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RESEARCH ARTICLE

ANALYSIS OF NUTRIENT CONTENT OF COMPLEMENTARY FOOD OF *BELEYAM* (A MIXTURE OF RICE, CATFISH AND SPINACH) CEREAL

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ABSTRACT

Family can provide complimentary food (CF) by using local ingredients with the nutritional standards set by the government which are a minimum of energy of 400 Kcal, protein of 15-22 grams, and 10-15% of fat. The utilization of local food such as rice, catfish and spinach as the main ingredients can increase the nutrient content of children under five. This study aimed to analyse the nutrient content of the CF of *beleyam* (a mixture of rice, catfish and chicken) and its chemical properties. The method used in this study was experimental method with proximate analysis test of protein, fat, calories, crude fibre, ash and water. The result of the CF of *beleyam* cereal study showed a fat level of 10.53%, protein of 18.75%, calorie of 400.92, water limit of 3.48, fibre of 1.52, and ash of 1.94. The CF of *beleyam* cereal has a fairly good nutritional content in fulfilling the nutrition needs of under-five children.

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INTRODUCTION

Nutrition plays an important role in the stages of the human life cycle. Children under two years (> 6-24 months) are quite susceptible to malnutrition because they are in the time of experiencing a rapid growth and development, so that malnutrition at this age will result in permanent growth and developmental disorders (Soekirman, 2000). In the study of UNICEF for Indonesia, there are various factors that cause high malnutrition rates, especially for under-twos who experience stunting. One major factor is inadequate knowledge of nutrition and improper nutrition practices. In particular, the problem in the mentioned factor is the low provision of exclusive breastfeeding and complementary feeding properly (Unicef, 2012). Based on the World Health Organization (WHO) Report, Indonesia is the third country with the highest prevalence of nutritional problems in the Southeast Asia region, specifically of stunting, with an average prevalence of 36.4% from 2005 to 2017 (Kemenkes, 2018). Complementary food (CF) is one of the nutrition-specific interventions in preventing the occurrence of stunting in the first 1,000 days of life. CF is given and introduced when children are at the age of 6 to 24 months. Besides to introduce new types of food to

children, CF can also fulfil their nutritional needs which can no longer be fulfilled by only breast milk. CF can also strengthen their immune system for certain food and drink (Kemenkes, 2018). The CF given to children must contain adequate amount of carbohydrates, proteins, fats, vitamins, minerals and other nutrients. The CF given should be also from local food sources, because it is cheap and easy to obtain by families (Mustika, 2012). The provision of CF can be done by families by using local ingredients with the nutritional standards set by the government which are a minimum of energy of 400 Kcal, protein of 15-22 grams, and 10-15% of fat (Kemenkes, 2007). Some of the local food ingredients that can be used as CF and are nutrient-rich are rice, catfish and local spinach. Catfish which has the Latin name of *Clarias Sp.* is a food that has high protein that is even better than of other animals (Kusharto, 2011). Rice is a local food that produces high energy that is 364 calories/gram, making it very suitable to be used as CF. While spinach is a type of vegetable that is rich in vitamins, minerals and fibre, with nutrient content per 100 grams of beta-carotene, 4.1 mg, vitamin B complex, 0.9 mg, and vitamin C, 52 mg (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/167942/Nutrient_analysis_of_fruit_and_vegetables). Based on this information, the researchers were interested to conduct

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research on the production of CF of *beleyam* (a mixture of rice, catfish and spinach) cereal by measuring its nutrient content.

METHODOLOGY

This study was an experimental study with proximate test analysis (protein, fat, calories, crude fibre, ash and water). The *beleyam* cereal consisted of three main ingredients which were rice, catfish and spinach with a mixture ratio of 1: 2: 2. This study was conducted in two stages, which were:

- The first stage was making *beleyam* cereal. This was done by dry blending rice, catfish and spinach. After all of the ingredients turned to porridge, it was dried and sieved with 60 mesh sieve. The drying process was done by using a cabinet dryer at temperatures of > 50°C for more than 12 hours.
- The second stage was determining the composition of the nutrient content of *beleyam* cereal by using Kjeldhal method. The determination of fat level was undertaken by using extraction method and the determination of carbohydrate level by using hydrolysis method. To determine the energy level, the calculation method was used while the water level was determined by oven method. The last was determining the ash level by using spectrophotometry method.

RESULTS AND DISCUSSION

Results

The characteristics of *beleyam* cereal: For its characteristics, the CF of *beleyam* cereal had greenish-yellow colour because this food was the combination of catfish and brown rice with their clear brown colour and with the spinach's green colour. With its soft (melted) texture after being brewed, it was suitable for baby's digestion. The other characteristic of this *beleyam* cereal was its savoury and natural sweet taste which arose from the combination of the mentioned ingredients. The characteristics of *beleyam* cereals is presented in the following table:

Table 1. The characteristics of *beleyam* cereal

No	Characteristic	Description of the Characteristics
1	Colour	Greenish- yellow
2	Texture	Soft (melted)
3	Taste	Savoury and sweet

Table 2. The nutrient content of the CF of *beleyam* cereal

Variant	Nutrient Content					
	Water (%)	Ash (%)	Fat (%)	Protein (%)	Fibre (%)	Calorie (kal/g)
<i>Beleyam</i> cereal	3.84 +0.15	1.94 +0.02	10.53 +0.05	18.75 +0.82	1.52 +0.22	400.92+4 8.98

The nutrient content of the CF of *beleyam* cereal: The proximate analysis test results showed that the nutritional content of the CF of *beleyam* cereals was quite balanced. This food contained fat of 10.53% and it fits the required fat range of 10-15 grams per 100 grams CF. The protein level of this CF was 18.75% and it was in accordance with the requirements of 15-22 grams per 100 grams CF. The calorie level of *beleyam* cereal was 400.92 Kcal and in accordance with the standard requirements which was 400-440 Kcal. 9 Furthermore, the chemical properties of CF of *beleyam* cereal were considerably good, which specifically consisted of water level that met the requirements of 4 grams per 100 grams CF, 1.52 grams of fibre

that met the requirement of less than 5 grams per 100 grams CF, and ash level of 1.94 grams which met the requirement of ash content standard that is less than 3.5 grams per 100 grams CF.10 The results of the analysis of the nutrient content and the chemical properties are presented in table 2 below:

DISCUSSION

Chemical properties

Water level: The water contained in the CF of *beleyam* cereals was 3.84 grams. With the specifications of instant CF powder by SNI 01-7111.1-2005 that set water level in 100 grams MP-ASI of less than 4 grams, the water level in this cereal met this requirement. The water level in a food product that is in this range will result in a longer shelf life because the food cannot be easily broken down by microorganisms (Badan Standarisasi Nasional, 2005).

Ash level: According to the analysis, the ash level in the CF of *beleyam* cereal was 1.94%. This level content already met the requirement of SNI 01-7111.1-2005. Therefore, giving *beleyam* cereal for two years old babies will not give harmful effect for their health (Badan Standarisasi Nasional, 2005).

Fibre level: The level of fibre content in the CF of *beleyam* cereal in this study was 1.52%. This level met the requirement of the standard level of fibre content of no more than 5 grams per 100 gram CF.

Nutrient content of the CF of *beleyam* cereal

Fat content: The level of fat content of this *beleyam* cereal was 10.53%, which met the standard level of fat content of CF of 10-15 grams. Thus, the *beleyam* cereal serves a dose of fat that is suitable for the growth of under-fives (Kemenkes, 2007).

Protein content: The level of protein contained in the *beleyam* cereal was 18.75 %. With the standard level of protein content of CF of 15-22 gram in 100 gram⁹, the *beleyam* cereal has met this requirement.

Calorie content: The *beleyam* cereal produced 400.92 Kcal of energy. With a standard level calorie content of CF of 400-440 Kcal, it can be concluded that this CF is good enough for under-fives because it serves a balanced energy for metabolism, growth, development, and body temperature of the children.

Conclusion and Suggestion

Conclusion

The CF of *beleyam* cereal has quite good nutrient content in meeting the recommended nutrient adequacy ratio, so that it is very appropriate to be a mandatory menu in meeting the nutritional intake of under-fives. Besides, the chemical properties contained in the *beleyam* cereal is quite safe to be consumed by the children.

Suggestion: Further research can include the analysis of other nutrient content, such as vitamins and minerals, of the CF of

beleyam cereal. An organoleptic test can be also conducted to analyse the acceptability of under-fives against this kind of CF.

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