the usual and dislike levels. From the results of the organoleptic test on the respondent's preference level, it showed that the taste of the purple sweet potato flour biscuit was good, as much as 55% really liked it. Respondents are addicted to the delicious and delicious taste of biscuits when eaten.

#### *Texture*

Texture is the sensation of pressure that can be observed with the mouth when it is bitten, chewed, and swallowed or can be touched with the fingers. Texture is just as important as smell, taste and aroma because it affects the image of the food. Soft and crunchy is the most important in texture (Lamusu, 2018). The texture of a product, especially in biscuits, is related to the water content of a product. The high water content makes the biscuits not crunchy and the texture is less favorable, besides that the fat content also affects the texture of the biscuits (Utami, 2016).

**Table 4.** Percentage of respondents' preference for biscuit texture MP-ASI made from purple sweet potato flour

Variable	Levels of pleasure			
	Really like	Like	Normal	Do not like
Purple sweet potato biscuits	31%	48%	21%	0%

The highest level of preference for the texture of the MP-ASI biscuits made from purple sweet potato flour was 48% (like) and the lowest level of preference for the purple sweet potato biscuit was 0% (dislike). The texture of the purple sweet potato flour biscuit is crispier and not soggy because the dough is made according to the dosage. The crunchy texture of sweet potato flour biscuits is also due to the low water content in the biscuits. In making purple sweet potato flour biscuits, it is necessary to pay attention to the ingredients used to be smooth, then pay attention to the moisture content of the biscuits in order to get a good biscuit texture that does not feel hard and not too soft.

*Scent*

Aroma is one of the parameters of sensory (organoleptic) testing using the sense of smell. Aroma is acceptable if the resulting material has a specific aroma. Aroma is a very subjective taste and smell and is difficult to measure, because everyone has different sensitivities and preferences. Although they can detect, but each individual has a different preference (Utami, 2016).

**Table 5.** Percentage level of respondent's preference for biscuit aroma MP-ASI made from purple sweet potato flour

Variable	Levels of pleasure			
	Really like	Like	Normal	Do not like
Purple sweet potato biscuits	34%	48%	18%	0%

The highest level of preference for the aroma of complementary feeding biscuits made from purple sweet potato flour was 48% (like) and the lowest level of preference for purple sweet potato biscuits was 0% (dislike). The aroma contained in purple sweet potato flour biscuits has a less distinctive aroma than purple sweet potato. Because in the process of making biscuits, there is more wheat flour than purple sweet potato flour. Aroma can determine whether or not a product is worth consuming or not.

**DISCUSSION**

This study develops innovations in complementary food products, especially biscuits made from purple sweet potato and determines the nutritional value, shelf life, and consumer acceptance, especially for infants aged 6-12 months from these biscuits. In the discussion section there is a link between the results and the hypothesis, namely the results of the innovation in processing complementary foods made from purple sweet potato in the form of biscuits for ages 6-12 months. This study has limitations, namely there is no laboratory test for nutritional values of vitamins, anthocyanins and zinc.

The future direction of this research can be used as complementary foods so that it can improve nutritional status in children. Then this study can be improved by conducting further research to see effect on weight gain in infants consuming purple sweet potato MP-ASI biscuits. Suggestions for further researchers to pay more attention to the protein content in purple sweet potato biscuits so that the protein content in purple sweet potato biscuits is in accordance with the Indonesian national standard for MP-ASI biscuits for babies. Then it is recommended that further research be conducted to see the effect on weight gain in infants who consume purple sweet potato MP-ASI biscuits.

## **CONCLUSION**

The results of this study show that the purple sweet potato MP-ASI biscuit can be useful as a complementary food for breast milk because it has a high nutritional content so that it can meet the daily nutritional needs of babies. It is recommended further research to increase the value of preference for color, texture, and aroma as well as laboratory tests for nutritional levels of vitamins, zinc, and anthocyanins in purple sweet potato biscuits.

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## **REFERENCES**

- Arikunto, S. (2014). *Research Procedures, A Practical Approach*. PT Rineka Cipta.
- Ayustaningwarno, F. (2014). *Food Technology, Practical Theory and Applications*. Graha ilmu.
- Central Bureau of Statistics of West Sumatra. (2017). *Purple sweet potato productivity data in 2017*.
- National Standardization Body. (2011). *Indonesian National Standard Biscuits*.
- National Standardization Body. (2005). *Complementary Foods for Mother's Milk (MP-ASI) part 2: biscuits*.
- Balitbangtan. (2016). *Bioindustrial Agriculture Innovations to Increase Competitiveness in the Modern Agriculture Era. Annual report.1-70*.
- Balitkabi. (2011). *Description of Superior Varieties of Nuts and Tubers (pp. 1–250)*.
- CODEX Alimentarius. (1991). *Guidelines on formulated complementary foods for older infants and young children CAC/GL 8-1991. 1–10*.
- CODEX Alimentarius. (2006). *CODEX Standard for Procossed Cereal-Based Foods for Infants and Children-CODEX STAN 74-1981, Rev.1-2006. 2–8*.
- Bukittinggi City Health Office. (2019). *2019 SKDN Recapitulation*.
- West Sumatra Health Office. (2020). *Data on the Nutritional Status of Toddlers 0-59 Months in West Sumatra Province in 2020*.
- Ginting, E., Utomo, JS, & Yulifianti, R. (2011). *Potential of Purple Sweet Potato as Functional Food. 6(1)*.
- IDAI. (2018). *Booklet-MPASI-revised-A-10-october-2018.pdf*.



- Indonesian Ministry of Health. (2016). data on the provision of MP-ASI in Indonesia in 2016.
- Indonesian Ministry of Health. (2019a). The recommended nutritional adequacy rate for the Indonesian people.
- Indonesian Ministry of Health. (2019b). Indonesia Health Profile 2019.
- Lamusu, D. (2018). Organoleptic Test of Purple Sweet Potato (*Ipomoea batatas* L) Jalongkote as an Effort for Food Diversification. *Journal of Food Processing*, 3(1), 9–15. <https://doi.org/10.31970/PANGAN.V3I1.7>
- Lastari, AN, Anandito, RBK, & Siswanti, S. (2016). Effect of concentration of sodium metabisulfite ( $\text{Na}_2\text{S}_2\text{O}_5$ ) and soaking time on the characteristics of soybean sprout flour. *Journal of Food Technology*, V(2). <https://jurnal.uns.ac.id/teknosains-pangan/article/view/4892>
- Li, A. (2019). Research Advances of Purple Sweet Potato Anthocyanins: Extraction, Identification, Stability, Bioactivity, Application, and Biotransformation.
- Mufida, L., Widyaningsih, TD, & Maligan, JM (2015). Basic Principles of Complementary Feeding for Infants 6 - 24 Months : Basic Principles of Complementary Feeding for Infants 6 - 24 Months : A Review. 3(4), 1646–1651.
- Notoatmojo, S. (2012). *Health Research Methodology*. Rineka Cipta.
- Nur, M. (2017). The Effect of Giving Purple Sweet Potato Biscuits (*Ipomea Batatas* L. Poiret) on Undernutrition Status in Toddlers Age 12-36 Months in the Working Area of Somba Opu Health Center. *ABA Journal*, 102(4), 24–25.
- Rezki Ananda, D. (2018). Content of Macro Nutrients in Purple Sweet Potato (*Ipomoea batatas* var *Ayamurasaki*)-Based Porridge as Complementary Food for Breast Milk. 58–67.
- Rijal, M. (2019). Analysis of Nutrient Content in Purple Sweet Potato Flour (*Ipomoea batatas* var *ayumurasaki*) with Sun Drying. 7(1), 48–57.
- Riskesdas. (2018). basic health research in 2018.
- Rohman, A. (2018). *Food Analysis*. Gadjah Mada University Press.
- Satrianegara, MF, & Alam, S. (2017). Analysis of Nutritional Content of Purple Sweet Potato Biscuits (*Ipomoea batatas* L. Poiret) as an Alternative for Nutrition Improvement in the Community. 9, 138–152.
- Septikasari, M., & St, S. (2018). *Children's Nutritional Status and Influencing Factors* (S. Amalia (ed.)). UNY Press.

- Sugiyono. (2016). *Quantitative, Qualitative, and R&D Research Methods*. Alfabeta CV.
- UNICEF. (2019). *The State Of The World's Children 2019- Children, food Growing well in a changing world*.
- USDA. (2020). *FoodData Central, Agricultural Research Service*. US Department of Agriculture. <https://fdc.nal.usda.gov/>
- Utami, AP (2016). Analysis of Organoleptic Assessment and Nutritional Value of Cookies Maombo Wikau Flour Formulation. *Journal of Food Science And Technology*, 1(1), 2527–6271 . <https://doi.org/10.33772/JSTP.V1I1.1043>
- Wirdani, P., Marlina, N., Roro, R., Agustine, D., Meylan, M., & Fernandez, Y. (2018). Flour as MPASI Innovation Product The Development of Biscuit Made from Assorted Flours as Innovative Complimentary Food. 27–38.