Mocaf (Modified Cassava Flour), Cornmeal (Zea mays L.), and Jackbeen Flour (Canavalia ensiformis)-Based Analogue Rice as a Functional Food to Reduce Rice Consumption in Indonesia

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ABSTRACT

The Indonesian needed of paddy rice is very high up to 139.5 kg/capita/year, it is twice of the world rice consumption; 60 kg/year. On the other hand, public demands a product that has functional value as a health nutrition. A solution to reduce the number of rice consumption and a health improvement is mocaf, cornmeal, and jackbeen flour-based analogue rice. The content of antioxidants, protein, and low glycemic index in analogue rice is able to create a functional food product. The purpose of this research was to know the nutrient content and the best formulation which acceptable to panelists. The analysis conducted consists of the physical, chemical and sensory test. Analogue rice is made into three formulations with ratio mocaf : cornmeal : jackbeen flour = 50%:40%:10% (F1), 40:40%:20% (F2), and 30%:40%:30% (F3). Based on sensory analysis, the best formulation of analogue rice is F1. It moisture contents of 7.367%; 0,556% ash contents; 6.904% protein contents; 4.308% fat contents; 80.223% carbohydrate contents; 24.728% amylose contents; HCN contents of 4.267 ppm; and 9.043% antioxidant levels. The higher percentage of jackbeen on rice analogue formulation effected the higher content of its protein and antioxidant. However, the panellists acceptance level decreased.

Keywords: Analogue-Rice, Mocaf, Cornmeal, Jackbeen.

I. INTRODUCTION (HEADING 1)

The dependence of Indonesian people on rice is very high at 139.5 kg / capita / year, twice bigger than the world rice consumption of 60 kg / year [1]. It is noted that during the last five years Indonesia has imported rice by 1,430,273 tons/year [2]. This continuous import policy will undermine Indonesia's position within the ASEAN Economic Community. Therefore, it is needed an effort to suppress the import of food products, especially rice. On the other hand, the public awareness of the increased health demands a product that has functional value. The solution to answer this problem is analog rice.

Analog rice has similar shape like paddy rice, so it is believed that it will be more easily accepted by the community. In addition, analog rice also has better nutritional value than regular rice[3][4]. Mocaf is chosen as one of the raw materials of analog rice because the calories are close to the rice calories and the carbohydrate content is quite high (> 80% of the dry weight)[5]. To enrich the content of protein and antioxidant in the analogue rice, it is substituted by jackbeen flour. Jackbeen is one of the been type that can be used as a source of vegetable protein with 55% carbohydrate content and 24% protein. Meanwhile, the addition of corn flour in analog rice is to improve the texture, color and aroma. The corn flour used is expected to reduce the stickiness, because it contains high enough fat of 4.6% [6].

The carbohydrate and protein content in the chemical composition of jackbeen opens new opportunities to exploit the jackbeen as a raw material for protein rich flour (PRF) [7]. According to Istiani [8], in the white jackbeen, there is an active component of flavonoids of 29.3mg/100 gram of seed flour, the total phenol is of 245.5 mg / 100 gram seed flour the antioxidant activity in the whole jackbeen is 47.13%. Antioxidants in this jackbeen seed will ward off free radicals that are detrimental to health. Other functional sides of analog rice that can be used as alternative staple food by people with diabetes mellitus because the ingredients used have a low glycemic index, ie cornstarch 33 [9], jackbeen flour 40,71- 44,05 , and mocaf 46 so that the estimated glycemic index of analog rice is in the range of 33-46 (below 55, including low IG).

II. EXPERIMENTAL METHOD

A. *Materials and Equipment*

In this study, the main ingredients used are mocaf (modified cassava flour) produced by PT Bangkit Cassava Mandiri, cornmeal produced by PT Kediri Matahari Corn Mills, Central Java and jackbeen (*Canavalia ensiformis*) obtained from local market in Surakarta . In addition to the main ingredients, the production of analog rice also needs other ingredients; water, cooking oil, salt and GMS (glycerol monostearat) obtained from CV An Nahlah Jember. The machine used to make analog rice is double screw extruder with hot extrusion method.

B. *Processing of Analogue Rice*

Mocaf, cornmeal, and jackbeen flour are mixed in accordance with the formulation for 5 minutes in the mixer. Then the emulsifier is prepared comprising oil, GMS, water, and salt mixed in the mixer for 5 minutes until homogeneous. Then, the homogeneous dry material is mixed with emulsifier solution and mixed for 5 minutes until dull, then the dough is put in a hot extruder machine with 20-21 Hz of adjusting speed, 40-42 Hz of screw speed and 15,43 Hz of cutting speed which will automatically cut up the material to resemble grains of rice. In the hot extruder machine, the analog rice dough will be heated twice; for the first heating, the material is heated to 85°C and for the subsequent heating, the material is heated with 75°C temperature, so that the grains of rice produced have experienced gelatinization optimally and produce wet grains of rice. Furthermore, the process of drying is used with the help of sunlight.

C. *Chemical composition of analogue rice*

1. Proximate analysis in analogue rice

   Analogue rice samples were estimated for their moisture with thermogravimetri method by Sudarmadji[10]; ash by AOAC [11]; fat with soxhlet extraction by Sudarmadji[10]; protein content with kjeldahl method by Sudarmadji[10]; and carbohidrat by different.

2. Amylose content in analogue rice

   The method of amylose content is described by Apriantono[12]. 100 mg of sample was added 1 ml of 95% ethanol and 9 ml of NaOH 1 N solution into the test tube, then the mix is heated in a water bath at 95°C for 10 minutes. The starch gel solution was transferred into a 100 ml flask, then distillate water is added until the tera mark and it is homogenized. The solution is piped 5 ml into a 100 ml flask, then add 1 ml of acetic acid and 2 ml of iod solution into the flask, distillate water is added. The solution was left for 20 minutes, and the absorbance is measured by a spectrophotometer at a wavelength of 625 nm. The sample of amylose content can be calculated by the following equation:

$$\text{Content Amilosa} = \frac{X \times FP}{Weight\ Sampels} \text{X } 100\%$$

3. Antioxidant Level

   The antioxidant level measured by DPPH method (Istiani, 2010). Sample preparation was done by weighing the sample as much as 100 mg then adding 10 ml methanol. The sample solution

   was then closed and stirred (using vortex) until homogeneous. Then, let it stand stand for 24 hours.

   How to make the test solution is by piping the sample solution as much as 0.1 ml, then adding 4.9 ml methanol and 1 ml DPPH solution. Then the solution is allowed to stand for 40 minutes. Furthermore, solution is stirred (using vortex) until homogeneous and its absorbance is measured at wavelength (λ) 517 nm as absorbance sample.

   Antiradical activity is shown in a system of which the color changes from purple to yellowish. The solution color change showed DPPH free radical capture activity and can be measured by the difference of absorbance produced in the sample compared with the control. Antiradical activity is expressed in the form of percentage of DPPH radical capture and is calculated by the equation:

$$\textit{Antioxidant activity} = \frac{Absorbance\ Sampels}{Absorbance\ Contrl} \times 100\%$$

4. Cyanide content (Sudarmadji *et al*., 2006)

   4 grams samples plus 125 ml aquades and 2.5 ml chlorofomes were put in the kjeldahl flask and werev distilled. HCN is absorbed in 2% KOH to get total volume as much as 20 ml. It is taken 5 ml from the solution and is added with 5 ml alkaline pichrate then is put in a test tube, then it is put in a waterbath containing boiling water for 5 minutes. The absorbance is measured at a wavelength of 520 nm. The

concentration is calculated from the standard curve obtained.

$$Levels\ of\ cyanide\ acid\ (ppm) = \frac{X \times FP}{Weigt\ Sampels} \times 10^4$$

D. *Physical Properties*

1. Color

The color of analogue rice was estimated by chromameter CR 300 Minolta suggested by Firmansyah[13]. Measurement data can be either absolute value or the value of difference with the standard. The analysis result of the color test is then converted into the °Hue value. The obtained °Hue values are then adjusted to the table of range color area of chromatization. The conversion formula of L *ab value to °Hue value is as follows:

°Hue = tan-1 (b/a)

2. *Cooking time*

The cooking time was measured by Oktaviani[14]. The analog rice that will be cooked is washed once. Then the analog rice is put into container and it is added cold water with the ratio 1:1 between analog rice and water (water seperes with rice). Then, let stand of 10 minutes, until the water is completely absorbed. After the water is fully absorbed, the analog rice is steamed until cooked.

3. *Water absorption*

The water absorption method described by Dewi[15]. 10 grams sample is weighed then soaked in warm water for 5 minutes then lifted and drained. The sampel is then weighed again. Water absorption is determined by the equation:

$$DayaSerapAir = \frac{B - A}{A} x\ 100\%$$

A = sample weight before immersion (gr)

B = sample weight after immersion (gr)

E. *Sensoris Analysis*

Sensory analysis of analogue rice was conducted by 30 untrained panelists consisting of male and female. Sensory analysis is performed on raw analogue rice with color and appearance parameters, meanwhile cooked analog rice with taste, aroma, and texture parameters. The method used is favorite test (scoring)[16].

F. *Stastical Analysis*

The experimental design used in this research is Complete Randomized Design with one factor that is variation of mocaf composition, cornmeal and jackbeen flour as the basic materials for making analog rice. Each treatment was done two replications of the sample and three replications of analysis. Sensory analysis data were then analyzed statistically by one way ANOVA method. If it shows different result, then it will be continued with the test using Duncan's Multiple Range Test (DMRT) analysis at significance level α = 0,05.

III. RESULT AND DISCUSSION

A. *Chemical composition of analogue rice*

1. Proximate analysis in analogue rice

In table 3.1.1 it can be seen that the comparison of moisture, ash , protein, fat, and carbohydrates contained in analogue rice (with the formula of F1, F2 and F3) with *sosoh* rice.

Tabel 3.1. Proximate Analysis of Analogue Rice and Beras Sosoh

Nutrient Content	Analogue Rice			Sosoh Rice**
	F1	F2	F3	
Moisture (%wb)	7,367^{ab}±0,96	6,678^{a}±0,10	7,488^{b}±0,38	11,22*
Ash (%db)	0,556^{a}±0,12	0,857^{b}±0.06	0,973^{b}±0,24	0,58
Protein (%db)	6,904^{a}±1,32	7,193^{ab}±1,48	8,579^{b}±0,58	6,61
Fat (%db)	4,352^{a}±0,20	4,369^{a}±0,23	4,533^{a}±0,68	0,98
Carbohydrates (%db)	80,223^{b}±1,19	80,422^{b}±1,58	77,860^{a}±0,94	79,34

Source : ** [28]
* [27]

Moisture content in the food is one of the things that determine the durability of food, the lower the moisture content, the slower the growth of microorganisms, so that the food can be durable.

Based on Table 3.1 it is known that the moisture content between F1 is not significantly different from F2 and F3. It means that there is no significant influence on both formulations. Meanwhile F2 is significantly different from F3, it can be interpreted that there is influence from both formulations. Moisture content is affected by the drying process, the amylose of the material and the moisture of the raw material. In this case, raw materials are mocaf, cornmeal and jackbeen flour. Mocaf has max 13% moisture content[17], 12,14% cornmeal [18] and 6,43% jackbeen flour.

Ash content indicates that the mineral content contained in a material. The ash content in F1 is

significantly different from that of F2 and F3 which can be interpreted as having effect on both formulations. Meanwhile, F2 is not significantly different from F3, so it does not have significant effect on both formulations. Compared with ash content of of sosoh rice which is only 0.58, the F1 analog rice is lower than ordinary rice, while F2 and F3 have higher ash content. The addition of jackbeen flour is considered to have effect on increasing ash content of analog rice. The ash content is influenced by ash content of raw materials used. The ash content of the jackbeen flour itself is 2.11%. It is higher than the mocaf ash content which is only max. 0.2% and corn ash content which is 0.62%.

Protein is an important food substance for human body because in addition to functioning as fuel in the body, it also serves as builder and regulator substances. Protein in F1 is not significantly different from F2 and F2 is not significantly different from F3 which means that thre is no significant influence on the formulation. Meanwhile F1 is significantly different from F3 which means that there is an influence from both formulations. Protein content of mocaf, cornmeal and jackbeen flour based analog rice increased from F1, F2 and F3 respectively 6.904%, 7.193% and 8.579%. This is most likely due to the raw material used for the production of analog rice that has different protein content. The addition of jackbeen flour to the production of analog rice affects the protein content of the analog rice. Jackbeen has high protein content of about 30.36% and jackbeen flour has protein content of 18.59%[19]. So that the addition of jackbeen flour on the production of analog rice is able to increase the protein content of the analog rice produced. Compared with sosoh rice which has protein content of 6.61%, the protein levels of F1, F2 and F3 have higher protein content than sosoh rice.

Talking about fat content in three formulations of analog rice based on mocaf, cornmeal and jackbeen flour, the fat content produced in F1, F2 and F3 is 4.352%, 4.369%, and 4.533%. The three formulations are not significantly different, it means that there is no significant influence on the three formulations. If compared with sosoh rice, the fat content of analog rice is higher than the fat content in ordinary rice which is only 0.98%. The high fat content is considered due to the addition of oil and corn flour which has fat content of 4.6%. The content of fat in corn flour is greater than the fat content of mocaf which is max 1% and that of jackbeen of 0.2-3%.

The values of carbohydrate in each formulation of carbohydrate of F1 equals to 80,223%, F2 equals to 80,422%, and F3 equals to 77,816%. F1 and F2 are not significantly different, there is no significant influence on both formulations. However, F1 and F2 differ significantly with F3, it can be interpreted that there is a significant influence on the formulation. The carbohydrate content of the three formulations is quite high, because the raw materials used is mocaf, cornmeal, jackbeen flour which have high carbohydrate content as well. Mocaf's carbohydrate content is 85-87%[17], corn flour's is 72.40% [18] and jackbeen flour's is 56.74%[23]. Carbohydrate content in sosoh rice is 79.34%. The content is lower than F1 and F2 of analog rice, while the F3 has lower carbohydrate content than sosoh rice.

2. Amylose content in analogue rice

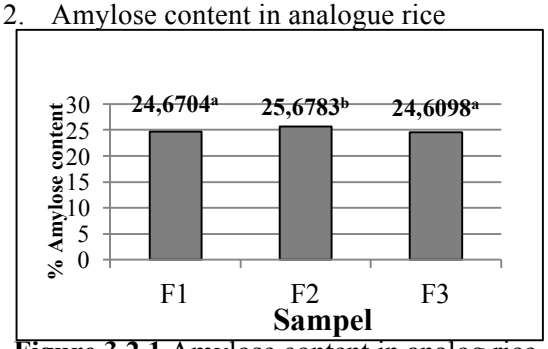

Figure 3.2.1 Amylose content in analog rice

Amylose has the ability to form hydrogen bonds with water[21] and consists of glucose units attached to α 1.4-glycosidic bonds, so the molecule is in the form of open chain. As a result, amylose is easy to absorb water and release it or experience sineresis more quickly and experience crystallization. One of the chemical characteristics of rice which can characterize the physical characteristics of rice is the amylose content of rice. Amylose content of rice is usually determined to find out the smoothness level of rice. However, amylose content cannot establish the level of favorite because people's tastes of rice smoothness are different. One example is that the people of Sumatra tend to like rough rice while the people of West Java tend to like smooth rice [4].

Based on Figure 3.2.1 it can be seen that the highest amylose content exists in F2 which is 25.6783%, and the lowest is in F3 which is 24.6098%. Of the three formulations, F1 and F3 are not significantly different, but significantly different from F2. If compared with sosoh rice which the amylose content is 20.65%, the amylose content of three analog rice formulations have higher amylose content. The analysis results of amylose content of analog rice are: F1 is 24,728% and F3 is 24,471%. Both are still included in rice with medium amylose content (20-25%) having moderate rice characteristic. Meanwhile, The amylose content of F2 is 25.546%, so that it is included in high amylose rice (25-33%) [21].

According Suarni, amylose has high water binding ability that will affect the stability of viscosity and soft

tendency of the gel[22]. More amylose contents will affect the hydration process which becomes faster and tends to increase its viscosity. However, it takes a high temperature and long time to reach gelatinization. Amylopectin has a lower water binding ability than amylose, so it affects the viscosity and consistency of the gel. The level of both starch-forming components influences the viscosity which will form the stickiness. Due to the amylose characteristic which is easy to bind water and easy to release water, in the drying process, analog rice with high amylose contents will more easily release water contained in the material so it has low water content.

3. Antioxidant level

In white jackbeen, there is an active component of flavonoids as much as 29.3mg/100gram of seed flour and total phenol is as much as 245.5 mg/100gram seed flour. Based on Istiani's research antioxidant activity in intact jackbeen is 47,13%. This antioxidant will ward off free radicals that are detrimental to health[10].

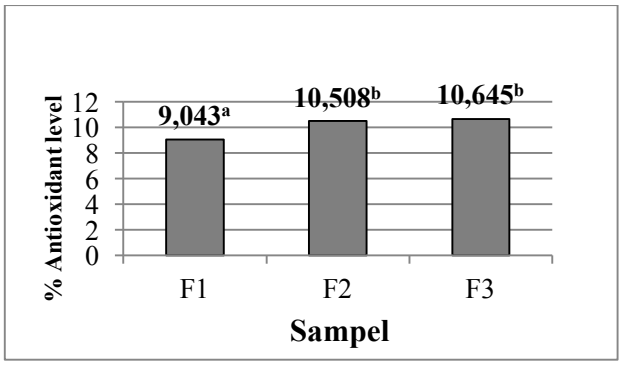

Figure 3.3.1 Antioxidant Levels of Analogue Rice

Based on Figure 3.3.1, it can be seen that F2 and F3 are not significantly different, it means that there is no significant influence on the two formulations, while F1 is significantly different from F2 and F3, it means that there is influence on the two formulations. The antioxidant contents decreased from raw seeds to become analog rice, raw seeds of jackbeen has 47.13% of antioxidant content [10]. After experiencing various cultivation process, the antioxidant changes to 9,043%, 10,966%, and 10,645%. This decrease is due to various processes carried out in the production of analog rice, repeated heating process and the drying process which can lead to the decreased of antioxidants contents in the final product of analog rice.

4. Cyanide content

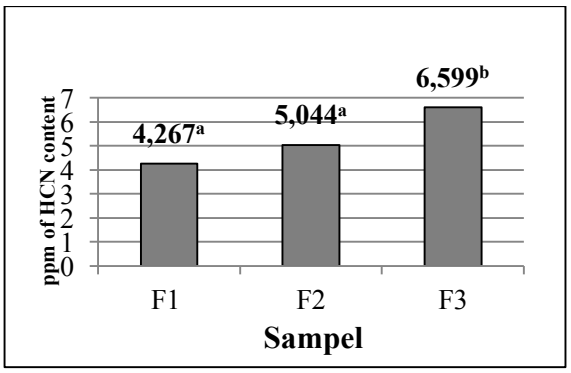

Figure 3.4.1 Cyanide content in Analog Rice

Based on Figure 3.4.1, the cyanide content of F1 and F2 is not significantly different, it means that there is no significant influence on the F1 and F2 samples, but F3 is significantly different from F1 and F2 which indicates the effect on the variation of the materials concentration used. From the figure above, the HCN level experienced an increase from F1 (4,267 ppm), then F2 (5.044 ppm) and the highest is in F3 (6,599 ppm). The more the composition of jackbeen flour added, the greater the cyanide content produced. The cyanide content of the analog rice is still categorized at safe level, because the maximum limit of HCN levels allowed by the Food Agricultural Organization (FAO) to consume is <10 ppm of cyanide acid [23].

The preliminary treatment to jackbeen used is able to decrease the cyanide content. The preliminary treatment which is done by soaking process using 1% sodium bicarbonate solution, with water change every 8 hours and boiling for 30 minutes as well as the drying and heating process in the production of analog rice, can reduce the cyanide content of jackbeen. The content of jackbeen raw seeds is as much as 49.68 ppm[19], after being processed into analog rice, the content ranged from 4 to 6 ppm. This is reinforced by Suciati, that cyanide acid is readily soluble in water, volatile when heated and cyanide acid may be toxic to the body if the content exceed 45-50 ppm[24].

B. Physical Properties

Color

Color is one of the important attributes which determines consumer acceptance on a product. Color analysis is performed using Chromameter Minota CR 300 tool. This color analysis is used to determine the degree of white or brightness of rice based on the L value and color scheme of rice based on the values of

a and b. The value of L indicates the level of brightness of the sample. The brighter the sample which is measured, the closer the L value to 100. On the contrary, the duller (darker), the closer the L value to 0. The value of a is chromatic color measurement of red-green mixture. The value of b is chromatic color measurement of yellow-blue mixture.

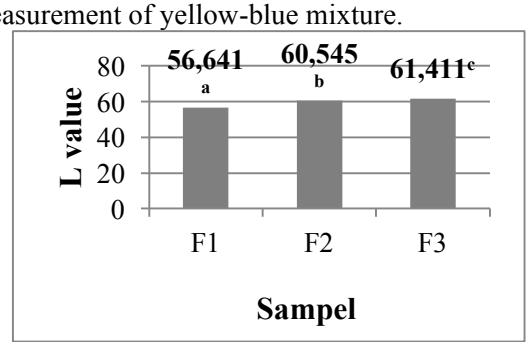

Figure **3.1.2** The L Value of Analog Rice

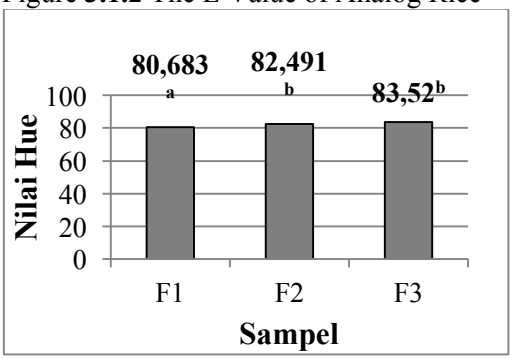

Figure **3.1.3** The °Hue Value Analog Rice

Figure 3.1.2 represents the L value of the analog rice showing the degree of degree of white or brightness. In the analog rice, the L value is 56,641 for F1, 60,545 for F2 and 61,411 for F3, the more the addition of jackbeen flour, the color of the analog rice tends to be cream color. If compared with ordinary rice which the L value is 80.79, analog rice has a lower degree of white or brightness level than sosoh rice. However, the value of oHue is based on the value of + a and + b, the analog rice is around 54-90 color range which is included in the yellow-red color range. The addition of jackbeen flour, which has high protein content, causes browning reactions that occur due to mailard reaction; the reaction that occurs at the stage of steaming and drying. Mailard reaction is a reaction between carbohydrates, especially reducing sugars with primary amine groups. The reaction results in brown colored material, which is often desired or sometimes a sign of degradation[25]. The existence of this mailard reaction of analog rice changes color from the bright yellow color to the faded yellow color towards the cream color.

Cooking time

Based on Figure 3.2.2 it can be seen that the three formulations of F1, F2 and F3 are significantly different, it means that there is significant influence on the three formulations. The more the content of jackbeen flour and the less the content of mocaf, the longer the cooking time will be and vice versa. This is related to water absorption, the higher the water absorption, the rehydration time is shorter and the cooking time will be longer, and the texture of the rice tends to be soft. Similarly vice versa when the absorption is low then the cooking time will be shorter and produce a texture of non sticky rice. Water absorption is also positively correlated with the time of cooking. Water absorption is the amount of water absorbed by the rice in the process of cooking. Water absorption varies for each rice variety. Both of these factors also determine the quality of the cooked rice and rice smoothness.

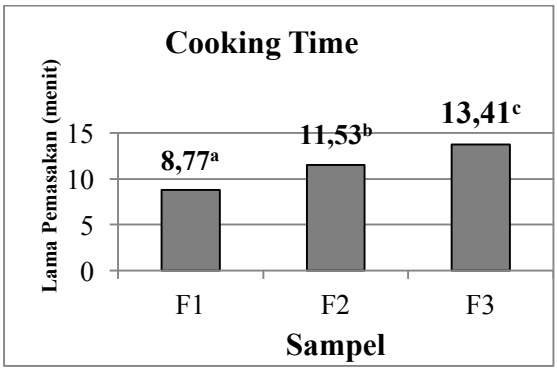

Figure 3.2.2 Cooking time of Analogue Rice

If compared with cooking time of sosoh rice, the time length of sosoh rice is longer than that of analog rice that is equal to 35,25 minutes.

Water Absorption

The value of water absorption is obtained from the amount of water absorbed per analog rice weight before immersion. Analog rice products experience some heating which cause starch to undergo gelatinization. Although these starch molecules can not return to their original characteristics before gelatinization, the dried starches are still able to re-absorb large amounts of water. This characteristic is the characteristic used to make instant rice and instant pudding able to re-absorb water easily by using starch that has undergone gelatinization.

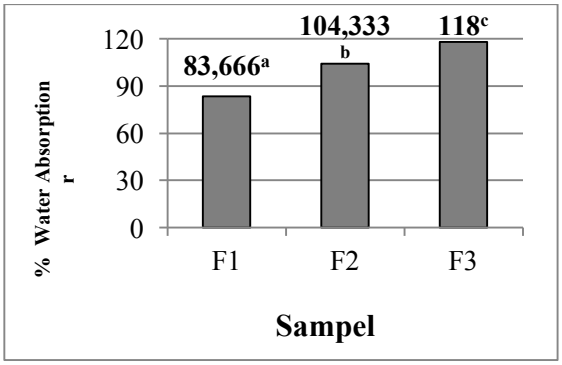

Figure 3 3.2 Water Absorption of Analog Rice

Based on Figure 3.3.2 it can be seen that the three formulations F1, F2 and F3 are significantly different, it means that there is significant influence on the three formulations. Based on water absorption viewed from the image, there is an increase of F1, F2 and F3. According to Pamularsih[29], protein increase levels will lead to an increase in water absorption (WHC/Water Holding Capacity). WHC is influenced by the interaction between protein with water. These interactions are influenced by protein sources and amino acid composition, particle size and denaturation degree. Therefore the higher the addition of jackbeen flour, the more the water absorbed at rehydration time, so that the texture becomes more soft. The water absorption is related to the rate of rehydration. The research conducted by Suarni shows that the differences in water absorption are caused by the concentration of starch amylose, protein content and fat in starch[22]. These three factors are the factors of absorption capacity of analog rice to the water. If compared with the sosoh rice, the water absorption capacity of rice is 24.3%, it is lower than the water absorption in analog rice.

C. *Sensory analysis*

Tabel 3.2 Sensory Analysis of Analog Rice

Information :

1. Score : 1 : absolutely dislike, 2 : dislike, 3 : neutral, 4 : like, 5 : absolutely like
2. F1: 50% mocaf composition: 40% corn flour:
3. 20% jackbeen flour
4. F3: 30% mocaf composition: 40% corn flour: 30% jackbeen flour
5. Control : Ordinary rice comsumed by the community
6. The same subset in the same column shows no significant difference at significance level of 5%

Overall, the panelist gives 3.3 for F1 which means neutral, 2.73 for F2 which means less favored, 3.00 for F3 which means neutral consumer acceptance. Overall, the addition of koro pedang flour to the analog rice production is less favored by panelists. In terms of color produced, the more the addition of koro pedang flour is, the paler the color is due to the browning reaction, pale cream color of analog rice is not favored by the panelist. In terms of flavor, the addition of koro pedang also less favored by the panelist. The bitter aftertaste is caused by Alkaloid compound as much as 0.614g/100g. This alkoloid causes bitter aftertaste on koro pedang flour[26]. In terms of aroma parameter, the addition of koro pedang flour produces bad odor that is less favored by panelist, and in terms of texture parameter, the more the addition of koro pedang, the texture produced is more sticky, the shape is not similar to rice because at the beginning of the immersion process, the texture of analog rice had started to be broken.

IV. CONCLUSION

Based on the result of chemical analysis, the best physical appearance and sensory of analog rice is F1 with 50% mocaf formulation, 40% cornflour and 10% koro pedang flour. In the Chemical analysis, F1 has water content as much as 7,367%, ash content as much as 0,556%, protein content as much as 6,904%, fat content as much as 4,352%, carbohydrate content as much as 80,223%; amylose content as much as 24,6704%; HCN content as much as 4,267 ppm; and antioxidant content as much as 9.043%. The result of physical test of analog rice F1 is the color value in ohue which is as much as 80,683 lying around the yellow-red color, the water absorption is 83,666%, and the cooking time is 8,77 minutes. The more percentage of jackbeen on analog rice formulation, the higher content of its protein and antioxidant. However, the panellist acceptance level decreases.

Sampel	Parameter					
	Color	View	Taste	Smell	Texture	Overall
F1	$3,40^{b}$±1,0	$3,43^{a}$±1,0	$3,17^{d}$±0,9	$2,97^{b}$±0.8	$3,27^{c}$±0,8	$3,30^{c}$±0,8
F2	$2,93^{ab}$±0,8	$3,17^{a}$±0,8	$2,67^{bc}$±0,9	$2,70^{ab}$±0,8	$2,87^{b}$±0,7	$2,73^{b}$±0,7
F3	$3,07^{ab}$±0.9	$3,20^{a}$±0,9	$2,90^{cd}$±1,0	$2,73^{ab}$±0,9	$2,83^{b}$±0,9	$3,00^{bc}$±0,9
R	$4,23^{c}$±0,8	4.30^{b}±0,6	$4,13^{c}$±0,6	$3,93^{c}$±0,8	$4,03^{d}$±0,6	$4,20^{d}$±0,6

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