

Modification of Mocaf Flour and Its Effect on Acceptance of Flakes with Formulation of Green Beans and Red Beans

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Food diversification utilising local carbohydrate sources in making cassava-based staple foods offers one alternative with the use of modified mocaf flour in making flakes. The addition of green beans and red beans in making flakes is expected to increase the nutritional content and acceptability of flakes products. The purpose of this study was to determine the best formula of flakes with modified mocaf flour with the formulation of green bean flour and red bean flour. Formula 1, 50% green bean flour, 0% red bean flour, Formula 2, 40% green bean flour, 10% red bean, Formula 3, 30% green bean flour, 20% red bean flour, Formula 4, 20% green bean flour, red bean flour 30%, Formula 5, green bean flour 10%, red bean flour 40%, Formula 6, green bean flour 0%, red bean flour 50%. Flakes were tested hedonically on 25 panellists to find out the panellists' acceptance, and the nutritional content analysis. The results of the analysis of the acceptability of colour flakes from formula 1 to formula 6, 95% of panellists said they really liked them. The results of the one way ANOVA test with $\alpha = 0.05\%$ flakes on colour, aroma, and texture concluded that there was no significant difference in the treatment of formulas for colours, aroma. One way ANOVA test results ($\alpha = 0.05\%$) flakes to taste concluded there were substantial differences in formula treatment to taste. The conclusion of this research is that the best formula in terms of nutritional value and acceptability of flavoured flakes is formula 1 (50% green bean, 0% red bean).

Keywords: Cassava, Modified Mocaf Flour, Flakes.

Introduction

One of the cassava-based food ingredients is rice cassava, the primary material for making cassava into mocaf flour, which then is formed into the rice. Obstacles faced by cassava flour mocaf rice is that it still tasted of cassava. According to Vinsensia, who said the obstacle to always using low mocaf flour is due to various factors such as the physicochemical properties of mocaf flour; the original flavour and aroma of cassava is still deeply felt (Rosmeri & Monica, 2013). One way to overcome the flavour and aroma of cassava in making mocaf flour is modifications to the heating (Heat Moisture Treatment) then making cassava rice with raw starch modification mocaf heating (Heat Moisture Treatment) (Garnida, 2019; Setiarto & Widhyastuti, 2018). Rice cassava mocaf flour modifications to the heating (Heat Moisture Treatment) in terms of flavour and aroma dissipate the aroma and taste of cassava and produces fragrant odours and tastes delicious. But in terms of colour, rice cassava can not be accepted because it produces brown rice cassava different from white rice, so it is not preferred. After all, colour is the first thing that will be judged by consumers. However, the taste and aroma of a good product makes people think to buy and consume it, so products must be created that can use the food starch-modified mocaf heating (Heat Moisture Treatment)(Asbar et al., 2014).

One alternative to the use of starch modification mocaf heating (Heat Moisture Treatment) is making flakes. Characteristics of product flakes are the same brown colour mocaf flour modification premises heating (Heat Moisture Treatment), the problem is it is still lacking the nutrients, especially protein flour modification mocaf heating (Heat Moisture Treatment) – thus needing the addition of other foodstuffs so that the nutrients can be better. The addition of green beans and red beans in the manufacture of flakes with mocaf flour raw material modification heating (Heat Moisture Treatment) is expected to increase the nutrient content and product acceptance in the flakes. Research conducted by Welli concluded the manufacture of cookies supplemented with raw green beans with taro tuber 30% -60% got the best judgement from the panelist (Welli Yuliatmoko, 2012). It was concluded that fermented cassava flour and red bean flour has a significant impact on colour, aroma, texture, and taste of the cake.

Methods

This study used an experimental method that is arranged in a completely randomised design (CRD) with three repetitions of six treatments (formula – green beans and red beans). Formula 1 (50%, 0%) formula 2 (40%, 10%) formula 3 (30%, 20%) Formula 4 (20%, 30%), Formula 5 (10%, 40%), Formula 6 (0%, 50%), research was conducted in the Department of Nutrition Poltekkes Laboturium Tandjungkarang and Polinela Lampung conducted from February to September 2019.

The first phase of this study is the manufacture of starch modification mocaf heating. First cassava is sorted and then stripping the skin of cassava. After peeling cassava is washed clean

and cut or sliced thin; after that is done is done, heating in an oven at 150 °C for 15 minutes, after which it was milled into flour, then sieved with 40 mesh to obtain mocaf flour. Mocaf produced flour is used as an ingredient in the manufacture of flakes, along with flour of formulating green bean and red bean flour. Formula manufacture of flakes: Tepug mocaf 50g, the percentage of green bean flour and red bean flour, skim milk powder 25g, 25g chocolate, margarine 10g. The following are the percentages of usage of mung bean flour and red beans for each formula: formula 1, 50% mung bean flour, 0% red bean flour; Formula 2, 40% mung bean flour, 10% red bean flour; Formula 3, 30% mung bean flour, red bean flour 20%; Formula 4, green bean flour 20%, red bean flour 30%; Formula 5, green bean flour 10%, red bean flour 40%; Formula 6, green bean flour 0%, red bean flour 50%. Flakes were tested hedonically on 25 panellists; finding out the nutritional value of flakes was calculated by using all the raw materials used in making flakes.

Results

1. Formula 1 (50%, 0%) green beans and red beans

Analysis results of acceptability (colour, aroma, texture, and taste) mocaf flakes starch modification heating (heat moisture treatment) with the formulation of green beans and red beans (50%, 0%) can be seen in Table 1. Table 1 Results of Analysis of acceptability (colour, aroma, texture, and taste) mocaf flakes starch modification heating (heat moisture treatment) with the formulation of green beans and red beans (50%, 0%). 25 panellists, the assessment results from panellists formula 1 (colour) – 20 panellists really like, five panellists like; (aroma) – 19 really like, six panellists like; (texture) – 19 panellists really like, six panellists like. The average total value of formula 1 is 94.75% (really like).

2. Formula 2 (40%, 10%) green beans and red beans

Analysis results of acceptability (colour, aroma, texture, and taste) mocaf flour flake with a modified heating (heat moisture treatment) formulations of green beans and red beans (40%, 10%), as shown in Table 2. Table 2 is the results of the received power analysis (colour, aroma, texture, and taste) flakes mocaf starch modification heating (heat moisture treatment) with the formulation of green beans and red beans (40%, 10%) of 25 panelists. The assessment results from panellists formula 2 (colour) – 20 panellists really like, five panellists like, the total score of the colour of 95%; (flavour) – 19 really like, six panellists like, an overall score of aroma 94 %; (texture) – 20 panellists really like, five panellists like, the overall score of the texture of 95%; (flavour) – 18 panellists really like, four panellists like, three panellists did not like. The total score of taste by 90%, the overall average value of formula 2 is 93.50% (really like).

3. Formula 3 (30%, 20%) green beans and red beans

Analysis results of acceptability (colour, aroma, texture, and taste) mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans and red beans (30%, 20%), This is shown in Table 3. According to Table 3, there can be seen Analysis Results acceptability (colour, aroma, texture, and taste) mocaf starch flakes modification

heating (heat moisture treatment) with the formulation of green beans and red beans (30%, 20%). 25 panellists, assessment of panellists flakes formula 3 for (colour) – 20 panellists really like, five panellists like, the total score of the colour of 95%; (flavour) – 19 really like, six panellists like, an overall score of aroma 94%; (texture) – 18 panellists really like, seven panellists like, total texture score of 93%. (Flavour) – 16 panellists really like, five panellists like, four panellists did not like. The total score of taste by 90%, total average value formula 3 is 92.25% (really like).

4. Formula 4 (20%, 30%) green beans and red beans

Analysis results of acceptability (colour, aroma, texture, and taste) mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans and red beans (20%, 30%), are shown in Table 4. Table 4 shows Analysis Results of acceptability (colour, aroma, texture, and taste) mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans and red beans(20%, 30%) of 25 panellists. The assessment of the panellists flakes formula 4 for (colour) – 20 panellists really like, five panellists like, the total score of the colour of 95%; (flavour) – 19 really like, six panellists like, a total score of aroma 94%; (texture) – 18 panellists really like, seven panellists like, total texture score of 93%. (Flavour) – 15 panellists really like, five panellists like, five panellists did not like. The total score of taste 85%, the overall value average formula 4 is 91.75% (really like).

5. Formula 5 (10%, 40%) green beans and red beans

Analysis results of acceptability (colour, aroma, texture, and taste) mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans and red beans (10%, 40%), are shown in Table 5. Table 5 shows Analysis Results of acceptability (colour, aroma, texture, and taste) flakes mocaf flour with moisture heat treatment method by the formulation of green beans and red beans (10%, 40%) of 25 panellists. Assessment by panellists of flakes formula 3 for (colour) – 20 panellists really like, five panellists like, the total score of the colour of 95%; (flavour) – 19 really like, six panellists like, a total score of aroma 94%; (texture) – 17 panellists really liked, 8 panellists like, the total score of the texture of 92%. (Flavour) – 13 panellists really like, seven panellists liked, 5 panellists did not like. The total score of taste 83%, the total average value formula 5 is 90.25% (really like).

6. Formula 6 (0%, 50%) green beans and red beans

Analysis results of acceptability (colour, aroma, texture, and taste mocaf starch) flakes modification heating (heat moisture treatment) with the formulation of green beans and red beans (0%, 50%), is shown in Table 6. Based on Table 6 Analysis Results acceptability (colour, aroma, texture, and taste) flakes mocaf flour with moisture heat treatment method by the formulation of green beans and red beans (0%, 50%). Of 25 panellists. assessment of flakes formula 3 for (colour) –20 panellists really like, five panellists like, the total score of the colour of 95%; (flavour) – 19 really like, six panellists like, an overall rating of aroma 94%; (texture)

– 18 panellists really like, seven panellists liked, total texture score of 89%. (Flavour) – 10 panellists really like, five panellists like, seven panellists did not like, really do not like the taste 3, total scores 72%. The overall average value of formula 6 is 89% (really like).

7. Colour

Results Analysis 25 panellists acceptance of the mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans and red beans to colour, are shown in Table 7. Based on Table 7, it can be seen the panellists' assessment of the colour formula 1 to formula 6 is an average value of 3.76.

8. Aroma

Results Analysis 25 panellists acceptance of the mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans and red beans on the scent can be seen in Table 8. Based on Table 8, the panellists' assessment formula 1 to formula 6 average value is 3.80.

9. Texture

The analysis results received of the mocaf starch flakes modification heating (heat moisture treatment) formulations of green beans and red beans; the texture can be seen in Table 9. Based on table 9, it can be seen on the texture, the panelist's assessment formula 1 to formula 6 average value is 3.72 to 3.80.

10. Taste

The analysis results received of mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans and red beans to taste can be seen in Table 10. Based on table 10, it can be seen the rating of the panellists to taste formula 1 to formula 6 is an average value of 3.80 to 3.84.

11. Energy

The results of the analysis of the energy content of mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans, and red beans can be seen in Table 11. Based on table 11, it can be seen the highest energy content of the formula 1 is (50% and 0% of green beans red beans), while the lowest energy content is the formula 6 (0% to 50% of green beans and red beans).

12. Protein

The results of the analysis of protein mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans, and red beans can be seen in Table 12. Based on table 12, it can be seen the highest protein content is formula 1 (50% and 0% of green beans red beans), while the lowest protein content is formula 6 (0% to 50% of green beans and red beans).

13. Fat

The results of the analysis of fat mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans, and red beans can be seen in Table 13. Based on table 13, it can be seen the highest fat content is formula 1 (50% and 0% of green beans red beans), while the lowest fat content is formula 6 (0% to 50% of green beans and red beans).

14. Carbohydrates

The results of the analysis of the carbohydrate content of mocaf starch flakes modification heating (heat moisture treatment) with the formulation of green beans, and red beans can be seen in Table 14. Based on table 14, it can be seen the highest carbohydrate content in formula 1 (50% and 0% of green beans red beans), while the lowest fat content is in formula 6 (0% to 50% of green beans and red beans).

Discussion

Colour

Colour of flakes is the first characteristic to be judged by the eyes of the panellists; the colour will determine the next characteristic of the product to be assessed: if the colour of the product does not attract someone they will think twice about the product despite the aroma, texture, and good taste (Rakhmawati et al., 2014). The results of the analysis of the acceptability of colour flakes of formula 1 to formula 6, 95% of panellists expressed love, one way ANOVA test result with $\alpha = 0.05\%$ of the colour flakes formula ($p = 1.000$) concluded there was no significant difference in the formula treatment for colour flakes. No difference between the treatment formula due to brown flakes derived from the use of chocolate bars with the amount of weight for each formula that is as much as 25g. These results are consistent with research conducted by Fatimah (2016), which stated that the results flour brownies brown fruit punch on each product caused block chocolate ingredient formula used in the same amount (Fatimah, 2016; Susanti et al., 2017; Ihromi et al., 2019).

Aroma

The aroma is rated by the panellist on the odour released by a food product – food aromas that stimulate the sense of aroma can make someone interested in the food product. The especially fragrant aroma makes people want to consume (Klensporf & Jelen, 2008). The results of the analysis received power flakes on the aroma of formula 1 to formula 6, 94% of panellists expressed love. The test results from one way ANOVA with $\alpha = 0.05\%$ flakes on flavour formula ($p = 1.000$) concluded there was no significant difference in treatment formula. On the aroma. Wangi and flakes fragrant aroma arising from the use of the main ingredients mocaf flour heating modification and use of chocolate bars. The research result Ardiyansyah & Endang Sri, concluded mocaf starch modification heating produces fragrant flour and good

aroma (Ardiyansyah & Endang Sri, 2019). The use of the same amount of material in each formula causes each formula to produce a uniform scent on every flakes product produced (Cutyanti et al., Nd). The use of mocaf flour and chocolate bars with the same amount of mocaf flour uses such modifications as 50g and 25g chocolate bar (Asmoro et al., 2017).

Texture

The texture is one indicator to determine the level of softness and crispness of a food product (Majid et al., 2017; Paramita et al., 2015), The level of crispness of flakes when bitten or chewed influenced the perception of panellists (Lohman et al., 2016). The results of the analysis received power flakes on the texture of formula 1, 94% of panellists expressed really like, the formula 2 95% of panellists expressed love, and formula 3 states really like, formula 4, 93% stated really like, the formula 5, 92% of panellists expressed really like, formula 6, 89% states really like. The test results from one way ANOVA with $\alpha = 0.05\%$ formula flakes on the texture ($p = 0.912$), concluded there was no significant difference in treatment formula. The texture: dry texture and soft flakes due to the roasting process with an oven with a temperature of 130°C with a time of 15 minutes produces crispy and tender flakes. Research conducted by Daforte, Sobari, & Lock, stating Brownies baked have a texture that is a bit dry on the outside and tender on the inside of the brownies (Daforte et al., 2018). Pastries most favoured by the hedonic test is a pastry with red bean flour substitution 25%. The more red bean starch content, the more disliked the texture of pastries (Asmoro et al., 2017; Oliver, 2013).

Flavour

The taste is the perceived stimuli when eating food that causes the sense of taste and is an essential factor for a person to accept a food product as a food ingredient (Gozaly, 2019; Hildayanti, 2012). The results of the analysis received power flakes to taste of Formula 1, 96% of panellists expressed love, formula 2, 90% of panellists expressed love, formula 3, 87% of panellists expressed love, formula 4, 85 panellists love, formula 5, 83% love, formula 6, 72% of panellists expressed love. The test results from one way ANOVA ($\alpha = 0.05\%$) formula flakes to taste ($p = 0.000$) concluded there were significant differences in treatment formula. To taste. This study was carried out by (Fatimah et al., 2013), which states, as more and more red bean flour is added, then the resulting taste is a bitter biscuit (Frances, Damiaty, and Suriani, 2019; Rahman & Dwiani, 2018).

Nutritional Content of Flakes

1. Energy

Calories are the measure of energy in food. Each human needs Waterwheel for metabolism body and daily activities. Nutritional Adequacy Score (AKG) of energy is recommended per day for an adult person is about 2100 kcal Indonesia (Rahman & Dwiani, 2018; RI, 2013). The

results of the analysis of the energy content of flakes of the highest in the formula 1 are equal to 595.75 kcal, while the lowest is in the formula 6 at 593.50. It is due to differences in the use of additional material from the green beans. In Indonesia's food composition table, green beans' 100g energy content is 350 kcal and energy content is 280 kcal in red beans. The test results from one way ANOVA ($\alpha = 0.05\%$) of the energy flakes formula concludes that there is significant difference treatment formula to energy (Sofyan & Husna AZ, 2019).

2. Protein

The protein content of food influences the use of raw materials: protein plays a huge role in the metabolic processes of the body, especially in the formation of new cells to replace damaged cells (Daforte et al., 2018; FatmaLa & Adi, 2018). Nutritional Adequacy Score (AKG) recommends protein for adults in Indonesia at about 65 g per day. The results of the analysis of flakes highest protein content of formula 1 is equal to 13.325g and the lowest at 6 amounted to 13.125g formula. In Indonesia's food composition tables, the protein content of 17.1g /100g green beans and red beans energy content 13.9g (RI, 2013). Statistical analysis showed that the red bean flour substitution increases the protein content of arrowroot flour pastries significantly ($p = 0.000$). The test results from one way ANOVA ($\alpha = 0.05\%$) formula flakes against protein concluded there was no significant difference in treatment formula. Of the protein results by other research carried out by Diniyanti, the highest protein content is green bean substitute 30% in the manufacture of Kue Garut dried flour compared with red bean flour substitution (Diniyati, 2012). The use of green bean flour as a protein source in each formula differs only in tiny amounts of about 5 grams (Frances et al., 2019; Justisia & Adi, 2017).

3. Fat

Fat is the fat content contained in all food and beverages. The fat role is to provide energy at 9 calories/gram, dissolving vitamin A, D, E, K (Hardinsyah et al., 2012). Under the Nutrition Adequacy Score (AKG), fat recommended for adults in Indonesia is about 80 g per day. The test results in one way ANOVA ($\alpha = 0.05\%$) flakes to fat formula concluded no significant difference in treatment formula against fat. Result analysis flakes of the highest fat content of formula 1 is equal to 25.67% and the lowest in formula 6 of 25.575g (Kusumastuti & Adriani, 2017). Indonesian food composition table shows 100g green bean protein content is 1.8g, and energy content of red beans 1.1g. These results are in contrast to studies conducted by (Susanti et al., 2017). Outcome analysis of fat flakes obtained was 13.90%. This because it contains margarine fat, which is 10 grams. The levels are still coming to terms SNI 01-2886-2000 flakes products that are produced without the frying process with a maximum limit of 30% (Kusumastuti & Adriani, 2017).

4. Carbohydrate

Carbohydrates or hydrate of charcoal is a nutrient that functions primarily as a producer of energy, which produces four calories per gram (Muhiddin et al., 2019; Sari, 2014). Nutritional

Adequacy Score (AKG) shows carbohydrates are recommended for adults per day in Indonesia at about 430g (Daforte et al., 2018). The results of the analysis of flake's highest carbohydrate content in formula 1 are equal to 78.70g while the lowest at 6 formula of 78.55g. In Indonesia's food composition table, green beans 100g protein content is 64.6g, and energy content of 56.2g for red beans. The test results in one way ANOVA ($\alpha = 0.05\%$) formula flakes on carbohydrates concluded there was no significant difference in treatment formula for carbs (Fatimah, 2016).

Conclusion

The best formula in terms of nutritional value and acceptability of taste in flakes is formula 1. Nutrient content of formula 1 flakes: Energy 595.75 kcal, protein 13.325g, fat 25.675g, carbohydrates 78.70g, average panellist acceptance 94.75%, which means they really like the nutritional content of flakes. For further research, it is necessary to conduct microbiological tests to determine the shelf life of flakes product.

Table 1. Results of Analysis acceptability (colour, aroma, texture, and taste) Formula 1 (50%, 0%), green beans and red beans

Indicator	Category	Panelist	Score	Total score	(%)
Colour	Really like	20	80	95	95.00
	Like	5	15		
	Dislike	0	0		
	Very dislike	0	0		
Aroma	Really like	19	76	94	94.00
	Like	6	18		
	Dislike	0	0		
	Very dislike	0	0		
Textures	Really like	19	76	94	94.00
	Like	6	18		
	Dislike	0	0		
	Very dislike	0	0		
Taste	Really like	21	84	96	96.00
	Like	4	12		
	Dislike	0	0		
	Very dislike	0	0		
Total score average				379	94.75
				94.75	

Table 2. Results of acceptance analysis (colour, aroma, texture, and taste) formula 2 (40%, 10%) green beans and red beans

Indicator	Category	Panelists	Score	Total score	(%)
Colour	Really like	20	80	95	95.00
	Like	5	15		
	Dislike	0	0		
	Very Dislike	0	0		
Aroma	Really like	19	76	94	94.00
	Like	6	18		
	Dislike	0	0		
	Very dislike	0	0		
Textures	Really like	20	80	95	95.00
	Like	5	15		
	Dislike	0	0		
	Very dislike	0	0		
Taste	Really like	18	72	90	90.00
	Like	4	12		
	Dislike	3	6		
	Very dislike	0	0		
Total score				374	93.50
average score				93.50	

Table 3. Acceptance analysis results (colour, aroma, texture, and taste) formula 3 (30%, 20%) green beans and red beans

Indicator	Category	Panelists	Score	Total score	(%)
Colour	Really like	20	80	95	95.00
	Like	5	15		
	Dislike	0	0		
	Very Dislike	0	0		
Aroma	Really like	19	76	94	94.00
	Like	6	18		
	Dislike	0	0		
	Very dislike	0	0		

Textures	Really like	18	72	93	93.00
	Like	7	21		
	Dislike	0	0		
	Very dislike	0	0		
Taste	Really like	16	64	87	87.00
	Like	5	15		
	Dislike	4	8		
	Very dislike	0	0		
Total score				369	92.25
average score					92.25

Table 4. Acceptance analysis results (colour, aroma, texture, and taste) formula 4 (20%, 30%) green beans and red beans

Indicator	Category	Panelists	Score	Total score	(%)
Colour	Really like	20	80	95	95.00
	Like	5	15		
	Dislikes	0	0		
	Very dislike	0	0		
Aroma	Really like	19	76	94	94.00
	Like	6	18		
	Dislike	0	0		
	Very dislikes	0	0		
Textures	Really like	18	72	93	93.00
	Like	7	21		
	Dislike	0	0		
	Very dislike	0	0		
Taste	Really like	15	60	85	85.00
	Like	5	15		
	Dislike	5	10		
	Very dislike	0	0		
Total score				367	91.75
average score					91.75

Table 5. Results of Analysis acceptability (colour, aroma, texture, and taste) the formula 5 (10%, 40%) of green beans and red beans

Indicator	Category	Panelist	Score	Total score	(%)
Colour	Really Like	20	80	95	95.00
	Like	5	15		
	Dislike	0	0		
	Very dislike	0	0		
Aroma	Really like	19	76	94	94.00
	Like	6	18		
	Dislike	0	0		
	Very dislike	0	0		
Textures	Really like	17	68	92	92.00
	Like	8	24		
	Dislike	0	0		
	Very dislike	0	0		
Taste	Really like	13	52	83	83.00
	Like	7	21		
	Dislike	5	10		
	Very dislike	0	0		
Total score				361	90.25
average score				90.25	

Table 6. Acceptance analysis results (colour, aroma, texture, and taste) formula 6 (0%, 50%) green beans and red beans

Indicator	Category	Panelist	Score	Total score	(%)
Colour	Really like	20	80	95	95.00
	Like	5	15		
	Dislike	0	0		
	Very dislike	0	0		

Aroma	Really like	19	76	94	94.00
	Like	6	18		
	Dislike	0	0		
	Very dislike	0	0		
Texture	Really like	17	68	89	89.00
	Like	5	15		
	Dislike	3	6		
	Very dislike	0	0		
Taste	Really like	10	40	72	72.00
	Like	5	15		
	Dislike	7	14		
	Very dislike	3	3		
Total score average score				356	89.00
				89	

Table 7. The average value of the colour of flakes with the formulation of green beans and red beans

Formula green beans, red beans	The average value of the colour	
Formula 1 (50%, 0%)	3.76	± 0.43
Formula 2 (40%, 10%)	3.76	± 0.43
Formula 3 (30%, 20%)	3.76	± 0.43
Formula 4 (20%, 30%)	3.76	± 0.43
Formula 5 (10%, 40%)	3.76	± 0.43
Formula 6 (0%, 50%)	3.76	± 0.43

Table 8. The average value of aroma flakes with the formulation of green beans and red beans

Formula green beans, red beans	The average value of the aroma
Formula 1 (50%, 0%)	3.80 ± 0.40
Formula 2 (40%, 10%)	3.80 ± 0.40
Formula 3 (30%, 20%)	3.80 ± 0.40
Formula 4 (20%, 30%)	3.80 ± 0.40
Formula 5 (10%, 40%)	3.80 ± 0.40
Formula 6 (0%, 50%)	3.80 ± 0.40

Table 9. Average value of flakes texture with formulation of green beans and red beans

beans Formula green beans, red beans	Average value of texture
Formula 1 (50%, 0%)	3.76 ± 0.43
Formula 2 (40%, 10%)	3.80 ± 0.40
Formula 3 (30%, 20%)	3.72 ± 0.45
Formula 4 (20%, 30%)	3.72 ± 0.45
Formula 5 (10%, 40%)	3.68 ± 0.47
Formula 6 (0%, 50%)	3.80 ± 0.40

Table 10. Average value of flakes with the formulation of green beans and red beans

Formula green beans, red beans	Average value of flavour
Formula 1 (50%, 0%)	3.84 ± 0.37
Formula 2 (40%, 10%)	3.84 ± 0.37
Formula 3 (30%, 20%)	3.80 ± 0.40

Formula 4 (20%, 30%)	3.80 ± 0.40
Formula 5 (10%, 40%)	3.84 ± 0.37
Formula 6 (0%, 50%)	3.84 ± 0.37

Table 11. The energy content of flakes with the formulation of green beans and red beans

Formula green beans, red beans	Energy
Formula 1 (50%, 0%)	595.75 ± 2.08
Formula 2 (40%, 10%)	595.30 ± 1.52
Formula 3 (30%, 20%)	594.85 ± 0.57
Formula 4 (20%, 30%)	594.40 ± 1.73
Formula 5 (10%, 40%)	593.95 ± 1.52
Formula 6 (0%, 50%)	593, 50 ± 2.30

Table 12. Content of protein flakes with formulations of green beans and red beans

Formula green beans, red beans	Protein
Formula 1 (50%, 0%)	13.325 ± 1.52
Formula 2 (40%, 10%)	13.285 ± 2.08
Formula 3 (30%, 20 %)	13.245 ± 1.00
Formula 4 (20%, 30%)	13.205 ± 2.08
Formula 5 (10%, 40%)	13.165 ± 2.64
Formula 6 (0%, 50%)	13.125 ± 1.52

Table 13. Content of fat flakes with the formulation of green beans and red beans

Formula green beans, red beans	Fat
Formula 1 (50%, 0%)	25.675 ± 1.52
Formula 2 (40%, 10%)	25.655 ± 1.52
Formula 3 (30%, 20%)	25.625 ± 2.08
Formula 4 (20%, 30%)	25.615 ± 1.00
Formula 5 (10%, 40%)	25.595 ± 1.00
Formula 6 (0%, 50%)	25.575 ± 1.52

Table 14. The content of carbohydrate flakes with the formulation of green beans and red beans

Formula green beans, red beans	Carbohydrates
Formula 1 (50%, 0%)	78.70 ± 1.52
Formula 2 (40%, 10%)	78.67 ± 2.64
Formula 3 (30%, 20%)	78.64 ± 1.52
Formula 4 (20%, 30%)	78.61 ± 1.52
Formula 5 (10%, 40%)	78.58 ± 2.08
Formula 6 (0%, 50%)	78.55 ± 1.00

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