Sport and Nutrition Journal
Vol 6 No 2 - 2024 (141-153)
https://journal.unnes.ac.id/journals/spnj

Evaluation of Performance Perceptions in Adult Combat Athletes about Rapid Weight Loss Practices and Poor Eating Habits in Two Lebanese Cities – A Pilot Study

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ABSTRACT

Background: Complementary feeding can help children accept a variety of foods, improve chewing and swallowing, and adapt to new foods. One of the options for complementary feeding is biscuits that can be made from yellow sweet potato flour and catfish meal. Yellow sweet potatoes contain B-carotene and carbohydrates, while catfish are rich in protein, fat, and calcium. **Objective:** To determine the acceptability and analysis of the nutritional content of yellow sweet potato flour biscuits and catfish meal as an alternative to complementary feeding. **Method:** This study used an experimental process that used three formulations: F1 (95% yellow sweet potato: 5% catfish), F2 (80% yellow sweet potato: 20% catfish), and F3 (65% yellow sweet potato): 35% catfish). The test is carried out through 2 stages, namely the organoleptic test and the nutrient test, which includes protein, fat, carbohydrates, and calcium. **Results:** The results showed that three formulations, F1 (95% yellow sweet potato: 5% catfish), F2 (80% yellow sweet potato: 20% catfish), and F3 (65% yellow sweet potato: 35% catfish) were the most preferred by the panelists was F2 (80% yellow sweet potato: 20% catfish). The results of the nutrient content in the most preferred formulation are F2 (80% yellow sweet potato: 20% catfish) which was carried out in the laboratory of the Pontianak State Polytechnic, namely, protein 9.09%, fat 28.2%, carbohydrate 47.35%, and calcium 8.33%. **Conclusion:** Biscuits affect color, aroma, and texture with the formulation of yellow sweet potato flour and catfish meal, with no effect on taste.

Keywords: complementary feeding, biscuit, yellow sweet potato flour, catfish flour

INTRODUCTION

When a baby is under 6 months old, his energy and nutritional needs increase, so it is essential to give complementary feeding during this time. Complementary feeding is shown when the child is 6 to 24 months old. Complementary feeding aims to meet nutritional needs during growth and development (Sairah et al., 2023). In addition, complementary feeding also helps children receive various types of food. Complementary feeding is also essential for improving the ability to chew, swallow, and adapt to new foods (Rismayani et al., 2023). One of the foods that can be given as complementary feeding is biscuits (Salman et al., 2019).

Biscuits are a type of pastry that has a sweet taste. Biscuits are usually made from wheat flour that is low in gluten or protein. Biscuits are small and made by baking using essential ingredients such as wheat flour, egg yolks, margarine, and refined sugar (Ismail, N.M & Bait, Y, 2023). Another alternative in making biscuits is to add yellow sweet potato flour. Using yellow sweet potato flour can increase the carbohydrate content in biscuits (Sriyanti et al., 2023).

Yellow sweet potato is one of the varieties that has yellow flesh. In addition, yellow sweet potatoes can be made into yellow sweet potato flour. Yellow sweet potato flour is made by steaming, drying, then mashing and sifting until it becomes yellow (Kahar *et al*., 2022). According to data from the West Kalimantan Food Security and Government Office, in 2022, sweet potato production reached 1,273 tons. In addition to animal protein, carbohydrates are also crucial for complementary feeding; one of the protein sources that can be used is catfish.

Catfish is one of the primary commodities and has excellent nutritional content. One way of processing catfish is by making it into flour. Catfish meal has a high protein content, around 63.83% (Ratulangi *et al.*, 2022). Based on Marine and Fisheries Service data, catfish production in West Kalimantan increased to 12,086.29 tons. The potential of local foods, such as yellow sweet potatoes and catfish, can be used to create snack products such as biscuits.

Based on background, researchers are interested in developing a product that plays a role in infant complementary feeding to support growth and development and prevent stunting. Local foods in West Kalimantan are used to make these biscuits, namely yellow sweet potatoes and catfish. These two ingredients are then processed into semi-finished food in the form of flour, which is then used as a mixture to create food products rich in carbohydrates, protein, and calcium. In addition, it will positively contribute to supporting children's growth and development. Thus, through this innovation, it is hoped to create a solution that is useful in meeting the nutritional needs of children to support optimal growth and development.

METHODS

Research Design

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

F1 = Yellow Sweet Potato Flour: Catfish Flour (95 gr: 5 gr)

F2 = Yellow Sweet Potato Flour: Catfish Flour (80 gr: 20 gr)

F3 = Yellow Sweet Potato Flour: Catfish Flour (65 gr: 35 gr)

Tool

The tools used in making biscuits in this study are containers, spatula, bowls, ovens, *chopper*, *mesh* 80, loyang, oven dryer, baking pan, grater, mold, steamer.

Material

The ingredients used in this study are yellow sweet potato flour, catfish meal, wheat flour, egg yolk, powdered sugar, margarine, skimmed milk, and baking powder.

Research Procedure

Making Yellow Sweet Potato Flour

Yellow sweet potatoes are washed until clean first; then sweet potatoes are peeled until clean; sweet potatoes are sliced as thin as possible so that when drying is easier and faster; sweet potatoes that have been cut are then steamed for 5 minutes and then dried in the oven for 60^{o} C for 12 hours, The sweet potatoes are mashed using a chopper and finally sifted using 80 mesh so that yellow sweet potato flour is obtained.

Making Catfish Flour

Making a catfish meal is first washing thoroughly, then cleaning the catfish head and dirt on the head and fins of the catfish. The catfish is steamed for 15 minutes at a temperature of 100^{o}C; after boiling, the fish meat is separated from the fish bone, and the skin fish meat that has been separated is then put in the oven at a temperature of 150^{o}C for 8 hours. Smoothing is done using *a* chopper, and then 80 mesh is sifted to obtain catfish flour.

Biscuit Making

Mix margarine, powdered sugar, egg yolks, and *baking powder* in a *mixer* for 2 minutes until the dough is well combined. Then, gradually add skim milk, wheat flour, yellow sweet potato flour, and a catfish meal by stirring; after becoming a dough, mold and bake in an oven at a temperature of 120^{o}C for 30 minutes, and the biscuits are ready to be consumed.

RESULTS AND DISCUSSION

Product Description

Biscuits are generally processed from low-protein wheat flour, eggs, skimmed milk, and margarine. Biscuits in this study used yellow sweet potato flour and catfish meal as complementary foods in babies with three different treatments. Yellow sweet potatoes contain carbohydrates and fiber, suitable for energy and help children's digestion. In addition, catfish, as a source of protein and calcium, is good for the growth and development of babies. This biscuit is for complementary feeding children aged 6-24 months.

The resulting biscuits are round with a weight of 10 grams, and one recipe produces 40 biscuits. In one serving, biscuits are served per 30 grams. These biscuits are eaten 2-3 times/day as the main menu or 1-2 times as an interlude.

In the formulation, F1 has a brownish-yellow color and a distinctive aroma of yellow sweet potatoes; this product's taste is sweet and has a rather hard texture. The F2 formulation has a yellow color but is not too brown, a sweet potato aroma, and a slight aroma of catfish; the taste of this product is not too sweet, and the texture of this biscuit is hard. The F3 formulation is yellowish-brown, and the aroma is more likely to be fishy than catfish. The taste is bland, and the texture is still hard. Each treatment has a different color, smell, taste, and texture, as shown in Table 1.

Table 1. Biscuits Yellow sweet potato flour and catfish meal

		
F1	**F2**	**F3**

Favorability Level

Color

The results of the power test of the level of preference based on color in complementary feeding biscuits with the addition of yellow sweet potato flour and catfish meal can be seen in Figure 1.

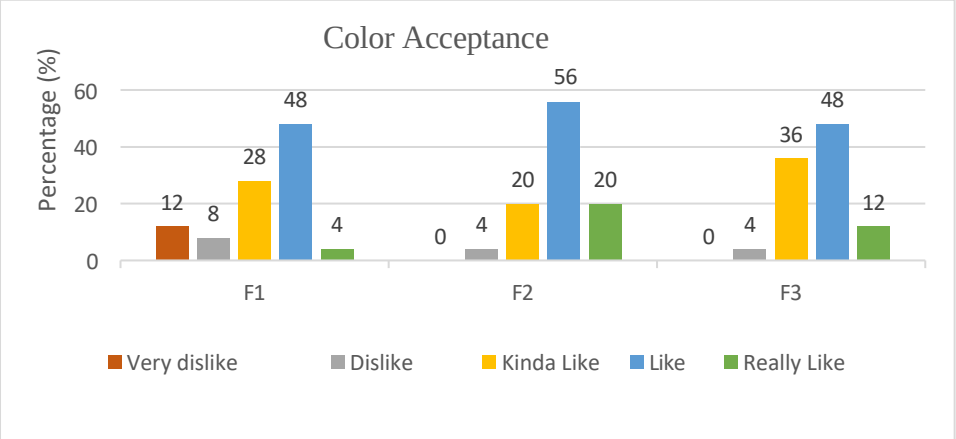

Figure 1. Color Acceptance

In Figure 1, the results of the organoleptic test on biscuits in F1 showed that the highest assessment was at the level of liking of 48%. In F2, the highest rate of liking is 56%. For F3, the highest likes rate is 48%. Based on the statistical results of the Friedman test with a confidence level of 95%, it shows that if T calculates > F table (5.72 > 3.19), then Ha is accepted, which means that there is an influence on the addition of yellow sweet potato flour and catfish meal which are different on the color of the biscuits.

Aroma

Results of the power test of the level of liking based on the aroma of complementary feeding biscuits with the addition of yellow sweet potato flour and catfish meal can be seen in Figure 2.

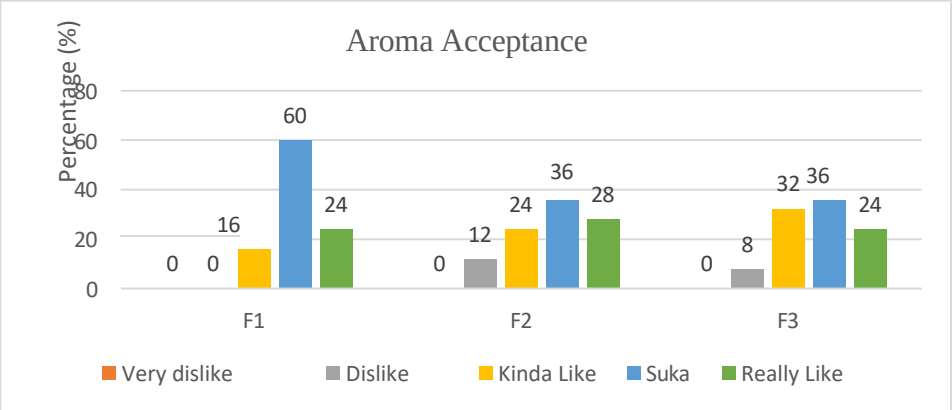

Figure 2. Aroma acceptance

In the figure above, the results of the organoleptic test on biscuits in F1 show that the highest score is at the liking level of 60%. In F2, the highest is at the level of liking at 36%. For F3, the highest likes rate is 36%. Based on the statistical results of *the Friedman test* with a confidence level of 95%, it shows that if T counts > F table (6.53 > 3.19), then Ha is accepted, which means that there is an influence on the addition of yellow sweet potato flour and catfish meal which are different on the aroma of the biscuits.

Texture

The results of the power test of the level of liking based on the texture of complementary feeding biscuits with the addition of yellow sweet potato flour and catfish meal can be seen in the figure below.

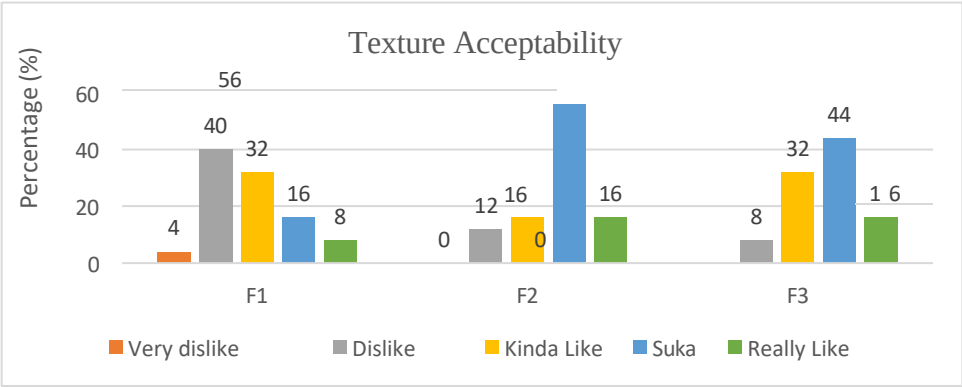

Figure 3. Texture acceptability

In the figure above, the results of the organoleptic test on biscuits, in F1, the highest rating at the level of very dislike is 40%. In F2, the highest rate of liking is 56%. For F3, the highest liking

rate is 44%. Based on the statistical results of the Friedman test with a confidence level of 95%, it shows that if T counts > F table (10.24 > 3.19), then Ha is accepted, which means that there is an influence on the addition of yellow sweet potato flour and catfish meal which are different on the texture of the biscuits.

Taste

Results of the power test of the level of preference based on taste in complementary feeding biscuits with the addition of Yellow sweet potato flour and catfish meal can be seen in Figure 4.

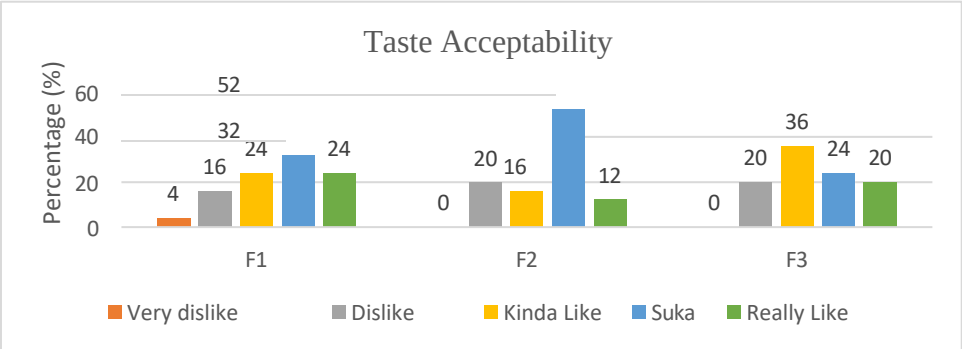

Figure 4. Taste acceptability

In the figure above, the results of the organoleptic test on biscuits in F1 showed the highest assessment at the liking level of 32%. In F2, the highest is at the level of liking at 52%. For F3, the highest liking rate is somewhat liked by 36%. Based on the statistical results of the Friedman test with a confidence level of 95%, it shows that if T counts ≤ F table (0.39 ≤ 3.19), then Ha is rejected, which means that there is no effect on the addition of yellow sweet potato flour and catfish meal which are different on the taste of biscuits.

Overall Acceptability

The results of taste tests on three different treatments of biscuits, yellow sweet potato flour, and catfish meal. The ratings of the three treatments show the rank of the preference criteria, which include color, aroma, taste, and texture, as shown in the figure 5.

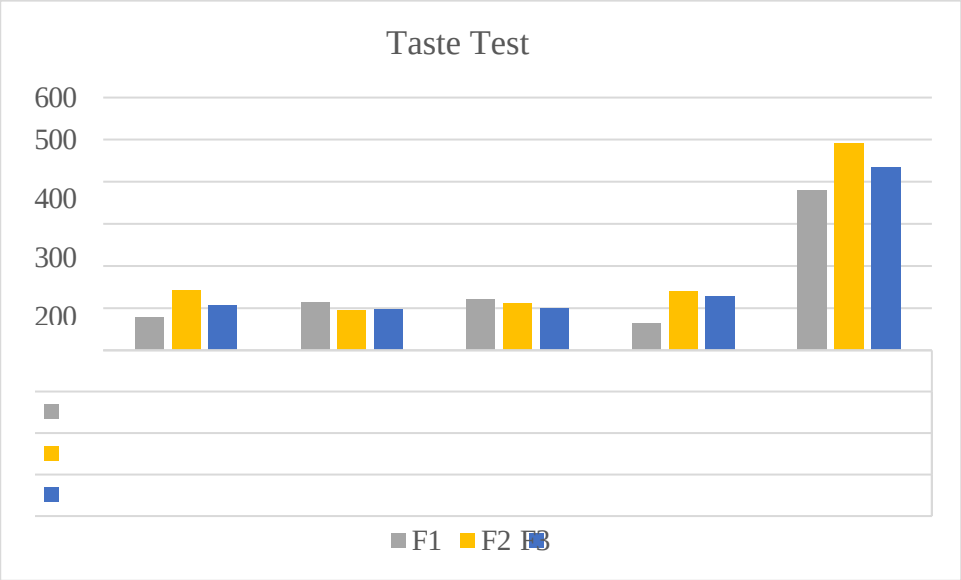

Figure 5. Taste Image Test Results

In Figure 5. The number of preference levels in each treatment was based on the color, aroma, taste, and texture of yellow sweet potato flour and catfish meal biscuits—figure 5. The highest results were obtained in formulation two treatment with a total of 492.5, meaning that the panelists preferred it most.

Nutrient analysis

Nutrient analysis was carried out using two experiments *(Duplo).* This method is carried out so that if there is doubt or reduced errors, the results are more accurate; the process compares the first and second data. The sample analyzed in formulation 2 was the most liked by the panelists. The results of the analysis of nutrients of biscuits, yellow sweet potato flour, and tempeh flour can be seen in Table 2 below.

Table 2. Results of Nutritional Content of Complementary Biscuits according to SNI

Nutrient Content	Results of Analysis	SNI Biscuits
F2 Complementary Feeding Biscuits	For	Complementary Feeding
Protein	9,09 g	Min. 6 g
Fat	28.2 g	Max.18 g
Carbohydrates	47.35 g	Max. 30 g
Calcium	833 mg	Min. 200 mg

Table 2 showed complementary feeding biscuits with yellow sweet potato flour and catfish meal yielding 9.09 grams of protein, 28.2 grams of fat, 47.35 grams of carbohydrates, and 833 grams of calcium. From the above laboratory results, only protein and calcium meet the Indonesian National Standard (01-7111.2- 2005). The yield of fat and carbohydrates exceeds the maximum standard of

complementary feeding biscuits. Although the results exceeded SNI, complementary feeding biscuits with yellow sweet potato flour and catfish meal could meet the intake of complementary feeding toddlers according to the Recommended Dietary Allowance (RDA) of toddlers per day in the age group of 7-11 months, with a need for fat of 36 grams/day and carbohydrates of 82 grams/day.

DISCUSSION

Organoleptic Test

The organoleptic test is a test to determine a person's acceptability of a product with different formulations in terms of color, aroma, taste, and texture. The organoleptic test was carried out on May 21, 2024, at the Food Technology Laboratory of the Department of Nutrition of the Ministry of Health of Pontianak. The panelists used were 25 instead trained panelists consisting of students majoring in nutrition at the Pontianak Ministry of Health Polytechnic at levels 1 and 2 who had taken organoleptic test courses, with the criteria of not having allergies, not being sick or in physiological conditions or being forced.

Color

Color is the leading indicator in visual assessment and can give the first impression before the evaluation is carried out on a product. The color factor that attracts the most attention of consumers. Attractive and natural-looking colors will indicate whether the food will be liked (Lumentut, 2018).

The results of the color organoleptic test on yellow sweet potato flour and catfish meal biscuits showed that the concentration of yellow sweet potato flour and catfish meal was 80%: 20% in the formulation two treatment of 56%, which the panelists preferred because it had a golden brown color compared to others. The difference in color in each formulation is due to the presence of the yellow sweet potato flour, which influences the ingredients used. Based on the results of *the Friedman test*, it was concluded that color influenced biscuits, yellow sweet potato flour, and catfish meal.

The yellow sweet potato flour that produces color in the biscuits makes the color browner. This is because the formulation used is yellow sweet potato flour and catfish meal 80%: 20%. The more yellow sweet potato flour is used, the more brown or dark the color will be.

According to research (Sriyanti et al., 2023), the browning color of these biscuits is also influenced by the miller reaction *(browning reaction)* during baking. This reaction occurs due to the interaction between amino acids in fishmeal and simple sugars (powdered sugars) at high temperatures. The result of this reaction is a distinctive brown color at the end of the product.

This research is in line with the research of Imandira and Fitriyono (2013). The distribution of catfish meal and yellow sweet potato flour influences the biscuits' color. The catfish color is light brown, while the yellow sweet potato flour is pale yellow. The higher the catfish substitution, the browner the biscuits will be.

Aroma

Aroma determines the deliciousness of a food product, and the assessment of smell uses the function of the sense of smell. The results of the aroma organoleptic test on yellow sweet potato flour biscuits and catfish meal showed that the concentration of yellow sweet potato flour and catfish meal was 80%: 20% in formulation two treatment of 36%. The difference in aroma in each formulation is due to the difference in the ingredients used, namely the yellow sweet potato flour. Based on the results of *the Friedman test*, it was concluded that aroma affected yellow sweet potato flour biscuits and catfish meal.

The presence of a catfish meal produces a fishy aroma in biscuits. This is because the formulation used is yellow sweet potato flour and catfish meal 95%: 5%. This study showed an influence on the level of liking for the aroma of biscuits because there was an influence on the composition of the fishmeal used. This is in line with the research of Kahar, Sri Milanti et al. (2022), which stated that the influence of the more fishmeal used, the sharper the aroma produced, causing the respondents to decrease. This is because the aroma in food that appears in the processing process is caused by *volatile compounds* that evaporate during the roasting process, as well as proteins that have been broken down into amino acids, especially glutamic acid; this causes the aroma in fish.

Texture

The texture generally uses the sense of taste that can be felt through the skin and the sensation of pressure observed by the mouth (chewed or swallowed). The texture found in the resulting food products, such as crispy and soft, is the most important in every food product (Lumentut, 2018). The texture of the biscuits is usually crispy and dry.

The results of the texture organoleptic test on yellow sweet potato flour and catfish meal biscuits showed that the concentration of yellow sweet potato flour and catfish meal was 80%: 20% in the formulation two treatment of 56%, which the panelists preferred because it had a crispier texture than others. The difference in texture in each formulation is due to the influence of the ingredients used, namely the yellow sweet potato flour. Based on the results of *the Friedman test*, it was concluded that texture did not affect biscuits, yellow sweet potato flour, and catfish meal.

This is in line with the research of Imandira & Fitriyono (2013), which stated that the addition of yellow sweet potato flour makes the texture of the biscuits crispier. However, it mostly also makes the texture harder. This different texture is produced because yellow sweet potato flour has gelatinization properties that can affect the texture created. It can be seen from the texture preferred by the respondents that it is F2 because it produces a crispy texture due to the use of sweet potato flour, which is not too little, at 80% compared to F1 at 95% and F2 at 65%.

Taste

Taste is generally done with a sense of taste in the form of the tongue to determine the quality of food products suitable for consumption. If the appearance of the food product is served, it stimulates the nerves through the sense of sight to arouse the appetite to taste a food product. In the next stage, the taste of food will be determined by stimuli to the sense of smell and taste (Lumentut, 2018).

The results of the taste organoleptic test on yellow sweet potato flour and catfish meal biscuits showed that the concentration of yellow sweet potato flour and catfish meal was 80%: 20% in formulation two treatment of 52%, which the panelists preferred because it had a sweet and savory taste, and the taste of fish and sweet potato was not too strong. Based on the results of *the Friedman test*, it was concluded that there was no effect of taste on yellow sweet potato flour biscuits and catfish meal.

Acceptability

The acceptability results included color, aroma, taste, and texture for each treatment calculated on the *Friedman* test. The panelists obtained the most preferred treatment with the highest score at F2 of 492.5. This is related to the formulation in F2 of yellow sweet potato flour and catfish meal using a ratio of 80%: 20% where the formulation has a color that is not too intense, the aroma of the catfish is also not too fishy, the taste is also sweet, and the texture is crispy and not too hard.

Nutrient Analysis

Protein

The protein content obtained from biscuits, yellow sweet potato flour, and catfish meal results from an F2 protein content of 9.09 grams. The Kjeldhal method is used in this protein content test. Based on the results, the protein content meets the standard (SNI 01-7111.2-2005) of at least 6 grams. The protein content in biscuits will increase along with the amount of fishmeal in the formulation.

The fishmeal used to manufacture biscuits, the higher the protein content produced. This study is in line with the research of Imandira & Fitriyono (2013), which stated that the substitution of yellow sweet potato flour and catfish meal had a real effect on the protein content of biscuits.

Fat

Based on the results of the fat test obtained from biscuits, yellow sweet potato flour, and catfish meal, it is known that the F2 fat content is 28.2 grams. The method used in this fat content test is using *the Soxhlet* method. Based on the results, the fat content exceeds the standard (SNI 01-7111.2-2005), which is a maximum of 18 grams. This is because the heating process in the manufacture of catfish meal (steaming and drying using an oven) is in line with research conducted

by Salman et al. (2019), stating that the more significant the proportion of catfish meal, the higher the fat content.

In this study, consuming one serving of biscuits, yellow sweet potato flour, and catfish meal as much as 30 grams as a side food. The fat requirement can be met by 0.94 grams. According to RDA, children aged 7-11 months need 36 grams daily. If using standard RDA, it can meet 2.6% of its fat needs.

Carbohydrates

Based on the results of the carbohydrate test obtained from biscuits, yellow sweet potato flour, and catfish meal, it was known that the F2 carbohydrate content was 47.5 grams. The method used in this carbohydrate content test uses a different process. Based on the results, the carbohydrate content exceeded the standard (SNI 01-7111.2-2005), a maximum of 30 grams. This is because carbohydrates can also be affected by yellow sweet potato flour. After all, yellow sweet potato flour contains 85.26%/100 grams (Milanti Kahar et al., 2022). The difference with other biscuits is that in complementary feeding biscuits, yellow sweet potato flour and catfish meal use yellow sweet potato flour instead of other biscuits that only use wheat flour. This research is in line with the research of Gigiringi et al. (2022), which showed an increase in carbohydrate levels in biscuits because of the higher formulation of yellow sweet potato flour used.

In this study, consuming one serving of biscuits, yellow sweet potato flour, and catfish meal as much as 30 grams as a side food. The carbohydrate requirement can be met by 1.58 grams. According to RDA, children aged 7-11 months need 82 grams daily. If using standard RDA, it can meet 1.92% of its carbohydrate needs.

Calcium

Based on the results of the calcium test obtained from biscuits, yellow sweet potato flour, and catfish meal, it is known that the F2 calcium content is 8.39%. The complexity method is used in this calcium content test. Based on the results, the calcium content meets the standard (SNI 01-7111.2-2005), a minimum of 200 milligrams, 4 times higher than SNI. This is because other additives contribute to the value of relatively high calcium in catfish. The difference between other biscuits, yellow sweet potato flour biscuits, and catfish meal is that they are high in calcium.

Up to abu

The ash content in yellow sweet potato flour biscuits and catfish meal is 3.06 grams. Based on the data results, it can be said that the ash content in complementary feeding biscuits has met the standard (SNI 01-7111.2-2005) with a minimum ash content in complementary feeding biscuits, which is 3.5 grams. The ash content is related to the mineral content contained in a material; the higher the ash content, the higher the mineral content. The ash content serves to find out that the higher the ash content, the worse the quality of the foodstuffs. Meanwhile, this complementary

feeding biscuit product has met the SNI standard 01-7111.2-2005) which means that this product is suitable for consumption.

Water Level

The moisture content is helpful because it affects the ingredients' appearance, texture, and taste. The result of the moisture content in yellow sweet potato flour biscuits and catfish meal is 5.91 grams where the result exceeds the SNI (SNI 01-7111.2-2005) by a maximum of 5 grams; this shows that the yellow sweet potato flour biscuits and catfish meal have texture damage due to the high moisture content which makes the product tend to be softer. In addition, excess moisture content can cause the product to become heavier and cause a decrease in quality in terms of texture, appearance, and taste.

Fiber Content

Fiber is essential for the digestive process because it helps slow stomach emptying and shortens food transit time to the intestines. The fiber yield in these biscuits is 6.4 grams, more than SNI (SNI 01-7111.2-2005), with a maximum of 5 grams. Fiber content that exceeds this standard can cause a harder/coarser texture in biscuits, making it difficult to chew; excess fiber can change the taste of biscuits, making the taste more bitter. Fiber exceeding this makes these biscuits challenging to consume because they are too dense and difficult to dissolve in the baby's mouth.

CONCLUSION

Based on the study's results, it can be concluded that biscuits affect the formulation of yellow sweet potato flour and catfish meal in terms of color, aroma, and texture, while they do not affect taste.

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