International Journal of Innovation, Creativity and Change. www.ijicc.net
Special Edition: Safe Communities, 2020

# Use of Local Food Ingredients MOCAF (Modified Cassava Flour) and Rebon (Planktonic Shrimp) in Cookies as an Alternative Supplementary Food for Children

**Ayu Unayah[a], Wiwit Estuti[b], Uun Kunaepah[c],** [a,b,c]Nutritional Studies Program, Poltekkes Kemenkes Tasikmalaya, Jawa Barat, Indonesia, Email: [b]estutiwesti68@gmail.com, [b]wiwit.estuti@dosen.poltekkestasikmalaya.ac.id

Toddlerhood is the most important period in the development of human children. This is due to this period being a period of very rapid growth and development. Besides, the age group of toddlers is a group that is prone to nutrition, because at this time if malnourished children will cause growth and development disorders which if not addressed early can continue into adulthood. On the other hand, the potential of local materials such as MOCAF and *rebon* pretty much produced that need to be utilized. Flour Cookies Rebon MOCAF and formulations are expected to become an alternative supplementary food for children under five. This study is a quasi-experimental study with treatment formulations MOCAF flour and Rebon 90:10, 80:20, and 70:30. Organoleptic properties assessed using the hedonic test form and processed using the *Kruskal-Wallis* test if there is continued with the influence of the *Mann-Whitney* test. Kamba density and nutrient levels are the best cookies product obtained through laboratory testing and processed using descriptive methods. The results showed that there is an influence on the formulation cookies in terms of color, aroma, and flavor ($\rho = 0.00$), whereas no effect on the texture ($\rho = 0.738$). A product based on the best cookies on the organoleptic properties of the panelists is flour formulation MOCAF and Rebon 90%: 10%. Best Cookies product density Kamba density of 0.77 g / ml. Results of the proximate analysis of the product that best cookies with a protein content of 9.09 / bk, fat content 22.72% / bk, and carbohydrate content of 55.14% / bk. *Rebon* and powder formulations MOCAF affect the color, aroma, and taste of cookies but does not change the texture of the cake. The best product is the formulation of flour cookies MOCAF and Rebon 90%: 10%, 20% protein. The best product is the formulation of flour cookies MOCAF and Rebon 90%: 10%, 20% protein *Rebon* and powder formulations MOCAF affect the color, aroma, and taste of cookies but does not affect the texture of the cake. The best

product is the formulation of flour cookies MOCAF and *Rebon* 90%: 10%, 20% protein.

**Key words:** *MOCAF flour, Rebon, Cookies, Food Supplements Toddler.*

## Introduction

Toddlerhood is the most important period in the development of human children. This is due to this period being a period of very rapid growth and development. Besides, the age group of toddlers is a group that is prone to nutrition, because at this time if malnourished children will cause growth and development disorders which if not addressed early can continue into adulthood.

Growth and optimal childhood development are strongly influenced by the nutrient intake of food consumed. Foods low in energy and protein is one of the causes of malnutrition in children under five (Hadi, 2005).

Protein Energy Malnutrition (PEM) is one of the leading nutritional problems in Indonesia. According to the outcomes of Health Research (Riskesdas) in 2010, the prevalence of malnutrition among children under the composition of approximately 13% of children suffering from undernourishment and malnutrition of 4.9%, 76.2% and 5.8% nutrition proper nutrition. Many children under five are currently around 12% (about 28.5 million) of the total population of 237.6 million.

Nationally, the prevalence of less severe in 2010 was 17.9%, consisting of 4.9% and 13.0% severe malnutrition. When compared to the national prevalence rate in 2007 (18.4%) have seen a decrease. The decrease mainly occurred in the prevalence of malnutrition, namely from 5.4% in 2007 to 4.9% in 2010, down by 0.5%, while the prevalence of malnutrition remains at 13.0% when compared to the achievement of the MDG targets by 2015, namely 15.5%, the prevalence of underweight nationally to be lowered at a minimum of 2.4% in the period 2011 to 2015 (RISKESDAS, 2010).

Feeding (PMT) toddler is one of the efforts to improve the consumption patterns in toddlers. PMT Recovery for children aged 6-59 months is intended as an addition to, not as a main meal daily. PMT-based Recovery is a local grocery with a typical regional menu tailored to local conditions (Kesehatan et al., 2011).

One of the infants preferred snack foods that can be used as an alternative to food additives are Cookies. Cookies are types of cookies that are easy to find, and preferably toddlers, as well as adults, the average consumption of pastries in Indonesia, was 0.40 kg/capita/year.

Cookies are generally produced in the form of high-energy foods and high sugar-based flour. The main ingredient in the manufacture of Cookies is flour, but wheat flour is imported products since its production in Indonesia underdeveloped. This problem can be reduced by making use of local food commodities as raw materials of high nutritional value with a relatively cheap price, can produce economically valuable new products and nutritious. One of them is using the processed cassava into flour MOCAF (Modified Cassava Flour) (Diniyah, Wahyu, & Subagio, 2019; Hariadi, 2017).

MOCAF flour (Modified Cassava Flour) is a flour made from cassava, which is fermented in advance to obtain a powder that has the physical properties (flower power) is equivalent to type II wheat flour (cake flour). MOCAF flour made from cassava also has a higher calcium content compared with the powder and more comfortable to digest (Ratnawati, Desnilasari, Kumalasari, & Surahman, 2020; Sahidin, 2018).

MOCAF flour can be used as a substitute wheat flour for food products with a different number. In the manufacture of pastries, MOCAF can replace 100% of wheat flour (Salim, 2011). However, MOCAF has the disadvantage of low protein content. Therefore, in the manufacture of alternative Cookies, supplementary food for infants required the addition of other foodstuffs that have a reasonably high protein content. Foods that have high protein content one is Rebon.

Rebon is local food that is produced in the city of Cirebon. The protein content of the Rebon Fresh (wet) is 16.2 g and calcium of 757 mg while the Dry Rebon 29.4 g of protein and calcium of 2,306 mg. The content of protein and calcium contained in Rebon illustrates that Rebon is food that has criteria as local food that are high in protein and calcium. Rebon has been treated by society as foods such as peanut brittle, and other woods (Sulistiyono, Herawati, & Arya, 2017), (Syarif, Holinesti, Faridah, & Fridayati, 2017).

Based on the description above, the research conducted to get Formulation MOCAF flour and Rebon the best at making cookies that can be used as an alternative supplementary food for stunting.

**Methods**

This study is a quasi-experimental research with the treatment formulation MOCAF flour and Rebon on Cookies on the Nature Appearance. Research conducted at the Laboratory of Food Science of Ministry of Health of Politeknik Kesehatan Kemenkes Tasikmalaya Program DIII Cirebon to the process of creation, Appearance Test and Analysis Kamba density, whereas the best formula Proximate Analysis conducted at the Laboratory of Food and Nutrition, Faculty of Agricultural Technology, Universitas Gadjah Mada.

The study design used was completely randomized design (CRD) with (three) treatments, each conducted two (2) times the repetition, so this research there are 3 x 2 = 6 experimental units.

**Table 1. Design of Experiments Research**

| repeat | Treatment | | |
|---|---|---|---|
| | F1 | F2 | F3 |
| **A** | F1A (SO) | F2a (SO) | F3a (SO) |
| **B** | F1B (SO) | F2B (SO) | F3b (SO) |

Information :
A, B: Deuteronomy
F1: Formula *cookies* 1
F2: Formula *cookies* 2
F3: Formula *cookies* 3
SO: Personality Appearance

The materials used in this study are MOCAF flour, fresh powdered Rebon, cornstarch, egg, flour sugar / powdered sugar, and lemon essence. MOCAF flour raw material obtained from one online store is located in Bandung, while the shrimp raw material purchased Rebon directly from fishers who are Samadikun-Cirebon area. Additional ingredients such as eggs, margarine, cornstarch, powdered sugar, and skim milk obtained from traditional markets Kanoman in Cirebon.

The data used are primary. Primary data were obtained from the data Personality Appearance and nutrient composition data. The collection using a hedonic test form for organoleptic properties, physical properties analysis Kamba density, and nutrient composition derived from the results of the proximate analysis.

Panelists are students of Diploma of Nutrition Cirebon were 20 people who are willing to become a panelist and have relatively the same level of preference. To the authors make the selection of panelists using panelist screening questionnaire to determine the level of A panelist on the Cookies, the author will not take prospective panelists were very liked and disliked Cookies.

Organoleptic test data were analyzed using a data processing program and tested with non-parametric statistics using *a Kruskal-Wallis* test. And if there is influence continued with *the Mann-Whitney* test while Density Test Kamba and Proximate analyzed descriptively.

**Stages Research**
**Preparation phase**
**Formulation Cookies**

In the early stages of research carried out the preparation of materials for the formula to get the composition of nutritional value calculation which qualifies as a food formula for toddlers at least 400 calories and 15 grams of protein. Formulation cookies from a variety of sources of starch and protein composition are based on the standard formula of food additives in the *Codex Alimentarius Guidelines* 1994 and the FAO / WHO, 1994, with the help of the Indonesian version Nutrisurvey program.

a. Flour manufacture Rebon
b. Preparation of Cookies
c. screening Panelists

Screening is carried out using a form of screening panelist. DIII Cirebon Nutrition Program students are given a screening form. Students selected to be a panelist are only students who like cassava, shrimp Rebon, and cookies. Researchers will take the prospective panelists who like and do not like cassava, shrimp Rebon, and cookies. In this study, the panelists used types are somewhat trained panelists as many as 20 people (Rahayu, 1998).

1. Appearance test
   On the implementation of the organoleptic test conducted by serving cookies formula 1, Formula 2, and Formula cookies three turns and gives form to the panelists for the organoleptic test is then filled with the assessment of the panelists.
2. Determining the Best Cookies Products
   Based on the results of organoleptic, researchers determined the best cookie product by looking at the number of panelists who give the most votes for each treatment or sample cookies.
3. Analysis of Chemical Properties (ash, protein, carbohydrates, fat and crude fiber) and Physical (density Kamba) Best Cookies.
4. Processing and data analysis
   Results of the organoleptic test are processed using computer software to be further analyzed with the *Kruskal-Wallis* test, while the test results and test Kamba density proximate analyzed descriptively.

**Table 2. Basic Formula Cookies Recipe**

| material | Weight (g) |
|---|---|
| Wheat flour | 250 |
| Cornstarch | 4 |
| Flour Skim Milk | 200 |
| flour Sugar | 160 |
| Butter | 200 |
| Egg | 100 |

**Table 3. Composition Formulation Cookies**

| material | F1 | | F2 | | F3 | |
|---|---|---|---|---|---|---|
| | per 1000gr | per 100g | per 1000gr | per 100g | per 1000gr | per 100g |
| flour MOCAF | 180 | 18 | 160 | 16 | 140 | 14 |
| flour Rebon | 20 | 2 | 40 | 4 | 60 | 6 |
| Cornstarch | 30 | 3 | 30 | 3 | 30 | 3 |
| Flour Skim Milk | 260 | 26 | 260 | 26 | 260 | 26 |
| sugar Flour | 160 | 16 | 160 | 16 | 160 | 16 |
| Chicken eggs | 100 | 10 | 100 | 10 | 100 | 10 |
| Margarine | 250 | 25 | 250 | 25 | 250 | 25 |
| Total | 1000 | 100 | 1000 | 100 | 1000 | 100 |

## Results and Discussion

### Formulation Cookies

*Cookies* MOCAF flour formulation (Modified Cassava Flour) and Rebon designed as highly nutritious cookies. Therefore cookies should contain at least 20% of the AKG of protein per serving. For children aged 1-3 years should contain at least 5 grams of protein and 7.8 grams per serving for children aged 4-5 years. Formulation cookies on some percentage of that formulation MOCAF flour and Rebon with a 90:10 percentage (F1), 80:20 (F2), 70:30 (F3) of the total powder used is 200 grams (Lestari & Murtini, 2017), (Riza Trihaditia, Melissa Syamsiah, Aliya Awaliyah, 2018).

The calculation of the estimated energy content of protein and cookies in each formulation was performed using the version Nutrisurvey Indonesia and obtained formulations can be seen in

Table. 4. The materials used in the manufacture of formulations MOCAF flour cookies and Rebon, is MOCAF flour, Rebon flour, sugar, skim milk, egg, cornstarch, margarine, and lemon essence.

**Table 4. Estimation of Protein Content of cookies**

| vitamin | formula | | |
|---|---|---|---|
| | F1 | F2 | F3 |
| **Protein (g / ss)** | 11.25 | 11:39 | 13.54 |

Information :
F1 : Formulation MOCAF flour: Rebon (90%: 10%)
F2 : Formulation MOCAF flour: Rebon (80%: 20%)
F3 : Formulation MOCAF flour: Rebon (70%: 30%)
* G / ss = grams / serving size (90gr)

**Appearance test**

In this study, the analysis was performed to assess hedonic A panelists will be the color, aroma, taste, and texture of product cookies. Based on Figure 4.1, it can be seen that the level of preference for color, aroma, flavor, and feel of the product decreased with increasing percentage Rebon given or higher protein content. The higher the protein content, the protein that reacts more and more, so that the color of the resulting cookies getting brown (Maillard reaction). The brown color on cookies due to non-enzymatic browning reactions during roasting (the Maillard reaction) resulting in color cookies dark. Maillard reaction is a reaction between amino groups of proteins with carbonyl groups of reducing sugar (Winarno, 2004a). Higher protein content can cause the cookies to become browner. When the proteins in the flour rebon react with reducing sugars would cause browning or a browning reaction to form compounds mellanoidin. Color chocolate cookies ever lead to a reduction of the color of the product panelist rating cookies (Muaris, 2007),

The aroma of the most preferred by the panelists is formula F1 compared to other formulas. It is thought by researchers and 75% (15) panelists for cookies formula F1 has a distinctive aroma and flavor Rebon cookies that do not taste, whereas formula Rebon F3 has a strong smell.

The most preferred flavor is formula F1 compared to F3. It is presumably because the cookies formula dominant F1 has a sweet taste and flavor of milk Rebon slight compared with the formula F3 that has a strong sense of Rebon.

Addition Rebon flour (high protein flour) produce cookies with a harder texture and a rough outer appearance. Besides, the hard surface of cookies can be affected by the absence of gluten

in the flour MOCAF levels and Rebon. MOCAF flour does not contain gluten such as wheat flour (Ali et al., 2018), (Diniyah, Subagio, Sari, Vindy, & Rofiah, 2018).

To cope with the harsh use of cookies texture of cornmeal and margarine can be added an amount in the making cookies (Sitti, Tamrin, & Baco, 2018). It is in line with (Luthfi, Lubis, & Aisyah, 2017). Margarine has a protein that is an emulsifier that the emulsifier can emulsify all the fat into the dough. Margarine can be used as a dip and helps the physical development of cookies. Based on the translation of the above can be concluded that the formula F1 is a formula most favored by all panelists at all organoleptic parameters tested. Therefore, the formula F1 is the best formula to be analyzed further.

**Best Cookies Formulation**

The best formula selected based on an assessment of the panelists through organoleptic parameters of color, aroma, flavor, and texture. Based on the test obtained, the best products, namely the formulation Cookies MOCAF flour products (Modified Cassava Flour) and Rebon 90:10 (F1) with an average of 3.80 A (approaching the like).

Based on the *Kruskal-Wallis* test results, there are significant MOCAF flour formulation (Modified Cassava Flour) and Rebon of the color, aroma, and flavor, and this is due to the difference in color, smell, and character compared to products Cookies formula F3. Cookies product formulas F1 has a brownish-yellow color, distinctive aroma of cookies, sweet taste in which aroma and taste Rebon not feel, and texture somewhat hard. Based on values obtained, organoleptic preference for color, smell, taste, and texture of each formula, as shown in Table 5.

**Table 5. Average preference for color, aroma, taste, and texture of each formula**

| formula | Color | aroma | flavor | Texture | amount | Average |
|---|---|---|---|---|---|---|
| **F1** | 4.03 | 3.90 | 3.83 | 3.46 | 15,22 | 3.80 |
| **F2** | 3.70 | 3.40 | 3.58 | 3.43 | 14,11 | 3.53 |
| **F3** | 3.48 | 3.33 | 3.13 | 3.38 | 13.32 | 3.33 |

**Analysis of Physical Properties Density Product Kamba Best Cookies**

Density Cookies Kamba's best product in this study was 0.77 g / ml. Meanwhile, density slurry product baby Kamba (MP-ASI) commercial in research(Hadiningsih, 2004), i.e., from 0.37 to 0.50 g / dl. It means that the density Kamba Best Cookies product is higher than the reference value approach Kamba breastfeeding density. According to Sulaiman, 1993, in Andriani, 1997, Kamba high density indicates energy-intensive products. Kamba product that has a low

frequency (voluminous) will result in the child satiety before its energy needs met (Sahidin, 2018),

Children who consume foods with a low-density Kamba (voluminous) in the long term, lead to the possibility of the child will be malnourished (Hazmi, 2016), According to Hadi (2005), Infants and children are at high risk of malnutrition. However, the child was born with a standard weight. Along with age, most toddlers will experience malnutrition if the nutritional needs of children under five are not met.

**Substance Composition Analysis Nutritional Products Best Cookies**

The results of the analysis of nutrients can be seen in Table 6. Proximate analysis was conducted to determine the content of macronutrients cookies. Based on proximate review known proteins, fats, carbohydrates, energy and crude fiber cookies and Rebon MOCAF flour formulation (Table 6).

**Table 6. Nutrient Content Analysis Results (Test Proximate) per 100 grams of Formula Cookies Top**

| Component | *cookies* | | |
|---|---|---|---|
| | Deuteronomy I | replay II | Average |
| **Water content (%)** | 9:13 | 9:32 | 9:22 |
| **Ash (%)** | 3:12 | 3:17 | 3:15 |
| **Fat (g)** | 22.72 | 22.71 | 22.72 |
| **Protein FK: 6.25** | 9:06 | 9:12 | 9:09 |
| **Karbohdirat (g)** | 55.29 | 55.00 | 55.14 |
| **Crude Fiber (g)** | 0.68 | 0.68 | 0.68 |
| **Energy (kcal)** | 461.92 | 460.87 | 461.40 |

**Water**

The water content of the cookies produced was 9.22%. Quality requirements cookies by SNI is the moisture content of 5% (bb). The resulting moisture content higher than the SNI requirements. So it can be said that the water levels do not meet the quality requirements of cookies by SNI. It is presumably due to the absorption of water during the process of delivery and storage of the product before analysis (Olapade & Adeyemo, 2014).

**Ash**

According to (Winarno, 2004b), Gray is the organic residue after high temperature burned material. In general, the ash consists of a compound of sodium (Na), calcium (Ca), and silicates (Si). All commercial starch derived from cereals and tubers contains organic salts which can be obtained from the material itself or the water during the treatment.

Based on the results of the analysis are known ash content ash content cookies product is 3.15%. Based on known No.01-2973-1992 SNI maximum ash content of the cookies is 2%. Higher levels of ash in the product formulation MOCAF flour cookies and Rebon compared with SNI. It is presumably because Rebon MOCAF flour and mineral content of calcium (Ca) are high. MOCAF flour made from cassava has a higher calcium content compared to wheat flour.

Fresh Rebon calcium content (wet) is 757 mg, during the Dry Rebon calcium content of 2,306 mg. The content of calcium contained in Rebon illustrates that Rebon is food that has criteria as local food that is high in calcium (Sharif et al., 2017),

**Protein**

The results of protein analysis showed the protein content of the cookies is 9.09 g / 100 g. In the early stages of formulation, cookies efforts cookies estimate protein content. Based on the estimation results, calculated cookies protein content formula F1 is 12.50 g / 100 g.

The decrease in protein levels can be caused by several factors, such as the amino acid structure changes as a result of warming. Heating can cause damage to the nutritional components, especially carbohydrate and protein content. Protein degradation can cause the formation of small peptides, amino acids, amine compounds, and ammonia volatile (Sharif et al., 2017), (Gantohe, 2012), Czuchajowska et al. (1995) in Gantohe (2012), states that when the protein binds to molecules of coarse flour and baking experience will decrease by 23-31% protein solubility.

According to the standard formula of food additives in the Codex Alimentarius Guidelines 1994 and the FAO / WHO in 1994, every 100 grams of the product contains 15-20 grams of protein. The protein content of the product cookies generated in this study was 9.09 g / 100 g. It means that the value of cookies produced protein products already meet the 60.6% minimum protein standard formula of food additives in the Codex Alimentarius Guidelines 1994 and the FAO / WHO 1994(Bell et al., 2017).

According to the quality requirements of cookies by SNI minimum protein content of the cookies is 6% (bb) or 6 g / 100 g. When compared with a minimum protein content requirement, SNI only cookies, cookies are qualified product quality standards.

**Fat**

The fat content of cookies produced is 22.72 g / 100 g. It shows the fat content in cookies has met the requirements of food additives in the Codex Alimentarius Guidelines 1994 and the FAO / WHO in 1994, that every 100 grams of a product containing 10-25g fat. Meanwhile, according to ISO, the minimum fat content of the cookies was 9.5% (bb) or 9.5 g / 100 g. When compared to the fat content requirements of the ISO, the higher fat content product requirements SNI minimum fat content, so it can be said that based on fat content, cookies produced have met the quality requirements of ISO cookies (Mauer & Reuhs, 2017), (Naclerio & Larumbe-Zabala, 2016).

**Carbohydrate**

The analysis showed that the levels of carbohydrate cookies produced are 55.14 g / 100 g. When compared with the minimum requirements, carb cookies contained in SNI 70% (dd), carb cookies MOCAF flour formulation, and Rebon lower. It is because of the reduction in levels of carbohydrate replacement MOCAF flour is the primary source of carbohydrates in the flour Rebon cookies (Müller, Despras, and Lindhorst, 2016).

**Energy**

Cookies energy calculations are based on proteins, fats, and carbohydrates, which is the sum of 4 calories (9.09 grams of protein) + 9 calories (22.72 grams of fat) + 4 calories (55.14 grams of carbohydrates). Based on the calculation result known that the energy content in every 100-gram cookies is 461.40 kcal / 100 g.

According to the Codex Alimentarius Guidelines 1994 and the FAO / WHO in 1994, the energy on the composition of supplementary food for children under five minimally contains 400 kcal / 100 grams of the food. Similarly, according to SNI, terms of the energy content of the cookies at least 400 kcal per 100 grams. Therefore, cookies formula F1 already meet the quality criteria for energy content.

**Crude fiber**

The crude fiber content of cookies produced was 0.68 g / 100 g. Based on the FAO / WHO (1994) note, the maximum oil fiber content supplementary food for children under five was 5.0

g / 100 g. Therefore, cookies formula F1 already meet the quality criteria for crude fiber content.

According to (Rieuwpassa, Santoso & Trilaksani, 2013), The general nature of the desired product toddler food is energy-dense and nutrient-dense. Early childhood food products as much as possible to meet the needs of energy and nutrition. Nutritional components needed include carbohydrates, proteins, fats, vitamins, and minerals. Early childhood food products desired coarse fiber or other materials that are difficult to digest minimum.

**Meeting the Needs Analysis Nutrition Substance Giving Toddler with Cookies**

According to the Food and Drug Monitoring Agency (2004) (Muaris, 2007), Food can be said to have a higher protein content when it meets at least 20% of the recommended RDA per serving (Dewey, 2016). When the RDA for children under five is used RDA for children ages 4-6 years, then 20% of 39 grams of protein is 7.8 grams of protein that must be met from the grain (Semba et al., 2016).

*Cookies* F1 formula based on the results of the proximate analysis and energy calculations, per 100 grams of grain donated 461.40 kcal of energy and 9.09 grams of protein. Means to meet the criteria for a high-protein, the number of cookies that should be consumed is 86 grams. In other words, to fulfill 20% RDA of protein, toddlers should eat cookies as much as 90 grams. When one chip cookies weigh about 12.5 to 12.9 grams, to meet 20% RDA, toddlers should consume seven chip cookies or 90 grams per day. Nutrient content per dose presentation presented can be seen in Table 7.

**Table 7. Nutrients and energy content per dose serving (90 grams)**

| Energy and Substance Nutrition | Total dose per dish (90 grams) |
|---|---|
| Energy (kcal) | 415.26 |
| Protein (g) | 8,18 |
| Carbohydrate (g) | 49.63 |
| Fat (g) | 20.44 |

AKG value calculation is based on the energy and protein sufficiency, which is divided into two categories, namely the age of 1-3 years and 4-6 years of age. AKG per serving calculation are presented in Table 8 Cookies formulation MOCAF flour, and Rebon has contributed significantly to the fulfillment of nutrients, especially protein and energy. With protein providing 32.72% and 20.97% of the RDA toddlers aged 4-5 years, as well as the energy contribution of 41.52% and 26.79% of the RDA toddlers aged 1-3 years, the product can be said to be nutritious cookies high (Vaivada, Gaffey, and Bhutta, 2017).

**Table 8. Figures adequacy dose of nutrients per serving (90 grams)**

| vitamin | vitamin Per dose Saji | AKG (%) | |
|---|---|---|---|
| | | Age 1-3 years | Age 4-6 years |
| protein | 8,18 | 32.72 | 20.97 |
| Energy | 415.26 | 41.52 | 26.79 |

## Conclusion

MOCAF flour formulation (Modified Cassava Flour) and Rebon affect the color, aroma, and flavor Cookies (ρ = value 0.00), but does not change the texture of the cookies. Cookies with the best formula are MOCAF flour (Modified Cassava Flour) and Rebon 90:10 (F1). Cookies Product Kamba's best density is 0.77 grams. Levels of nutrients based on the best products Cookies Cookies proximate analysis are as follows: 9.22% moisture content, an ash content of 3.15%, 22.72% fat, 9.09% protein content, the carbohydrate content of 55.14% and levels fiber 0.68%. Cookies' best formula contains 461.40 kcal of energy per 100 grams. The best method to meet the 20% RDA of protein and energy toddlers. To meet the 20% RDA of protein and power, the number of cookies that should be consumed by children under five every day is seven pieces of cookies or 90 grams of cookies. Ninety grams of cookies can give 415.26 kcal of energy; 81.8 grams protein; 20.44 grams of fat and 49.636 grams of carbohydrates. We recommend that further research needs to be done to increase consumer acceptance of Cookies texture MOCAF flour formulation (Modified Cassava Flour) and Rebon with additional variations of cornmeal and margarine. We recommend further research on the acceptability of products Cookies with MOCAF flour formulation (Modified Cassava Flour) and Rebon directly on the target group of children under five.

## REFERENCES

Ali, F., A, RL, N, RJ, Fahri, A., Rennanti, LA, Grace, JN, ... Pucungbedug, D. (2018). VILLAGE FARMER'S GROUPS combro PUCUNGBEDUG. 44-51.

Bell, KE, Snijders, T., Zulyniak, M., Kumbhare, D., Parise, G., Chabowski, A., & Phillips, SM (2017). A whey protein-based multi-ingredient nutritional supplements Stimulates gains in lean body mass and strength in healthy older men: A randomized controlled trial. PLoS ONE, 12 (7), 1-18. https://doi.org/10.1371/journal.pone.0181387

Dewey, KG (2016). Reducing stunting by improving maternal, infant and young child nutrition in regions such as South Asia: Evidence, challenges and opportunities. Maternal and Child Nutrition, 12, 27-38. https://doi.org/10.1111/mcn.12282

Diniyah, N., Subagio, A., Sari, RNL, Vindy, PG, & Rofiah, AA (2018). Effect of Fermentation Time and Cassava Varieties on Water Content and the Yield of Modified Starch from Cassava Flour (MOCAF). Indonesian Journal of Pharmaceutical Science and Technology, Vol. 5, p. 71. https://doi.org/10.24198/ijpst.v5i3.15094

Diniyah, N., Revelation, F., & Subagio, A. (2019). FLOUR CHARACTERISTICS BASED MOCAF premix (MODIFIED CASSAVA FLOUR) cornstarch IN MAKING COOKIES AND GREEN TEA. Journal of Food and Agro-Industry, Vol. 7, pp. 25-36. https://doi.org/10.21776/ub.jpa.2019.007.03.4

Gantohe, TM (2012). COOKIES FORMULATIONS BASED FUNCTIONAL FISH MEAL CORK (Channa striata) with microcapsules fortification Fe and Zn.

Hadi, A. (2005). Decision management principle of environmental samples. Jakarta: Gramedia Pustaka Utama.

Hadiningsih, N. (2004). By methodology.

Hariadi, H. (2017). Nutritional content analysis and Appearance "Cookies" Flour MOCAF (Modified Cassava Flour) and broccoli (Brassica oleracea L) With the addition of mung bean flour (Phaseolus radiatus L). Agrotek Indonesian Journal, Vol. 2. https://doi.org/10.33661/jai.v2i2.1180

Hazmi, MA and K. (2016). Physicochemical Characteristics of Soybean Sprouts Tempe flour. Physicochemical Characteristics of Soybean Sprouts Tempe flour, 11 (1), 105-112. https://doi.org/10.25182/jgp.2016.11.1.%p

Health, K., Indonesia, R., General, D., Nutrition, B., health, D. A N., And, Mom, & Nutrition, DB (2011). Technical Guidelines for Child Malnutrition Procedure. Koko, Vol. 11, p. 123.

Lestari, NOS, and Murtini, ES (2017). Formulation Cookies Flour Peanut Protein Source Based Stumps For Utilization of Commodities Local Efforts. Journal of Technology and Food Industry, Vol. 28, pp. 194-200. https://doi.org/10.6066/jtip.2017.28.2.194

Lutfi, M., Lopez, YM, and Aisha, Y. (2017). Studies with Addition Porridge Making Cookies Red Spinach (Amaranthus Gangeticus) and Margarine as a Source of Antioxidants (Study of Manufacture Cookies with Replenishment Pulp of Red Spinach (Amaranthus Gangeticus) and Margarine as Resources Antio. 2 (4), 446-453.

Mauer, L., & Reuhs, BL (2017). High-Performance Liquid Chromatography Bradley. Food Analysis, 213-226. https://doi.org/10.1007/978-3-319-45776-5

Muaris, H. (2007). Formulation biscuits with flour substitution Dumbo Catfish (Clarias gariepinus) and Soy Protein Isolate (Glycine max) as a Potential for Early Childhood Food Nutrition Less. Journal of Food Technology and Industry, 23 (1), 9-16.

Müller, C., Despras, G., & Lindhorst, TK (2016). Organizing multivalency in carbohydrate recognition. Chemical Society Reviews, 45 (11), 3275-3302. https://doi.org/10.1039/c6cs00165c

Naclerio, F., & Larumbe-Zabala, E. (2016). Effects of Whey Protein Alone or as Part of a Multi-Ingredient Formulation on Strength, Fat-Free Mass, or Lean Body Mass in Resistance-Trained Individuals: A Meta-analysis. Sports Medicine, 46 (1), 125-137. https://doi.org/10.1007/s40279-015-0403-y

Olapade, AA, & Adeyemo, MA (2014). Evaluation of cookies produced from blends of wheat, cassava and cowpea flours. International Journal of Food Studies, Vol. 3. https://doi.org/10.7455/ijfs.v3i2.213

Ratnawati, L., Desnilasari, D., Kumalasari, R., & Surahman, DN (2020). Characterization of modified cassava flour (MOCAF) -based biscuits substituted with soybean flour at varying concentrations and particle sizes. Food Research, Vol. 4, pp. 645-651. https://doi.org/10.26656/fr.2017.4(3).282

Rieuwpassa, FJ, Santoso, J., & Trilaksani, W. (2013). CHARACTERIZATION FUNCTIONAL PROPERTIES OF EGG PROTEIN kosentrat skipjack (Katsuwonus pelamis). 5 (2), 299-310.

RISKESDAS. (2010). Basic Health Research; Agency for Health Research and Development Ministry of Health Tahun2010. National Report 2010, 1-446. https://doi.org/1 December 2013

Riza Trihaditia, Melissa Syamsiah, Aliya Awaliyah, S. (2018). DETERMINATION OF OPTIMUM MAKING ADDITIONAL FORMULATIONS USING WHEAT FLOUR RSM (Response Surface Method). 8 (2), 212-230.

Sahidin, I. (2018). USE OF BEING MOCAF flour CASSAVA FOR IMPROVED REVENUE DIVERSIFICATION AND MEDIUM MICRO SMALL VILLAGE IN DISTRICT BAR DAY litter. Abdi Karya Society Journal,43), 1(العدد الحا/. https://doi.org/10.1017/CBO9781107415324.004

Salim. (2011). Cassava flour processing Being MOCAF flour. Yogyakarta: ANDI.

Semba, RD, Shardell, M., Sakr Ashour, FA, Moaddel, R., Trehan, I., Maleta, KM, ... Manary, MJ (2016). Child Stunting is Associated with Low Circulating Essential Amino Acids. EBioMedicine, 6, 246-252. https://doi.org/10.1016/j.ebiom.2016.02.030

Sitti, A., Tamrin, and Baco, AR (2018). SUBSTITUTION EFFECT AMPAS COCONUT FLOUR AND CARROT (Daucus Carota L) ON NUTRITION AND VALUE organoleptic value COOKIES. 3 (5), 1652-1662.

Sulistiyono, P., Herath, DMD, and Arya, IFD (2017). Rebon shrimp powder addition influences to nutritional values, organoleptic properties and acceptance of supplementary food by children aged 4-5 years old. Public Health, 11 (4), 168-172. https://doi.org/10.21109/kesmas.v11i4.1280

Sharif, W., Holinesti, R., Faridah, A., & Fridayati, L. (2017). Shrimp Rebon Sala Quality Analysis. Andalas Agricultural Technology Journal, 21 (1), 45. https://doi.org/10.25077/jtpa.21.1.45-51.2017

Vaivada, T., Gaffey, MF, & Bhutta, ZA (2017). Promoting early child development with interventions in health and nutrition: A systematic review. Pediatrics, 140 (2). https://doi.org/10.1542/peds.2016-4308

Winarno, FG (2004). Chemistry of Food and Nutrition Jakarta. PT Gramedia Pustaka, Www Jakarta, Kompas. Co. Id, 64.