ANALYSIS OF CONTENTS OF MACRO AND MICRO NUTRITION IN THE COUPLES OF GUDE NUT FLOUR (CAJANUS CAJAN) AND MOCAF FLOURS (MODIFIED CASSAVA FLOUR)

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ABSTRACT

Protein energy deficiency (KEP) is one of the nutritional problems in Indonesia. Ready to Use Separation Food (RUSF) is one of the nutritional interventions by providing food alternatives that are being promoted to overcome nutritional deficiency problems (Devis 2014). RUSF is a ready-to-eat food that is made as an energy-dense and nutrient-rich food. Cookies are one form of RUSF that is loved by all ages, especially toddlers. According to Indonesian National Standard (SNI) 2973-2011, cookies are dry bakery products made by baking dough made from wheat flour with or without substitution, oil or fat, with or without the addition of other food ingredients with additional food allowed. To determine the analysis of the content of macro and micro nutrients in cookies formulations of gude peanut flour (cajanus cajan) and mocaf flour. This research is an experimental study, which is making cookies, peanut flour, gude and mocaf formulations and assessing macro and micro nutrient content. Research on the analysis of macro nutrient content in cookies, namely protein as much as 4.672 grams, fat as much as 30.20 grams and carbohydrates as much 13.72 grams. The content of micronutrients in cookies is calcium as much as 0.035 grams and iron as much as 0.0023 grams. The protein content in cookies is considered sufficient, high fat, carbohydrates, calcium and iron are still lacking.

Keywords: Macro and micro nutrition, gude and mocaf bean flour

INTRODUCTION

Protein energy deficiency (KEP) is one of the nutritional problems in Indonesia. KEP has a variety of conditions caused by a lack of energy or protein in mild to severe degrees. At severe KEP degrees it is called marasmus which is caused due to deficiency of energy and nutrients, while kwashiorkhor is caused due to protein deficiency, which means a lack of consumption of foods containing calories or protein (Adriani et al.2012).

The occurrence of lack of energy and protein of toddlers will have an impact later when adults. Results of the 2013 Riskesdas Nationally, the lean prevalence of toddlers is 12.1 percent and the prevalence of underweight is 19.6 percent (Riskesdas, 2013). From the 2016 Nutritional Status Monitoring (PSG) data based on South Sulawesi province, the prevalence of malnutrition among children under the age of 0-23 months is 4.4 percent, the prevalence of underweight children under five ages 0-23 months is 16.5 percent. The very thin prevalence in children under five 0-23 months of age is 2.7 percent, and the thinner prevalence in children under the age of 0-23 months is 8.3 percent. The data shows that the handling of malnutrition cases in Indonesia is still not optimal (PSG, 2016).

Ready to Use Separation Food (RUSF) is a nutritional intervention method with the provision of food alternatives that are currently being promoted to address nutritional deficiency problems (Devis 2014). RUSF is a ready-to-eat food that is made as an energy-dense and nutrient-rich food. Biscuits are one form of RUSF that is loved by all ages, especially toddlers. According to Indonesian National Standard (SNI) 2973-2011, biscuits are dry bakery products made by baking dough made from wheat flour with or without substitution, oil or fat, with or without the addition of other foods with additional food that is permitted.

Efforts are being made to overcome the nutritional problems of KEP which occur by using local food ingredients, namely gude beans (cajanus cajan) and mocaf flour. Gude beans (cajanus cajan) is one of the most drought-tolerant legumes and produces pods in the dry season. Gude beans has a combination of advantages such as an optimal nutritional profile, rich in starch, protein, calcium,
manganese, crude fiber, fat, and minerals. In addition, gude beans are also used as traditional medicine in various countries (Valenzuela and Smith 2002 in Sharma et al. 2011). The advantages of gude beans (cajanus cajan) compared to other types of beans are that they have a fairly high nutrient content of 65% carbohydrates, 22% protein, 15% fat (Fachruddin 2007).

Modified Cassava Fluor (MOCAF) is a flour product from cassava which is processed using the principle of modifying cassava cells by fermentation. Microbes that grow cause changes in the characteristics of flour produced in the form of increased viscosity, gelation ability, rehydration power, and ease of dissolution (Amanu & Susanto 2014).

On the other hand cassava is an abundant commodity of carbohydrate sources. MOCAF flour has similar characteristics to wheat flour so it can be used as a substitute or mixture of flour from 30-100% and can reduce the cost of consumption of wheat flour 30-100% (Regional Research and Development Agency of East Kalimantan, 2012).

The use of gude peanut flour (cajanus cajan) and MOCAF flour in making biscuits is expected to reduce or prevent one of the nutritional problems namely KEP which is currently occurring. Therefore, it is necessary to do an analysis of macro nutrient content and micro in cookies formulated with gude peanut flour (cajanus cajan) and mocaf flour.

METHODS

This research is an experimental research that is making cookies formulated with peanut flour, gude and mocaf, and assessing macro and micro nutrient content. The research design used was post test group design. The place of research was conducted at the Food Technology Laboratory of the Nutrition Department of the Makassar Health Polytechnic. The study was conducted in March-October 2018.

The process of making gude bean flour begins with sorting the gude beans that are good or not perforated, soaking is done for 24 hours, drying using the oven for 8 hours with a temperature of 55-60 °C, crushing using a dry blender, sifting size 80 mash.

In making biscuits there are 3 types of biscuit formulas namely (20%). The process of making cookies begins by shaking the egg using a mixer until it turns white (expanding) at high speed after that add the butter and margarine that has been melted first. Add the mixture of MOCAF flour, gude bean flour (cajanus cajan) and baking powder into the mixture, stirring the cake spatula until smooth. The dough is ready to be printed and baked with a temperature of 50-60 °C for ± 60 minutes.

Data collection of macro nutrient content was obtained from the results of the Luff Schroll, Shoxlet, and Micro kjedhall test. Data collection of micronutrient content was obtained from the results of the Spectrometry test.

RESULTS
a. Gude Peanut Flour

Making gude bean flour begins with the process of soaking, steaming, drying and the final stages of refining and sifting. Treat the gude beans by using an 80 mesh size sieve. The processed gude beans are as follows:

<table>
<thead>
<tr>
<th>Material</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gude Nuts</td>
<td>6.09</td>
</tr>
<tr>
<td>Gude Peanut Flour</td>
<td>5.04</td>
</tr>
</tbody>
</table>

The weight of the flour produced is 5.04 kg of the net weight of the gude beans as much as 6.09 kg. Material shrinkage
b. Macro and Micronutrient Substances in Cookies

Analysis carried out in the laboratory to test the macro and micro nutrient content obtained as follows:

Table 2. Macro and Micro Nutrient Substances in Cookies

<table>
<thead>
<tr>
<th>Type of Analysis</th>
<th>Analysis Results (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>4.672</td>
</tr>
<tr>
<td>Fat</td>
<td>30.20</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>13.72</td>
</tr>
<tr>
<td>Iron</td>
<td>0.0023</td>
</tr>
<tr>
<td>C</td>
<td>0.035</td>
</tr>
</tbody>
</table>

Source: Primary Data, 2018

DISCUSSION

a. Gude Peanut Flour

Making gude peanut flour is made from clean gude beans at 6.08 kg and processed into flour to 5.04 kg in weight. Making the gude beans starts with washing the gude beans cleanly. After cleaning, the gude beans are soaked for 24 hours to soften the texture of the gude beans. During 24-hour immersion, every 6 hours the immersion water is replaced to remove the remaining of smell.

After the gude beans go through the soaking process for 24 hours, then the gude beans are then steamed for about 2 hours. After steaming the ingredients of the gude beans are then roasted in an oven where the temperature is controlled. The roasting time is approximately 18 hours and the oven temperature is 60 degrees Celsius. The dried gude beans are then mashed using a blender and sieved with an 80 mesh sieve.

The ready-to-use gude bean flour is mixed in the cookie dough along with the mocaf flour.

b. Macro and Micro Nutrition Content

1. Protein

The average number of nutritional needs recommended for school children 7-12 years is protein at 45 - 50 grams per person per day. The 2011 PMT-AS program, additional food can at least provide 10% of the total protein requirements according to the age of school children. The nutritional content of each additional food contains at least 4.5 - 5 grams of protein (Hardinsyah and Tambunan, 2004).

The results showed that the protein content of the cookies in the formulation of gude peanut flour and mocaf flour every 100 grams contained 4.672 g of protein. The protein content of cookies in the formulation of gude peanut flour and mocaf flour is in accordance with the standards prescribed by the PMT-AS program as a supplementary food. Indonesian National Standard (SNI) cookies 01 - 2973 - 1992 minimum protein content of 9%. While the cookies formulation of gude peanut flour and mocaf flour contain only around 4.672%. If referring to SNI cookies, the cookies for the formulation of gude peanut flour and mocaf flour still need to be added to the protein so that it can reach the SNI standard of cookies.

2. Fat

The fat content of the cookies in the formulation of gude peanut flour and mocaf flour is 30.20%. When compared with the standard SNI 01-292973 1992 the fat content of cookies is at least 9.5%. The fat content of cookies in the formulation of gude peanut flour and mocaf flour compared to SNI cookies is quite a lot. The highest fat source in cookies is the formulation of gude peanut flour and mocaf flour derived from margarine and butter cream which is included in the cookie dough.
3. Carbohydrate

The carbohydrate content according to SNI in cookies is 70 g. While the carbohydrate content in the cookies formulated with gude peanut flour and mocaf flour every 100 g is 13.72 g. The carbohydrate cookies content of gude bean flour formulation and mocaf flour are still low when compared to the SNI standard cookies.

4. Calcium

Calcium is a mineral that has an important role especially for the growth of bone and tooth formation. The calcium adequacy rate for children aged 1-3 years is 650 mg per day and for adolescents aged 10-18 years is 1200 mg per day. Adequacy of calcium intake and balance in the body are needed to support health. Calcium is not only needed for children and adolescents who are in their infancy but also for adults and the elderly both women and men.

Calcium content in cookies formulation of gude peanut flour and mocaf flour every 100 g is around 0.00175 g. Although there is calcium in the cookies, the formulation of gude peanut flour and mocaf flour, but the content is still low. This is because the percentage of gude and mocaf bean flour is only around 20%.

5. Iron

Iron is a mineral that is present in very small amounts in the body but has an important role for health. The highest iron requirement in healthy individuals is in women aged 13 - 49 years, namely 26 mg per day. Iron is needed by the body, especially for the formation of red blood cells.

Iron deficiency can result in decreased work productivity because red blood cells are unable to carry enough oxygen from the lungs to all body tissues causing fatigue, decreased concentration, headaches, and pallor.

The iron content in cookies formulations of gude peanut flour and mocaf flour every 100 grams is 0.0023 g. Although there is an iron content in cookies, the formulation of gude peanut flour and mocaf flour, but the content is still low. This is because the percentage of gude and mocaf bean flour is only around 20%.

CONCLUSION

1. The content of macro nutrients in cookies formulation of gude peanut flour and mocaf flour per 100 grams are 4.672 grams of protein, 30.20 grams of fat and 13.72 grams of carbohydrates.

2. The content of micronutrients in cookies formulation of gude peanut flour and mocaf flour per 100 grams is calcium as much as 0.035 grams and iron as much as 0.0023 grams.

REFERENCES


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