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Acceptability and Analysis of The Proximate of Instant Porridge Breast Milk Complementary Food (MP-ASI) with Toman Fishmeal Substitution (Channa *micropellets*) for Infants Aged 6-9 Months Based on Local Food

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ABSTRACT

Background: Complementary foods for breast milk (MP-ASI) are foods or drinks that contain nutrients to meet the nutritional content of infants or toddlers as a substitute for breast milk in infants over 6 months of age. Instant porridge is a porridge that is served practically. Toman fish is a local food that can be used to develop MP-ASI. The benefits of Toman fish are helping the growth and development of children's bones, improving brain performance, preventing heart disease, containing proteins that help replace damaged cells, and supporting wound healing. **Objective:** To determine the acceptability and analysis of nutrient content of instant porridge breast milk supplement (mp-asi) with toman fish meal substitution (*Channa micropeltes)* for infants aged 6-11 months based on local food from the North Kayong region. **Method:** This study used an experimental method consisting of 3 treatments of toman fishmeal formulation: F1 (15 grams), F2 (20 grams), and F3 (25 grams). The test is carried out through 2 stages, namely, the organoleptic test and the proximate test. **Results:** The results showed the best value of F2 nutritional analysis of instant porridge flour with tomato meal substitution showed that the concentration of tomato fish meal in the selected treatment was F2 (20 grams) with the content of fat 26.02 grams, protein 31.41 grams, carbohydrates 73.28 grams, fiber 6.98 grams, water content 8.24 grams, and ash content 4.04 grams. **Conclusion:** Substituting the toman fishmeal formulation affects instant porridge's color, aroma, and taste. However, substituting the Toman fishmeal formulation does not affect the texture.

Keywords: Instant porridge, MP-ASI, Toman fish

INTRODUCTION

Malnutrition problems in infants and toddlers will cause disturbances in growth and development. In Indonesia, nutritional problems in infants and toddlers are still high; judging based on the results of the SSGI in 2021, the number of stunted toddlers is 24.4%, while for 2022, the number of stunted toddlers has decreased by 21.6% (Hatijar, 2023). Meanwhile, the % of infants and toddlers who experienced stunting in 2021 West Kalimantan Province was 27.8%. In North Kayong Regency, the percentage of infants and toddlers who are stunted is 24.5% (Wardanu, 2023).

Suboptimal processing of MP-ASI is the leading cause of malnutrition and growth retardation in babies. The practice of breastfeeding in Indonesia for babies over 6 months of age is still not optimal. According to data sources from WHO, only 42% of children aged 6-23 months get complementary foods for breast milk (MP-ASI) as recommended by WHO (Andriani, 2021).

Complementary foods for breast milk (MP-ASI) are foods or drinks that contain nutrients for babies or toddlers and meet the nutritional content of infants or toddlers as a substitute for breast

milk at the age of babies over 6 months. A good complementary food for breast milk is Mp-Asi, which meets the needs on time, is nutritionally complete, sufficient, balanced, and is made or managed safely and correctly. (Ardiana, 2019).

Instant porridge contains the ingredients that make up instant porridge, so there is no need to cook it when you want to make it. When babies are 6 months old, they need complementary foods for breast milk (MP-ASI) with a texture that is so soft that it is easy for 6-month-old babies to swallow them. The practical way to process instant porridge makes it one of the options for mothers of babies or toddlers as an alternative to feeding their children by only brewing with warm water so that the instant porridge is ready to be given to the baby or toddler (Azis, 2020).

The nutritional content itself can be increased by adding and substituting using local food sources of protein, such as fish, tempeh, tofu, eggs, and so on which can be substituted with local foods around as a source of protein nutrition content (Darningsih, 2023). In addition to being rich in nutrient content, using local food can make local food more beneficial to the local community.

Local food in North Kayong that can be used to develop MP-ASI is toman fish (*Channa micropeltes).* According to the Fisheries Office of North Kayong Regency, the production of toman fish in 2022 is 78,100 Kg. The reason for using toman fish is that this food contains high albumin and protein and has a complete content of essential amino acids. (Astuti & Budiarti, 2023). So that these local foods are suitable for MP-ASI food for babies with malnutrition problems (Fitriyani et al., 2020).

The toman fish (*Channa micropeltes*) is the largest freshwater fish from the family *Channidae*. This family of fish is all carnivorous or predatory animals. Like snakehead fish, toman fish are aggressive predators. The moisture content in fresh toman meat (74.1%), Protein (18.92%), Fat (5.23%), Ash content (0.94%). Toman fish is usually less preferred to be cooked directly, so it is generally processed in preserved form as dried or salted fish. The benefits of Toman fish are helping the growth and development of children's bones, improving brain performance, controlling blood pressure, preventing heart disease, lowering the risk of diabetes, containing protein that helps replace damaged cells, and supporting wound healing. One of the contents obtained from Toman fish is albumin protein (Hermanto & Susanty, 2020).

In this study, several factors will be tested in the manufacture of products, including color, aroma, taste, and texture. Color is a visualization of a product that is immediately visible first compared to other variables. Color will directly affect the perception of the panelists. Color is essential to determining a food ingredient's quality or degree of acceptance (Lestari, 2015).

Aroma is one of the parameters that affects the perception of the good taste of a food. In the food industry, the test for aroma is considered vital because it can quickly assess consumer interest in the products produced (Soekarto, 1995 in Uliyanti & Niaga, 2023).

The tasting point of the tongue is the ability to detect the four bases of taste: sweet, sour, salty, and bitter. In certain foods, these four flavors combine to become a unique and interesting taste (Tantrisna, 2005). The taste of food comes from the ingredients themselves, and if it has gone

through the processing process, the taste will be influenced by the ingredients added during the processing process (Ladamay, 2014).

Texture is a characteristic of a material as a result of a combination of several physical properties that include size, shape, number, and elements of the formation of a material that can be felt by the sense of touch and taste, including the sense of mouth and sight (Ladamay & Yuwono, 2014). Food texture results from *tactile sense* responses to physical stimuli when there is contact between parts of the oral cavity and food (Indriasari, 2019).

METHOD

Research Design

The research design used is an experimental design using three different formulations, namely

F1 : Toman Fish Meal (15 grams) F2 : Toman Fish Meal (20 grams) F3 : Toman Fish Meal (25 grams)

Tool

The tools used in making instant porridge are ovens, baking pans, sieves, spoons, basins, pans, steamers, cutting boards, knives, blenders, digital scales, spatulas, and aluminum foil.

Material

The ingredients for instant porridge are tomato fish meal, rice flour, skimmed milk, soybean oil, and sugar flour.

Research Procedure

Making Toman Fish Flour

The procedure for making toman fish meal goes through several stages that have been modified to produce good toman fish meal, namely weeding the fish to remove the head and stomach contents of the toman fish, filleting, washing, steaming for ± 15 minutes, baking for 1 hour and 40 minutes at a temperature of 1250 C, smoothing, and sifting using a 60 mesh sieve for smooth results.

Instant Porridge Manufacturing

The process of making instant porridge goes through several stages, namely weighing the ingredients according to the formulation, mixing the ingredients, cooking the ingredients on the stove for 10 minutes with 100 ml of water and a temperature of 750 C, stirring the ingredients until smooth, the ingredients are poured on a baking sheet that has been lined with aluminum foil, then dried in a drying oven for 3 hours at a temperature of 125^0 C. It is mashed and meshed using a 60-mesh sieve.

RESULTS AND DISCUSSION

Product Description

MP-ASI instant porridge in this study uses rice flour, skimmed milk, soybean oil, and sugar flour with tomato fish meal substitution as a complementary food for babies. This MP-ASI is in the form of instant porridge ready to brew. The results of instant porridge that has been made with different formulations can be seen in Figure 1

F1 Instant Porridge | *F2* Instant Porridge | *F3* Instant Porridge

Figure 1. Instant Porridge Products

Table 1. Product Characteristics

Formulation	Color	Aroma	Taste	Texture
F1	It has a light yellow color	It has a distinctive aroma of toman fish	Slightly sweet taste	It is like a general porridge but slightly tastes like sand
F2	It has a brownish-yellow color	The distinctive aroma of toman fish,	The taste is slightly sweet, and the fish flavor is slightly tasted.	The texture of this MP-ASI still tastes like grains of sand.
F3	It has a dark brown color	The distinctive aroma of toman fish meal	It has a distinctive taste in toman fish, slightly sweet, and the taste of it is tasted.	The texture of this MP-ASI still tastes like sand.

Color Preference Level

Based on the results of the color organoleptic test on instant porridge with tomato fish meal substitution can be seen in Figure 2.

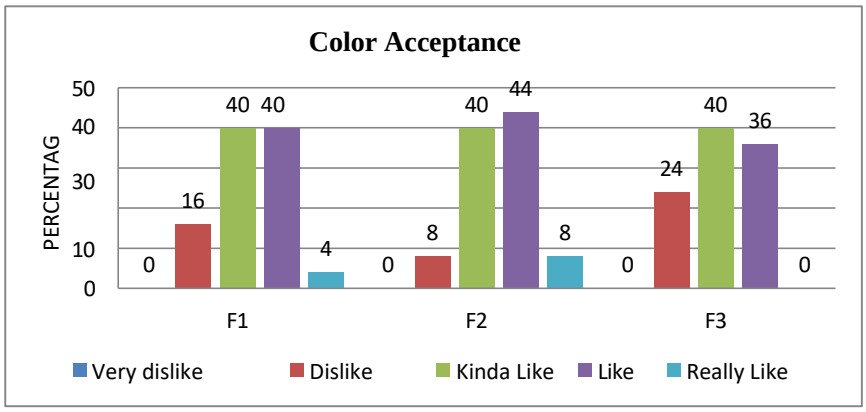


Figure 2. Graph of Organoleptic Test of Color Acceptance in Instant Porridge

In Figure 2, the results of the organoleptic test on instant porridge with tomato fishmeal substitution, formulation 1 has the highest score at the level of liking and somewhat liking by 40%, formulation 2 has the highest score at the level of liking by 44%, and formulation 3 has the highest score at the level of liking somewhat like by 40%. Based on the statistical results on the Friedman test with a confidence level of 95%, T calculated > F table (3.50 > 3.19), then Ha is accepted, which means that there is an effect of the substitution of toman fishmeal on the color of instant porridge.

Based on the results of the organoleptic test of instant porridge, the assessment on color with the highest average is F2, which is 44%. The panelists expressed their liking because the instant porridge in F2 was brownish-yellow due to the influence of giving tomato fish meal, which gave a brownish-yellow color that could attract the panelists' attention, with 20 grams of tomato fish meal.

Aroma

Based on the results of the aroma organoleptic test on instant porridge with toman fish meal substitution can be seen in Figure 3.

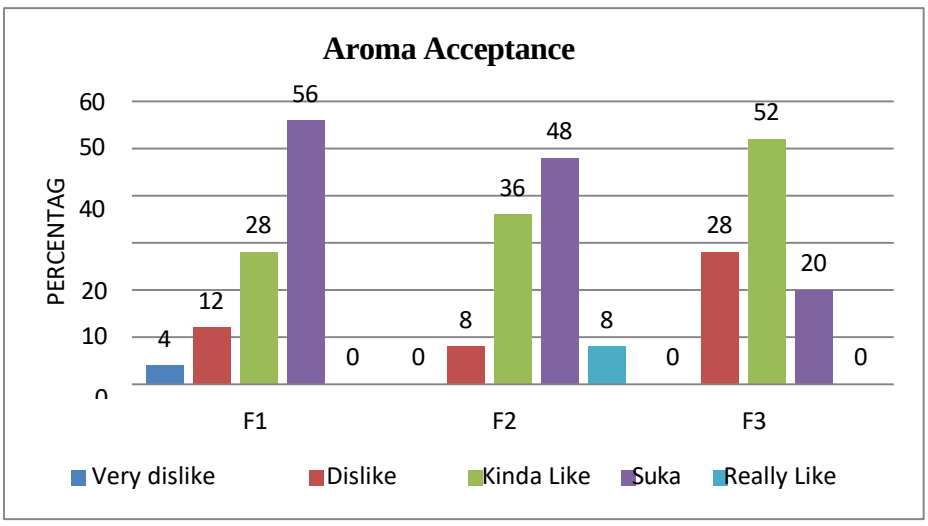


Figure 3. Organoleptic Test Graph of Aroma Acceptance in Instant Porridge

In Figure 3, the results of the organoleptic test on instant porridge with tomato fishmeal substitution, in formulation 1, the highest assessment was at the level of liking of 56%; in the treatment of formulation 2, the highest was at the level of liking of 48%, and in the treatment of formulation 3, the highest was at the level of liking somewhat of 52%. Based on the statistical results on the Friedman test with a confidence level of 95%, T calculated > F table (8.56 > 3.19), then Ha was accepted, which means that there is an effect of the substitution of toman fishmeal on the aroma of instant porridge.

Based on the results of the organoleptic test of instant porridge, the assessment of the aroma with the highest average in F1 was 56%. The panelists expressed their liking because the instant porridge in F1 was not too fishy and contained 15 grams of tomato fish meal.

Taste

Based on the results of the taste organoleptic test on instant porridge with tomato fish meal substitution can be seen in Figure 4.

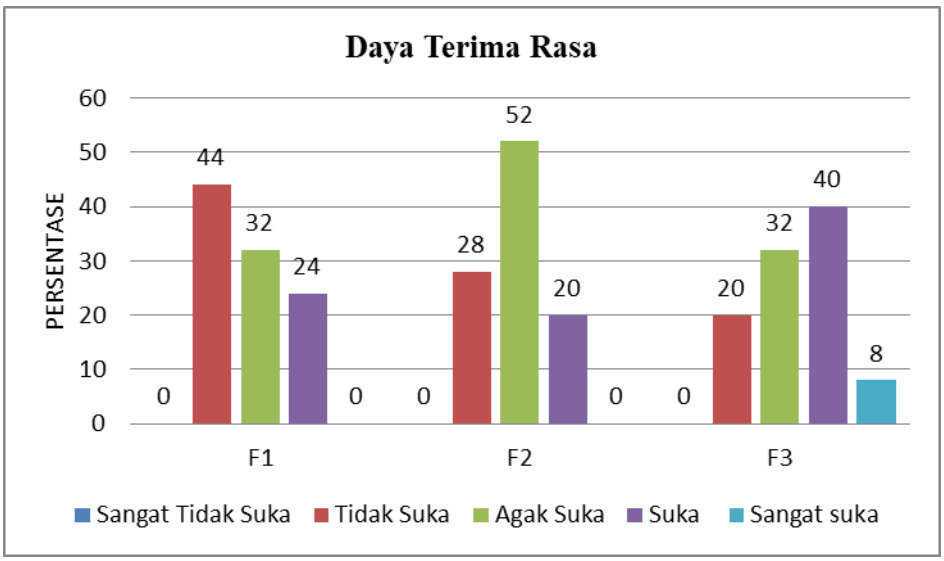


Figure 4. Graph of Organoleptic Test of Taste Acceptability in Instant Porridge

In Figure 4, the results of the organoleptic test on instant porridge with tomato fishmeal substitution, in formulation 1, the highest assessment was at the level of liking and disliking of 44%; in the treatment of formulation 2, the highest was at the level of liking somewhat of 52%, and in the treatment of formulation 3, the highest was at the level of liking of 40%. Based on the statistical results of the Friedman test with a confidence level of 95%, T calculated > F table (4.16 > 3.19), then Ha was accepted, which means that there is an effect of the substitution of toman fishmeal on the taste of instant porridge.

Based on the results of the organoleptic test of instant porridge, the assessment on taste with the highest average is F3, which is 40%. The panelists expressed their liking because the instant porridge in F3 tasted savory from tomato fish meal, with an additional 25 grams of tomato fish meal.

Texture

Based on the results of the texture organoleptic test on instant porridge with tomato fishmeal substitution can be seen in Figure 5.

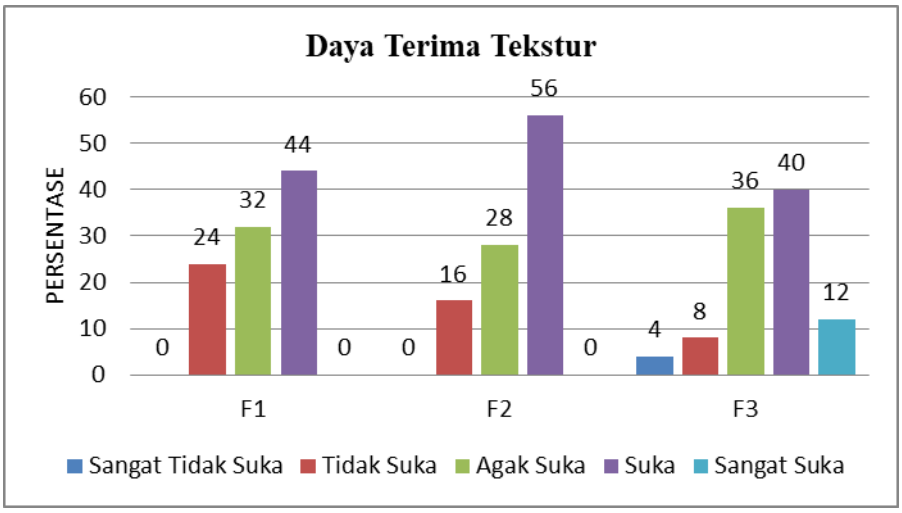


Figure 5. Graph of Organoleptic Test of Texture Acceptability in Instant Porridge

In Figure 5, the results of organoleptic tests on instant porridge with tomato fishmeal substitution, in formulation 1, the highest assessment was at the level of liking of 44%; in the treatment of formulation 2, the highest was at the level of liking of 56%, and in the treatment of formulation 3, the highest was at the level of liking of 40%. Based on the statistical results on the Friedman test with a confidence level of 95%, T calculated < F table (1.04 < 3.19), Ha was not accepted, which means that there was no effect of toman fish meal substitution on the texture of instant porridge.

Based on the results of the organoleptic test of instant porridge, the assessment of the texture with the highest average at F2 was 56%. The panelists expressed their liking because the instant porridge on F2 has a softer and smoother texture with the addition of 20 grams of toman fish meal. This can be caused by the sieving process using a mesh of the same size so that the texture of the toman fish meal in the instant porridge is smooth.

Acceptability

Table 2. Number of preference levels in each formulation using Friedman's test

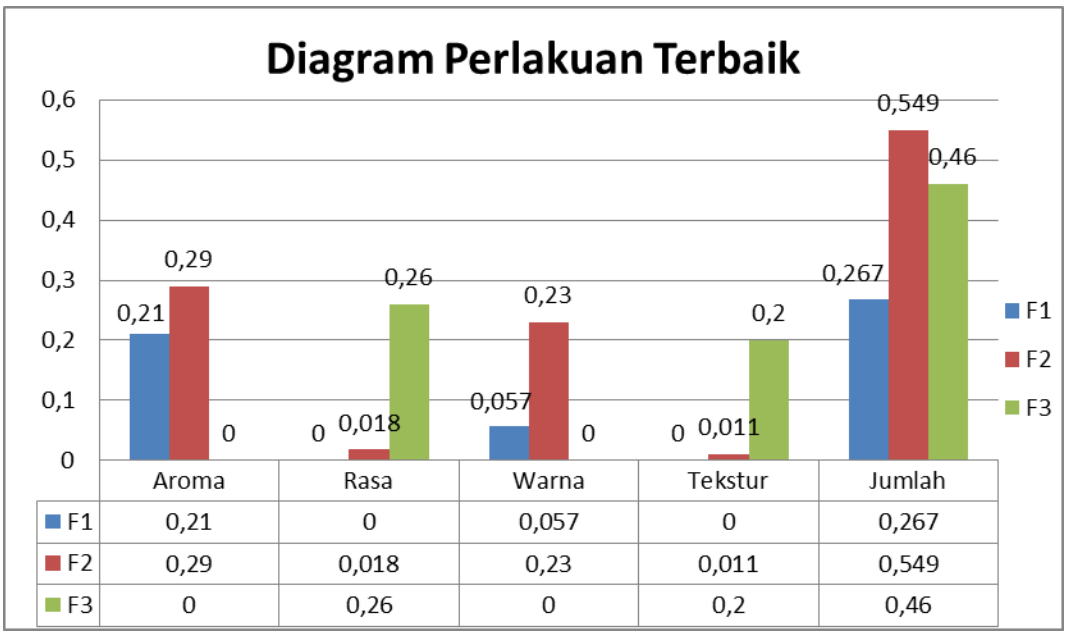
	Favorability Level				
Formulation	Color	Aroma	Taste	Texture	Result
F1	83	84	70	80	317

F2	88	89	73	85	335
F3	78	73	84	87	322

Based on Table 2, it can be seen that the number of ranks of the preference criteria assessment, in each formulation, the overall acceptance of the panelists was obtained in color, aroma, taste, and texture. By using Friedman's test on the selected instant porridge, many of the panelists liked the formulation of instant porridge (F2), with a total score of 335.

Overall Acceptability

The assessment shows the panelists' favorite criteria, which include color, aroma, taste, and texture, as shown in Figure 6.



	Aroma	Rasa	Warna	Tekstur	Jumlah
F1	0,21	0	0,057	0	0,267
F2	0,29	0,018	0,23	0,011	0,549
F3	0	0,26	0	0,2	0,46

Figure 6. The number of preference levels in each treatment was based on color, aroma, taste, and texture in the instant porridge formulation with toman fish meal substitution.

Based on the theory in the Effectiveness Index method of the de Garmo method, the best treatment can be selected from the treatment with the highest Total Product Value (NP) for each organoleptic parameter observed in this case, including color, aroma, taste, and texture. So it can be concluded that F2 is a formula or type of treatment that was selected as an Instant Porridge product with the substitution of toman fishmeal, which as a whole obtained the highest results in the F2 treatment based on the total Product Value with an amount of 0.549 which means that the panelists prefer this treatment.

Nutritional Content Analysis

The analysis of nutritional content or proximate is carried out by two experiments *(duplo),* which are done so that the results obtained are more valid or to reduce technical and tool errors. The samples analyzed were only the most preferred treatment by the panelists, namely formulation treatment 2. Proximate analysis was carried out to determine the nutritional value of MP-ASI instant porridge with tomato fish meal substitution. The proximate results in MP-ASI instant porridge can be seen in Table 3.

Table 3. Results of Proximate Analysis from Instant Porridge

Kandungan Proximate F2 Instant Porridge	Results of Analysis	SNI Instant Porridge	MP-ASI Standards According to the Ministry of Health
Carbohydrates	48.84 gr	< 30 gram	Max 30 gr
Protein	20.93 gr	8-22 g	15-22 gr
Fat	17.31 gr	6 – 15 grams	10-15 gr
Fiber	4.66 gr	>5 g	Max 5 gr
Up Air	5.52 gr	< 4.0 g	-
Up to Abu	2.7 g	< 3.5 g	-

Table 3 shows the results of proximate analysis on MP-ASI instant porridge with tomato fish meal substitution, namely with the results of carbohydrates 48.84 grams, protein 20.93 grams, fat 17.31 grams, fiber 4.66 grams, moisture content 5.52 grams, ash content 2.7 grams. Based on the laboratory results, only protein and ash content meet the Indonesian National Standard (01-7111.1-2005), while the others do not meet the Indonesian National Standard.

The results of the analysis of carbohydrate content exceeded the maximum standard of instant porridge. This is due to skimmed milk and refined sugar, which contribute to the added value of carbohydrates apart from rice flour as raw materials. The results of the fat content analysis exceeded the maximum standard of instant porridge due to the use of oil as an additive other than skim milk and toman fish. The results of the fiber content check were less than the standard of the instant porridge. This happens due to the lack of food additives high in fiber content. The moisture content check results exceeded the instant porridge's maximum standard level. This happens because of the steaming process in toman fish, where the water content is high and not optimal.

Water Absorption Analysis

The water absorption test was carried out to determine the ability of instant porridge to absorb water. The samples analyzed were only the most preferred treatment by the panelists, namely formulation treatment 2. The results of water absorption can be seen in Table 4.

Table 4. Results of Water Absorption Analysis in Instant Porridge

Test Parameters	Test Results
Water Absorption	8,59%

Table 4 shows the results of the water absorption analysis in MP-ASI instant porridge with tomato fish meal substitution, which is 8.59%. According to Anam et al., in 2020, the absorption capacity of MP-ASI instant porridge generally ranges from 3.60-6.20. Water absorption can also be affected by the amount of water added to the instant slurry. The starch content in the material affects the absorption value of instant porridge products. The starch will bind to water, and then, with high-temperature treatment, the starch will be gelatinized so that cavities will form in the product's structure. The more starch is gelatinized, the more air cavities will be formed. The more cavities are formed when rehydration occurs, the more water trapped in the instant porridge will be, so the level of rehydration will increase. In this study, the starch in instant porridge products comes from the rice flour used (Mulyanita et al., 2023).

Organoleppicking Test

This MP-ASI instant porridge has rice flour, skimmed milk, soybean oil, and sugar flour. Rice flour contains protein, fiber, carbohydrates, and some vitamins and minerals that are good for the growth and development of babies. Skimmed milk contains high protein, which is suitable for the growth and development of babies. Soybean oil contains fats such as omega-3 and omega-6 fatty acids and some vitamins. Sugar flour is added to MP-ASI to add flavor to instant porridge. In addition to brown rice flour, skim milk, soybean oil, and sugar flour as the main ingredients, there is a substitution of toman fish meal as a source of protein that contains essential amino acids for the growth and development of babies. In one serving, instant porridge is served per 25 grams.

Color

The results of the color organoleptic test on instant porridge with tomato fishmeal substitution showed that the concentration of 20 grams of tomato fishmeal in the formulation two treatment was 44%, which the panelists preferred because it had a brownish-yellow color that was not old and not pale. The difference in the color of each formulation is caused by the influence of the ingredients used, namely toman fish meal. (Khasanah & Mumpuni, 2021). The higher the concentration of adding toman fish meal, the more brown (dark) the instant porridge will be. Based on the results of Friedman's statistical test, it was concluded that there was an effect on the color of MP-ASI instant porridge with the addition of Toman Fish Meal.

The results of the color organoleptic test on MP-ASI instant porridge with Toman Fish Meal substitution showed that the concentration of 20 grams of Toman Fish Meal in the F2 treatment was 44%, which the panelists preferred because it had an attractive brownish-yellow color. The color

difference caused by the ingredients used is toman fish meal. The addition of toman fish meal produces the color of the instant porridge to brownish-yellow. The color is influenced by the number of substitutions for toman fish meal in instant porridge products. Fishmeal is yellowish due to the presence of xanthophyll compounds. This compound causes a yellowish color in fishmeal (Tresna Dewi, 2013). This is in line with researcher research where the higher the concentration of toman fish meal, the more intense the color of the instant porridge used in each formulation, and the color of the instant porridge becomes darker.

Aroma

The results of the color organoleptic test on MP-ASI instant porridge with tomato fish meal substitution showed that the concentration of 15 grams of tomato fish meal in the F1 treatment was 56%, which the panelists preferred because it had a less fishy aroma than tomato fish meal. The aroma of the three treatments varies; the higher the formulation of toman fishmeal, the better the aroma. The increased proportion of additives such as toman fish meal causes the fishy smell in instant porridge.

According to Putri, in 2022, her research stated that the more fishmeal substitutions were caused, the level of liking for the aroma of the products produced decreased. This is because the increasing amount of fishmeal used in the product's manufacture causes the smell of *choux pastry* to smell like dried fish, so the level of preference decreases. This is in line with research conducted by researchers, where the higher the concentration of toman fishmeal used in each formulation, the lower the panelists' preference value for instant porridge. However, F1, with the lowest concentration of catfish, has the highest acceptance value; this can happen because in F1, the addition of toman fish meal has the lowest concentration, so the aroma of instant porridge becomes less fishy.

Taste

The results of the taste organoleptic test on MP-ASI instant porridge with tomato fish meal substitution showed that the concentration of 25 grams of tomato fish meal in the F3 treatment was 40%, which was more preferred by the panelists because there was a savory taste of fish products that was familiar to the panelists' taste buds. Hence, the panelists tended to like it. In the study, the taste produced in the three treatments varied; the higher the dietary formulation, the more the fish tasted in the instant porridge. This is in line with research (Noer et al., 2014), which states that the savory taste in each treatment is caused by mixed food ingredients such as skimmed milk and fish, affecting consumer acceptance of fortified processed food products.

Texture

The results of the texture organoleptic test on MP-ASI instant porridge with tomato fish meal substitution showed that the concentration of 20 grams of tomato fish meal in the F2 treatment was 56%. According to the panelists, the texture in the F2 treatment is softer and smoother than the F1

and F3 treatments; this can be caused by the sieving process using a mesh of the same size so that the texture of the tomato fish meal in the instant porridge has a smooth texture.

Overall Acceptability

Based on the organoleptic test results, the panelists preferred instant porridge with tomato fish meal substitution with a concentration of 20 grams or in the F2 treatment.

According to researchers, instant baby porridge has a good color, aroma, taste, and texture at a concentration of 20 grams or F2 treatment because instant baby porridge in F2 treatment has a brownish yellow color with a distinctive aroma of tomato fish meal, the typical taste of tomato fish meal is slightly savory, and the texture is like porridge in general which is smooth but still has grains like sand that can be caused by rice flour.

Carbohydrate Proximate Analysis

Carbohydrates are a significant source of calories and play an essential role in the body. In the body, carbohydrates help prevent ketosis, excessive breakdown of body proteins, mineral loss, and fat and protein metabolism. In food, carbohydrates play an essential role in determining the characteristics of the body, such as food ingredients, color, texture, and other factors (Fitri & Fitriana, 2020).

The results of laboratory tests on instant porridge from Toman fish meal show a carbohydrate content of 48.84 grams. The data results show that the carbohydrate content in instant porridge exceeds the standard (SNI 01-7111.1-2005) of the minimum carbohydrate content in instant porridge, which is < 30 grams. This can be caused by other additives in the manufacture of instant porridge, which also contribute to a reasonably high carbohydrate value, namely refined sugar, rice flour, and skimmed milk. Compared to the MP-ASI standard, the carbohydrate yield of instant porridge also exceeds the MP-ASI standard of instant porridge, according to the Ministry of Health (Kemenkes), with a maximum value of 30 grams.

According to (Farida, 2016), research stated that adding food ingredients such as powdered sugar, rice flour, and skimmed milk can increase the value of carbohydrate content in instant porridge. This shows that additives in powdered sugar, rice flour, and skim milk also contribute to the carbohydrate value so that the carbohydrate content in instant porridge exceeds the SNI of instant porridge that has been set.

Protein

Proteins are macromolecules that have a molecular weight of between five thousand and several million and are a source of amino acids containing elements C, H, O, and

N. Protein as an energy source provides 4 Kcal per gram. Proteins are needed to repair or maintain tissues and grow and form various specific biologically active compounds that serve as energy sources (S Almatsier, 1989 in Fendri, 2019).

Based on the data from the protein test results on the toman fishmeal instant porridge sample, it is known that the F2 protein content is 20.93 grams. According to the results of the data, it can be said that the protein content contained in instant porridge is by the standard (SNI 01-7111.1-2005) of the minimum protein content in instant porridge, which is 6-22 grams. The ingredients in making instant porridge that contribute to protein are toman fish and skim milk. Compared to the standard of MP-ASI instant porridge, the protein value is also the standard of MP-ASI instant porridge, according to the Ministry of Health, which is 15-22 grams.

According to (Putri, 2022), protein levels are increasing with the addition of fishmeal and skim milk. Thus, the more fish meal and skim milk substitutions, the higher the protein content in instant porridge.

Fat

Fats are organic compounds of C, H, O, and carbohydrates. The oxygen-to-carbon and hydrogen ratio is lower in fats than in carbohydrates. Fat contains less oxygen, and its calories are twice as many carbohydrates. In the same amount, 1 gram of fat equals nine calories (Winda, 2023).

Based on the results of laboratory tests on instant porridge from Toman fish meal, the fat content was 17.31 grams. According to the results of the data, it can be said that the fat content in instant porridge exceeds the standard (SNI 01-7111.1-2005) of the minimum fat content in instant porridge, which is 6-15 grams. This can be caused by adding ingredients that contribute to high-fat value. Meanwhile, compared to the standard of MP-ASI instant porridge, the fat value also exceeds the standard of MP-ASI instant porridge, according to the Ministry of Health, which is 10-15 grams.

This is in line with research conducted by (Wa ode Nurul Maulidya Koila, 2021), stating that the greater the percentage of ingredients that contribute fat content, such as oil and other additives that contain fat, the higher the fat content in food.

Fiber

Fiber levels, or *dietary fiber*, are part of plants that can be consumed. It comprises carbohydrates resistant to digestion and absorption in the human small intestine and undergo partial or complete fermentation in the large intestine (Santoso, 2011).

Based on the data from the fiber test results on the sample of instant porridge of tomato fish meal, it is known that the fiber result in instant porridge with F2 is 4.66 grams. According to the results of the data, it can be said that the fiber content in instant porridge is still less than the standard (SNI 01-7111.1-2005) minimum fiber content in instant porridge, which is > 5 grams. In this case, the ingredients contributing to the fiber value come from rice flour and toman fish meal. Meanwhile, compared to the MP-ASI standard for instant porridge, the fiber value also exceeds the standard of MP-ASI instant porridge, according to the Ministry of Health, which has a maximum value of 5 grams.

Up Air

Moisture content is essential in determining a product's quality, especially instant products. Water content is significant in determining the shelf life of foodstuffs because it affects physical properties, chemicals, microbiological changes, and enzymatic changes (Farida, 2016).

Based on the data from the moisture content test results in the toman fish meal instant porridge sample, it is known that the moisture content of F2 is 5.52 grams. According to the results of the data, it can be said that the moisture content in instant porridge exceeds the standard (SNI 01-7111.1-2005) of the maximum moisture content in instant porridge, which is < 4 grams.

According to (Farida, 2016), in the manufacture of instant baby porridge, a gelatinization process is carried out with the addition of water that allows the uniformity of the condition of each formula. This is in line with the researcher's research where in the process of making tomato fish meal, the steaming process is first carried out with the addition of water, and then the drying process is carried out using an oven. Toman fish contain high water, as shown by fresh toman fish water content, which is 79.6 grams/100 grams of toman fish loaded in TKPI.

Up to Abu

Ash content is an inorganic substance left over from the combustion of an organic material. Foodstuffs are burned in high temperatures and turn into ashes. The ash content measurement aims to determine the amount of mineral content contained in food/food (Cecilia, 2018).

Based on the results of laboratory tests on instant porridge from Toman fish meal, the ash content was 2.7 grams. According to the results of the data, it can be said that the ash content in instant porridge has met the standard (SNI 01-7111.1-2005) with the value of ash content in instant porridge, which is < 3.5 grams.

Water Absorption

Water absorption testing is carried out to determine the ability to absorb water. Water absorption is the ability of a material to absorb water; the calculation of water absorption in instant porridge products needs to be done because it is related to rehydration in the product. In instant products, good water absorption indicates that the rehydration time used will be shorter so that the product absorbs water faster (Farida et al., 2016).

Based on the water absorption test data on instant porridge from Toman fish meal, the water absorption in instant porridge is 8.59%. Water absorption can also be affected by water added to the instant porridge. The starch content in the material affects the absorption value of instant porridge products. The starch will bind to water, and then, with high-temperature treatment, the starch will be gelatinized so that cavities will form in the product's structure. The more starch is gelatinized, the more air cavities will be formed. The more cavities are formed when rehydration occurs, the more water trapped in the instant porridge will be, so the level of rehydration will increase. In this study, the starch in instant porridge products comes from the rice flour used (Mulyanita et al., 2023).

CONCLUSIONS

There is an effect of toman fishmeal substitution on the color acceptability test in instant porridge as an alternative to breast milk complementary foods (MP-ASI), toman fishmeal substitution on the aroma acceptance test in instant porridge as an alternative to breast milk complementary foods (MP-ASI), toman fishmeal substitution on taste acceptability test in instant porridge as an alternative to breast milk complementary food (MP-ASI). There was no effect of toman fish meal substitution on the texture acceptability test in instant porridge as an alternative to breast milk supplement (MP-ASI). The nutritional analysis of F2 instant porridge flour with tomato fish meal substitution showed that the concentration of tomato fish meal in the selected treatment was F2 (20 grams) with the content of carbohydrates 48.84 grams, protein 20.93 grams, fat 17.31 grams, fiber 4.66 grams, water content 5.52 grams, and ash content 2.7 grams. There was an effect of tomato fish meal substitution on the water absorption test in instant porridge as an alternative to breast milk supplement (MP-ASI).

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