ANALYSIS OF THE QUALITY, NUTRITIONAL AND SUPPLEMENTARYFOOD SHELF LIFE ATION (MP-ASI), WHICH IN SUBSTIUSI WITH FLOUR CATFISH (CLARIAS GARIEPINUS) AND PUMPKIN FLOUR (CUCURBITHA MOSCHATA)

Sri Darningsih[1], Iswanelly Mourbas[1], Ismanilda[1]
1).Poltekkes Kemenkes Padang. Jln Simpang Pondok Kopi Siteba Nanggalo Padang
oneng.pdg@gmail.com

ABSTRACT

Malnutrition in infants will cause growth and development problems, if not addressed early can continue into adulthood. Age 0-24 months is a period of rapid growth and development, or also known as the golden period as well as a critical period. The golden period can be realized if during this time infants and children obtain appropriate nutritional intake for optimal growth and development.[1] Provision of nutrient-dense and safe food for infants as complementary foods (AS-ASI) should be given from the age of six months. Babies need additional energy by 24-30% because the nutritional content of milk is not sufficient. One of the local food sources of protein that can be used as MP-ASI material is catfish (Clarias gariepinus). Catfish is a freshwater fish that is easily found and has a protein content of 68.6%. The purpose of this study is to determine the nutrient content, both in mocrobiology and chemistry as well as the shelf life of MP-ASI instant baby porridge with the substitution of catfish flour and pumpkin flour. This research is a continuation of previous research. This research evaluates the food quality of MP-ASI, both chemically, microbiologically and in nutrients and looks at the shelf life of MP-ASI. Type of experimental research, descriptive data processing. Results: The best assessment results in the first stage of 2018 were Formula A, namely substitution of 15% catfish flour, 10% Pumpkin flour. The results of the quality and microbiology tests obtained were tests of water content, ash content, metal contaminationand microbiological tests of MPASI pulp substituted with catfish flour and yellow pumpkin flour were within the standard limits of the instant MPASI SNI set by the Government. The nutritional value of MPASI is in the range of SNI 01-7111-1-2005 and the shelf life ofMPASI has been up to five months. There are no signs of organoleptic damage to the color, taste, aroma of the porridge both stored at room temperature and stored in the refregerator. It can be concluded that MPASI porridge substituted with catfish flour and pumpkin flour is safe for consumption by babies 6-12 months, has good nutritional value and can be used as analternative food to prevent malnutrition and stunting. It is recommended that this MPASI be used for handling infants who are experiencing acute malnutrition both at the Posyandu andat the Puskesmas as Supplementary food to Babies from local food. Further research needs to be given to infants aged 6-12 months, and see changes in body weight.

Keywords: Quality, Catfish Flour, Pumpkin, MPASI.

INTRODUCTION

Malnutrition in infants will cause growth and development disorders, if not treated early it can continue into adulthood. Age 0-24 months is a period of rapid growth and development, or also known as the golden period as well as a critical period. The golden period can be realized if at this time infants and children receive appropriate nutritional intake for optimal growth and development

Malnutrition in toddlerhood contributes to increasing morbidity and mortality, impaired intellectual development, reduces work productivity and even increases the risk of various diseases in adulthood (WHO 2012). The prevalence of short and very short nutrition in 2018 in Baduta was still quite high, namely 29.9%, the prevalence of short and very short undernutrition was 17.1% and 12.8%. (Riskesdas 2018). The same condition was found in West Sumatra 27.7%. The prevalence of Short and very Short in 2018 was 9.1% and 18.6%, respectively.

The provision of nutrient-dense and safe foods to infants as complementary foods (MP-ASI) should be given from the age of six months. Babies need an additional 24-30% of energy because the nutritional content of breast milk is insufficient. 1 Absolute nutritional needs are met so that the baby's growth does not stop or slow down. According to Hermina & Prihatini 2, that growth in infants and nutritional problems in children are often caused by the inaccuracy of parents in their habits of inappropriate breastfeeding and complementary feeding, and mothers are less aware that babies aged 6 months already need complementary foods. Breast milk in good quantity and quality.

Important nutritional components in infancy include protein and vitamin A. Protein forinfants plays a role in cell growth and maintenance, while vitamin A plays a role in immune system function, protects the integrity of epithelial cells lining the skin, eye surface, inside of the mouth, and digestive and respiratory tract. 2,3 . The manufacture of instant baby porridge MP-ASI must primarily meet the nutritional needs of infants. This has been regulated by the government, including a minimum energy content of 400 Kcal, a protein content of 15-22 g, and vitamin A of 250-350 g in 100g of ingredients.1,5 In general, the ingredients for MP-ASI instant baby porridge come from a mixture of rice flour, skim milk, refined sugar, and vegetable oil.2 To increase the nutritional content, these ingredients can be substituted with local food sources of protein and vitamin A

One of the local food sources of protein that can be used as MP-ASI is catfish (Clarias gariepinus). Catfish is a freshwater fish that is easy to find and has a protein content of 68.6%. 10 One form of processing catfish that is suitable for MP-ASI is flouring. 100 g offish meal contains 60-75 g of protein, while the protein content in 100 g of skim milk is only 30 grams. 2,13 Foodstuffs rich in vitamin A also need to be used to meet the requirements forvitamin A content in MP-ASI. Pumpkin (Cucurbita moschata) is one of the local foodstuffs that contains quite high beta-carotene, namely 1,569 g/100 g.1,4 Research on the characterization and potential utilization of minor food commodities, including pumpkin, is still very small compared to main food commodities, such as rice. and soybeans. Pumpkincan be processed into flour so that it can be used as an ingredient for making MP-ASI. In addition, the protein contained in pumpkin flour has a digestibility of 99% so it is suitable for consumption by babies

B. Research Objectives

1. General Purpose

Knowing the quality, nutrient content, and shelf life of instant baby porridge MP-ASI with substitution of catfish flour and pumpkin flour to produce instant baby porridge which is high in protein and vitamin A.

2. Special Purpose

a. Microbiological quality is known for instant porridge MP-ASI with substitution of catfish flour and pumpkin flour.
b. Knowing the nutritional content of MP-ASI instant baby porridge with substitution of catfish flour and pumpkin flour
c. To know the shelf life of instant baby porridge MP-ASI with substitution of catfish flour and pumpkin flour.

C. Research Benefits

1. For the Government (health sector and related sectors)

As an alternative to processing appropriate formulas for intervention in handling malnutrition problems, especially the handling of toddlers who experience acute malnutrition / wasting.

The results of this study are expected to be useful in the short term with the availability of complementary feeding formulas that are high in protein and vitaminA, so as to optimize the growth and development of undernourished children aged 6- 12 months.

This writing is expected to provide information for the community that by

making MP-ASI which is rich in nutritional content and can overcome the problem of malnutrition or anxiety.

RESEARCH METHODS

A. Research Type and Design

The type of research used is experimental. This research is a follow-up study in the first year of 2018, the best results from previous research in 2018 were an assessment of the quality, nutrients and shelf life of complementary foods substituted with catfish flour and pumpkin flour.

B. Time and Place of Research

This research was conducted in the 2019 fiscal year, which is from February 2019 to November 2019, where experimental research for the manufacture of complementary feeding products, especially the manufacture of pumpkin flour, was carried out at the Food Science Laboratory, Department of Nutrition, Poltekkes, Ministry of Health, Padang. For testing the composition of nutritional quality, microbiological safety of MP-ASI was carried out at the Laboratory of Research and Standardization of Industrial Standards in Padang and testing for Vitamin levels was carried out at PT. Saraswanti Indo Genetech Bogor

C. Research Tools and Materials

Tools for making pumpkin flour include: preparation, processing and packaging tools. Tools for testing nutrients and tools for quality testing, namely laboratory equipment for chemical testing, microbiological quality testing.

Pumpkin material is a type of bokor which is round in shape and the flesh is dark orange in color. Catfish Flour was purchased from PT Clarmeritha Lestari Bogor. Other ingredients such as rice flour, milk flour and vegetable oil are purchased at the nearest market in the city of Padang.

D. Procedure/method of data collection.

The production of MPASI baby porridge which substitutes catfish flour and pumpkin flour is done by dry mixing method. The milled rice flour is then roasted until dry to reduce the moisture content so that it can be stored for a long time and is sieved through a 60 mesh sieve.

Making catfish flour, by first cleaning the fish and separating the bones from the head, cooking in an autoclave at 1210C for 2 hours, then separating the bones and pressing so that the fish meat is slightly dry, then the fish meat is dried with a drum drier. After

drying, the fish meat is ground and sifted and then stored in an airtight container. The production of catfish meal followed the modification of Clara M et al. 2009.20

Pumpkin flour is made by means of thinly sliced pumpkin meat / crab then dried in the sun to dry. Then it was milled and then sieved with 60 mesh, making pumpkin flour following the Vanty 2012 procedure.

Quality, microbiological and nutritional value tests of the MPASI porridge formula substituted with catfish meal and pumpkin flour were carried out at the Baristan Padang Laboratory and PT Saraswanti Indo Genetech Bogor.

Testing the shelf life of instant MP-ASI substituted with catfish flour and pumpkin flour was carried out by means of instant baby porridge which was packaged in athick plastic bag and pressed and then stored at room temperature and cold (refreegerator). Observed and recorded every week / month changes that occur organoleptically.

E. Data Analysis and Data Processing

The data obtained from the research results are presented in tabular form, and compared with the MP-ASI SNI Standard and analyzed descriptively.

F. Ethical Clearance - Attached.

RESULTS

The research carried out consisted of several stages, starting from making pumpkin flour, making catfish flour, and preparing other ingredients. After the flour is made, the ingredients are mixed using dry mixing. Then the organoleptic test was carried out, after obtaining the best formula, the nutrition was tested from the selected MPASI. The results of the analysis of the nutrients in the MPASI porridge substituted with catfish flour and pumpkin flour are as follows:

1. Quality Requirements and Microbiology of MP-ASI

Quality requirements of nutrients contained in instant powdered MP-ASI must be able to accompany Mother's Milk (ASI) to achieve nutritional adequacy in certain age groups. Instant MP-ASI can be in the form of powder, flakes, crystals and granules. MP-ASI Instant powder when added to liquid produces a smooth porridge, free from lumps and can be fed with a spoon. The results of quality testing of MPASI carried out obtained the following results:

a. Water content

Moisture content is the amount of water contained in the material expressed in percent. Water content is also one of the most important characteristics of foodstuffs,

because water can affect the appearance, texture, and taste of foodstuffs. The water content in foodstuffs determines the freshness and durability of these foodstuffs, high water content makes it easy for bacteria, molds, and yeasts to breed, so that changes will occur in foodstuffs.

The results of the analysis of water content obtained by the research are 5.28 grams per 100 grams. Standard No more than 5.0 grams per 100 grams. The results obtained are slightly higher than the standard set by SNI for MPASI Instant porridge. This is because the water content of pumpkin flour obtained from the analysis is quite high, namely 9.49%. This is because the process of making solid food is done by dry mixing, mixing it dry, because after it is mixed it should not be reheated because itwill damage the nutrients from the solid food. This allows the level of MPASIproduced to be higher.

Food spoilage is generally a microbiological, chemical, enzymatic process or a combination of the three. The process of these three processes requires water where free water can help the process take place (Anonymous, 2010). High water content will accelerate the occurrence of food spoilage. Food preservation technology isbasically in two alternatives, namely the first to inhibit enzymes and microbial activity/growth by lowering the temperature to below the freezing point of 0oC. The second is to reduce the water content of foodstuffs so that there is less/no opportunity for the growth of microbes by drying the water content inside and on the surface of the foodstuffs, until they reach certain conditions.

b. Ash Level

Research results MPASI porridge substituted with catfish and pumpkin flour contains ash content of 3.39 grams per 100 grams. In the standard set by SNI 01-7111.4-2005, the ash content of MPASI is required to be no more than 3.5 g per 100 grams of MP-ASI product. The resulting formula still meets the stipulated SNI requirements.

The ash content of a food material has a relationship with the mineral content which is an inorganic substance. The amount of minerals in the body must be within optimal limits. Both excess and deficiency of minerals can interfere with health. 7,19 Therefore, the ash content in MP-ASI needs to be limited, according to the recommended nutritional adequacy of the baby.

c. MP-ASI Kamba Density Test

Kamba density shows the ratio between the weight of the material to its volume, it can describe the perfection of the processing of the ingredients for making MP-ASI. The

results of the research on the density of the MP-ASI formula kamba were 0.46 g/ml (46g/100ml). This shows the kamba density is close to 50%. Kamba density is a very important characteristic in looking at the level of nutrient density and energy contained in MP-ASI.

The density of the MPASI porridge with the substitution of catfish and pumpkin flour was around 0.46 g/ml. This value is in the density range of commercial kamba pulp, which is 0.37-0.50 g/ml. MP-ASI which has a high density of kamba indicates that the product is more compact (non-voluminous). Food products that have a high density of kamba show a high nutritional density as well.22 The functional capacity of the baby's stomach is only 30 g/Kg body weight so that food with a high density of kamba is needed so that babies do not feel full quickly and nutritional intake is met.21,6

d. Metal Contamination Test

The quality requirements for metal contamination in instant porridge MPASI for babies 6-12 months must not exceed the standards set by the Government. The results of the metal contamination test on MPASI products from the research can be seen in the following table:

Table 1. : Metal Pollution Quality Requirements

Parameter Uji	Hasil Analisa (Mg/Kg)	Standar SNI 01-7111.1-2005
Arsen (As)	0,0086 mg/kg	Tidak lebih dari 0,38 mg/kg
Tembaga (Cu)	0,4473 mg/kg	Tidak lebih dari 1,14 mg/kg
Timbal (Pb)	0.2314 mg/kg	Tidak lebih dari 1.14 mg/kg
Raksa (Hg)	<0,0058 mg/kg	Tidak lebih dari 0,114 mg/kg

From the results of the study in table 6, it can be seen that all metal contamination tested was included in the limit not exceeding the SNI standard for MPASI instant porridge. It can be said that the MPASI porridge which is substituted with catfish flour and pumpkin flour meets the standard requirements set by the Government, there is no metal contamination that is harmful to the health of the baby.

e. Microbial Test

Quality requirements for MPASI instant porridge must be free from harmful microbes, the microbial test must be negative. The results of the microbial test on MPASI substituted with Catfish Flour and Pumpkin Flour can be seen in the following table:

Table 2. : Quality Requirements for Microbial Contamination in Substituted MPASI With Catfish Flour and Pumpkin Flour.

Parameter Uji	Hasil Analisa/Satuan	Standar SNI 01-7111.1-2005
Angka lempeng Total	$2{,}8 \times 10^5$ koloni/gram	Tidak lebih dari 1.0×10^4 koloni/gram
Escherichia Coli	Negatif	Negatif
Salmonella	Negatif	Negatif
Kasimpulan	Aman	Aman

From the results of the study in table 7, it can be seen that all the tested microbes were included in the safe limit, all results were negative, not exceeding the SNI standard for MPASI instant porridge. It can be concluded that the MPASI porridge which is substituted with catfish flour and pumpkin flour meets the requirements for microbial content standards set by the Government. It can be concluded that MPASI products are safe to be consumed by infants aged 6-12 months.

The Total Plate Number (ALT) test is carried out to determine the number or number of aerobic mesophyll bacteria that may contaminate a product, be it food, drink or traditional medicine.

There are several points that need to be considered in processing food or drinks. Among them are raw materials, processing processes, equipment used, storage of raw materials and finished materials, distribution, presentation, environmental cleanliness, and others. In food and beverage processing, bacteria can come from workers, raw materials, the environment, animals and fomites (inanimate objects). These points can affect the quality of hygiene and health of food or beverages, either directly or indirectly (Ismail, 2012)26

b. Nutritional Value of MP-ASI Formula

Calculation of the nutritional content of the formula based on the composition of macronutrients and micronutrients from MPASI Baby Porridge substituted with catfish flour and pumpkin flour can be seen as follows:

Table 3. : Nutritional Value of MP-ASI Formula in 100 grams

Kandungan Zat Gizi	F1 (Formula Terbaik)	Standar SNI SNI 01-7111.1-2005
Energi	423 Kkal	400 - 450 Kkal /100 gr
Protein	18,38 gr	Tidak kurang 16 – 22 gr/100 gr
Lemak	17,41 gr	Tidak kurang dari 15 gr /100 gr
Karbohidrat	48,46 gr	Tidak kurang dari 30 gr/100 gr
Kalsium (Ca)	226,1mg	Tidak kurang dari 200mg/100 gr
Besi (Fe)	38,91mg	Tidak Kurang dari 15 mg /100 gr
Natrium (Na)	0,15 mg	Tidak lebih dari 100 mg/100 kkal
Seng (Zn)	19,24mg	Tidak Kurang dari 2,5 mg/100 gram
Vitamin A	253,52 mcg	250- 350 mcg
Vitamin D	0,67 mcg	0.75 mcg /100 gr

In table 8 above, it can be seen that the nutritional value of the MPASI formula produced when compared to standard food formulas regulated by the government in accordance with the nutritional requirements of MP-ASI in 100 grams, namely 400 Kcal Energy, 15 Gr Protein, Vitamin A 250-350 Micrograms. The research results obtained exceed the standards that have been set by the Government. This shows that MP-ASI which is substituted with catfish flour and pumpkin flour is very good to be used as an alternative to MP-ASI which is good for tackling nutritional problems for infants aged 6-12 months and can be developed in the community as MP-ASI . Consumption of one serving of MPASI baby porridge substituted with catfish flour and pumpkin flour weighing 95-100g a day given two meals can contribute 33.56% tothe protein adequacy rate and 107.2% to the vitamin A adequacy rate for infants aged 8 months with a weight of 7.8 kg.

DISCUSSION

a. Energy

The minimum energy content required in the MPASI specification is 400 kcal/100g. The MPASI porridge formula which was substituted with catfish flour and pumpkin flour was obtained from research results of 423 kcal, has met the Ministry of Health's requirements.12 The average energy requirement of infants aged 6-8 months is 769 kcal/day. If the baby gets breast milk of moderate quality and quantity, energy intake of 423 kcal can be met through complementary feeding. The deficiency of 346 kcal is expected to be met through breast milk.6 Therefore, the minimum energy required for complementary feeding is 400 kcal/100g. The results of the MPASI test which were

substituted with catfish flour and pumpkin flour obtained an energy yield of 423 kcal, which met the minimum required energy requirements.

b. Protein Level

In the specification of instant MP-ASI powder for infants aged 6-12 months, a protein content of 15-22 g is required in 100 g of MP-ASI. amounted to 18.38 gr, in accordance with the specifications within the specified range. High-quality protein is needed for baby's growth and development. Infants aged 6-12 months is a critical period because of rapid growth and infants need additional food.15 Food sources of protein used in infant porridge for complementary foods are catfish meal and skim milk. Both are animal proteins that have a higher protein quality than vegetable protein. Fish has an amino acid score of 71 while the amino acid score of cow's milkis 95.18. Both of them have met the quality requirements of the established complementary food, namely an amino acid score of at least 65.8.

c. Fat level

The MPASI baby porridge substituted with catfish and pumpkin flour has a fatcontent of 17.41 gr. The resulting instant baby porridge formulation contains fathigher than the required range, which is not less than 15 g in 100 g of MP-ASI.12 Instant baby porridge formula substituted for catfish and pumpkin flour (15% and 10%) contains high fat. This is due to the addition of fat sources from vegetable oilsin the manufacture of instant baby porridge. The purpose of adding vegetable fat sources to MPASI is to increase the nutritional value and also provide high energyand add a good taste.

d. Carbohydrate Level

Carbohydrates for infants are the main source of energy. Carbohydrate intake should meet at least 52-54% of energy needs. Carbohydrate content is calculated by carbohydrate by difference. The calculation of this method is strongly influenced by the content of other nutrients such as water, ash, fiber, protein, and fat. The ingredients for baby food porridge containing high carbohydrates include gelatinized rice flour, skim milk, pumpkin flour, and powdered sugar. SNI for the carbohydrate content of MPASI should not be less than 30 grams / 100 grams. Carbohydrate content of MPASI porridge substituted with catfish and pumpkin flour was obtained at 48.46 mg. When compared with the standard requirements for instant porridge MPASI, it has met the baby's needs by 88.9%, the adequacy of infants 8-12 months. This has met the requirements for energy needs from carbohydrate sources.

e. Calcium

Calcium obtained from the tests carried out was 226.1 mg/100 grams, in accordance with the established standards, which was not less than 200 mg/100 grams. Calcium is needed by babies for the growth of bones and teeth. For infants and toddlers, calcium is useful for assisting in the growth process of the brain, bones and teeth, helping the development and health of the baby's brain. Infants aged 0-6 months need 200 mg/100 grams of calcium. Infants 6-12 months, the RDA increases to 260 mg per day. At the period 0-6 months babies get exclusive breastfeeding, calcium needs can be met from breast milk alone. After the baby's age increases from 6-12 months, they need additional food (MPASI), because the volume.

Calcium is an essential mineral for the body for the formation of bones and teeth. Bone size and mass increase during childhood to adulthood, peaking at age 30. In addition to the formation and growth of bones and teeth, another function of calciumis to help other body functions, such as heart function, blood vessel contraction, muscle function, nerve transmission, intracellular signaling, and hormone secretion.

f. Iron

From the analysis of the iron content of the MPASI porridge, it was found that the iron value was around 38.91 mg, this was in accordance with the established standards, which should not be less than 15 mg/100 gr. From the results of the analysis of berries, it turns out that MPASI has a high enough value, so it is very goodfor the health of babies.

The 2013 Nutrition Adequacy Rate (RDA) determined by the Ministry of Health, the iron needs of infants aged 7-11 months is 7 mg per day. This need certainly cannot be fulfilled by breast milk alone because the iron content in breast milk is very small. This is one of the reasons why babies aged 6 months and over should receive complementary foods with breast milk (MPASI).

g. Vitamin A

The level of Vitamin A in the instant baby porridge produced is 253.52 mcg or is atthe set standard. Vitamin A is essential for vision, growth, cell differentiation and proliferation, reproduction, and the immune system.15 An important function of vitamin A is to support the development of vision function and the health of the baby's skin. Not only that, the function of vitamin A also plays an important role in boosting the immune system and accelerating the growth process of the baby's bones and tissues. Giving vitamin A to infants must be adjusted to the age of the baby. This

is intended to prevent the toxic effects of vitamin A. Generally, for infants under 1 year of age, the recommended dose of vitamin A per day is 400 mcg. As many as 63.38% have been fulfilled from complementary foods, the rest can be fulfilled from breast milk.

h. Vitamin D

Vitamin D levels obtained from the results of laboratory tests obtained results of 0.67 mcg. The test results for vitamin D levels are slightly lower than the standard set at 0.75 mcg. This is because in the manufacture of instant MPASI porridge using catfish meat, which in catfish meat has little or low vitamin D content.

Another vitamin that has an important function for the baby's body is vitamin D. Vitamin D plays a role in helping the body absorb calcium and maintain healthy bones and teeth of the baby. Vitamin D deficiency in infants will result in bone disorders, such as rickets. Generally, babies under 1 year need 0.75 mcg of vitamin D per kg of baby weight. From MPASI, it can contribute 89.3% of the need for Vitamin D, the rest is obtained from breast milk. Vitamin D can also be obtained by drying the baby in the sun at 9-10 am.

3. Endurance Test to Save MPASI

Table 9. : Endurance Test of MPASI Slurry Storage.

Tanda Kerusakan	Minggu Ke																							
	Bulan ke I				Bulan ke II					Bulan ke III				Bulan Ke IV				Bulan ke V				Bulan ke VI		
Perubahan Warna	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perubahan Aroma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perubahan Rasa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perubahan Tekstur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

The results of observations on the shelf life of MPASI substituted with catfish flour and pumpkin flour produced:

Samples were stored in tightly closed plastic packaging, stored in two places, namely at room temperature (27-370C), starting from being stored on July 18, 2019 until 6 months there was still no organoleptic damage. Good color, aroma, taste and texture. This means that MPASI porridge is very good to be used as instant porridge for babies and safe and durable can be used as an alternative to commercial instant porridge MPASI.

CONCLUSIONS AND SUGGESTIONS

A. Conclusion

From the results of the research that has been done, the following conclusions can be drawn:

1. Microbiological quality of instant porridge MP-ASI which is substituted with catfish flour and pumpkin flour is very good and in accordance with the SNI standard for instant porridge for commercial MPASI.
2. The nutritional content of MP-ASI baby porridge which is substituted for catfish flour and pumpkin flour are all within the nutritional adequacy range set by the government in accordance with the SNI standard on MPASI for infants 6-12 months
3. The shelf life of MP-ASI instant baby porridge with the substitution of catfish flour and pumpkin flour for more than 5 months has not seen any signs of abnormalities, and if stored at low temperatures in good packaging it will last longer.

B. Suggestion.

1. It is recommended that in making MPASI instant baby porridge, which is substituted with catfish flour and pumpkin flour, it can follow the composition of the ingredients that have been made, namely catfish flour 15 gr and pumpkin flour 10gr, in the best organoleptic manner.
2. This MPASI can be used to treat infants who are acutely malnourished both at thePosyandu and at the Puskesmas as Supplementary food for infants from local food.
3. It is necessary to conduct trials of giving children under the age of five who are malnourished or stunted and see changes in nutritional status/weight and height.

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