









while the highest caloric results were obtained in P1 treatment brownies using 100 grams of wheat flour. The more cassava flour is added, the use of wheat flour will decrease so that calorie levels can decrease.

Based on the ANOVA results, it shows that the proportion of wheat flour and cassava flour is very different (sig. 0.000) at the level of 5% ( $p < 0.05$ ) from the results of testing the calorie content of steamed brownies produced. Then, based on the results of Duncan's further test with a level of 5%, it was found that steamed brownies using control treatment with a composition of 100 grams of wheat flour were very different from steamed brownies using 50 grams of wheat flour and 50 grams of cassava flour. The results obtained showed that there was a decrease in the percentage of calorie content in steamed brownies using 50 grams of wheat flour and 50 grams of cassava flour. The more use of cassava flour, the calorie levels produced will decrease. This is because cassava flour has a lower calorie content than wheat flour, which is around 146 cal / 100 g [2]. Therefore, steamed brownies produced with a larger proportion of cassava flour will reduce the calorie content of the brownies. This is in accordance with Pulungan (2013) research that cassava brownies have a lower calorie content than brownies made from wheat flour [13].

### 3.4 Organoleptic

#### 3.4.1 Taste

Taste is one of the sensory test parameters that determines the panelists' preference for the quality of the brownies produced and can be tested using the taste buds. In general, the resulting brownie flavor is sweet chocolate due to the use of additional ingredients such as chocolate bars, sugar, and other additives.

Data from the study of high-fiber steamed brownies ranged from 3.69-3.83. The lowest steamed brownie flavor organoleptic results were obtained in P4 treatment with the use of 50 grams of wheat flour and 50 grams of cassava flour, while the highest organoleptic results of steamed brownie flavor were obtained in P1 treatment with the use of 100 grams of wheat flour. Organoleptic results of the taste parameters of steamed brownies as high-fiber foods can be seen in Figure 1.

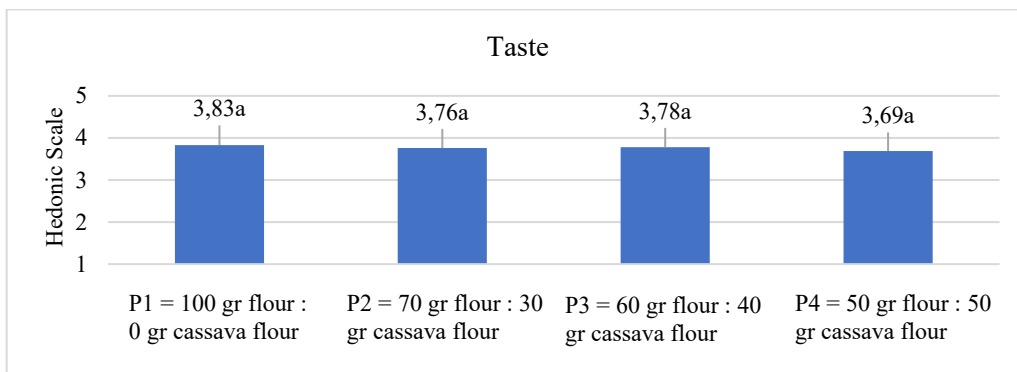


Figure 1. Organoleptic value of steamed brownie flavor

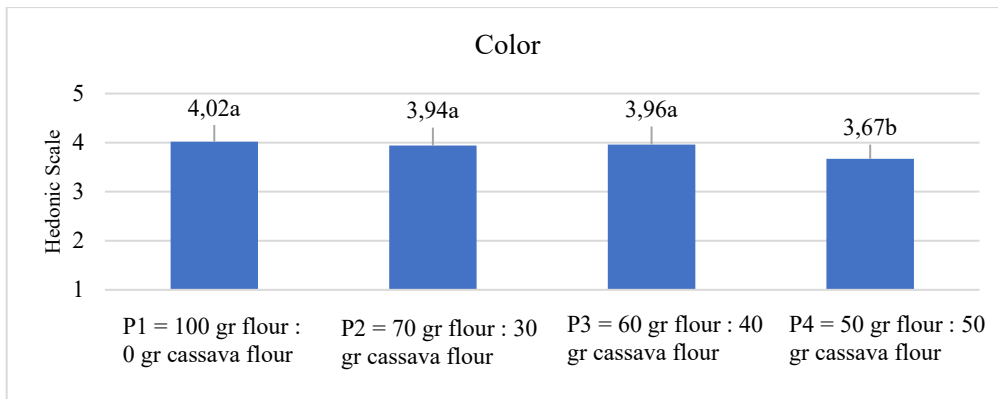
Based on the results of ANOVA showed that the combination of wheat flour and cassava flour in making steamed brownies had no real effect (sig. 0.000) at the level of 5% ( $p < 0.05$ ) on the taste of the resulting steamed brownies. The results obtained showed that steamed brownies using 100 g wheat flour had the highest value of 3.83 (like) with a sweet taste typical of brownies, while steamed brownies using 50 g wheat flour and 50 g cassava flour had the lowest value of 3.69 (like) with a less sweet taste. The use of cassava flour decreased the taste assessment by the panelists. This is because the addition of cassava flour can give cassava a distinctive taste to brownies so that panelists tend to prefer brownies with control treatment [13]. Therefore, the resulting steamed brownies have a fairly strong cassava flavor. This is in accordance with Yuniarti and Dwiani's (2021) research that the addition of cassava flour can reduce the taste of brownies because it can cause a distinctive cassava flavor [15].

#### 3.4.2 Color

Color is one of the sensory test parameters that determines the panelists' preference for the appearance of the resulting brownies that can be seen using the eyes. In general, the brownie color produced is brown due to the use of chocolate powder and chocolate bars.

Data from the study of high-fiber steamed brownies ranged from 3.67-4.02. The lowest organoleptic results of steamed brownie color were obtained in P4 treatment with the use of 50 grams of wheat flour and 50 grams of cassava flour, while the highest organoleptic results of steamed brownie color were obtained in P1 treatment with

the use of 100 grams of wheat flour. Organoleptic results of the color parameters of steamed brownies as high-fiber foods can be seen in Figure 2.



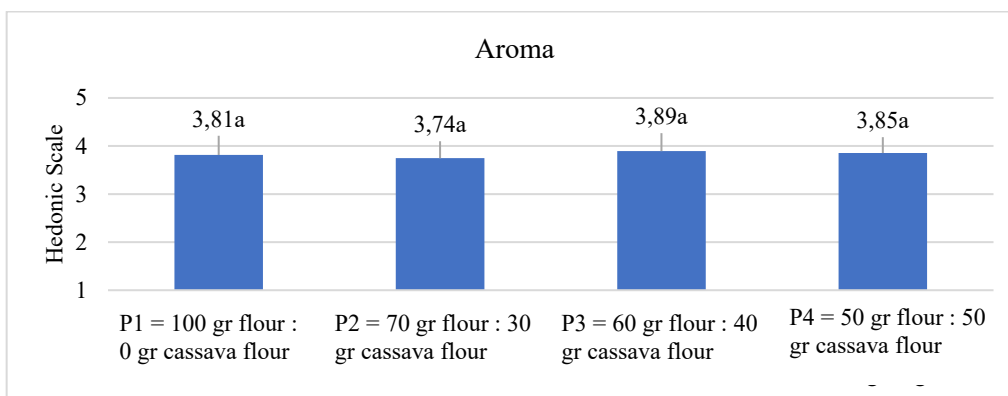
**Figure 2.** Organoleptic Value of Steamed Brownie Color

Based on the results of ANOVA shows that the combination of wheat flour and cassava flour in making steamed brownies has a significant effect (sig. 0.000) at the level of 5% ( $p < 0.05$ ) on the color of the steamed brownies produced. Then, based on the hedonic scale that has been converted, it is known that steamed brownies with control treatment have different values from steamed brownies that use various proportions of flour. The results obtained showed that steamed brownies using 100 grams of wheat flour had the highest value of 4.02 (likes) with a typical brownie brown color, while steamed brownies using 50 grams of wheat flour and 50 grams of cassava flour had the lowest value of 3.67 (likes) with a faded brown color. The less the use of wheat flour, the brownies produced will fade. This is because wheat flour has a higher amino acid content than cassava flour so that the maillard reaction that occurs during the steaming process will be faster [16]. This can lead to more brown pigment in brownies with the use of wheat flour in high proportions. Therefore, panelists tend to like brownies with the use of wheat flour in a larger composition. This is in accordance with Pangestika and Srimati's (2021) research that during the cake steaming process, a maillard reaction will occur which can form a brown pigment so that the resulting color becomes a distinctive brown [17].

### 3.4.3 Aroma

Aroma is one of the sensory test parameters that determines the panelists' preference for the quality of the brownies produced and can be tested using the sense of smell.

Data from the study of high-fiber steamed brownies ranged from 3.74-3.89. The lowest organoleptic results of steamed brownie aroma were obtained in P2 treatment with the use of 70 grams of wheat flour and 30 grams of cassava flour, while the highest organoleptic results of steamed brownie aroma were obtained in P3 treatment with the use of 60 grams of wheat flour and 40 grams of cassava flour. Organoleptic results on the aroma parameters of steamed brownies as high-fiber foods can be seen in Figure 3.



**Figure 3.** Nilai Organoleptik Aroma Brownies Kukus

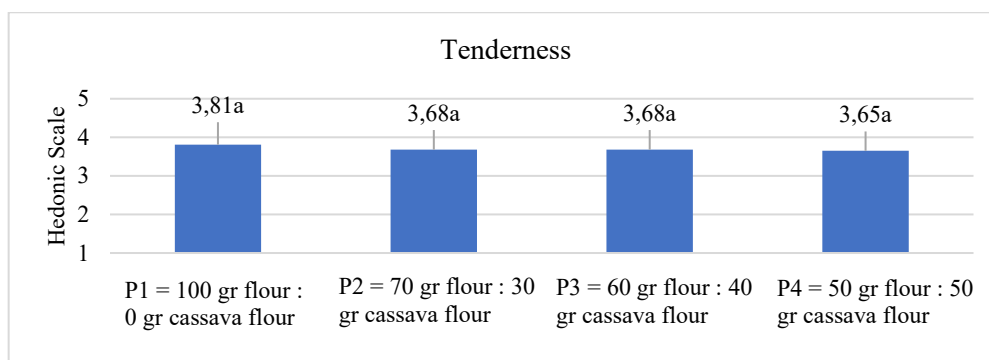
Based on ANOVA results, it shows that the combination of wheat flour and cassava flour in making steamed brownies has no real effect (sig. 0.000) at the level of 5% ( $p < 0.05$ ) on the aroma of steamed brownies produced.

The results obtained showed that steamed brownies using 60 grams of wheat flour and 40 grams of cassava flour had the highest value of 3.89 (likes) with a sweet brownie distinctive chocolate aroma, while steamed brownies using 70 grams of wheat flour and 30 grams of cassava flour had the lowest value of 3.74 (likes) with a distinctive brownie chocolate aroma which is pretty sweet. This is due to the use of brownie additives in the form of chocolate bars and chocolate powder which can give a distinctive aroma to brownies, where during the steaming process will evaporate volatile compounds in these ingredients so that they can mask the aroma of the flour used and can cause a distinctive sweet aroma in brownies [18]. Therefore, the resulting brownies have a sweet aroma peculiar to chocolate. This is in accordance with Fatimah's (2016) research that the use of chocolate powder and chocolate bars can affect the aroma of brownies produced [19].

### 3.4.3 Tenderness

Tenderness is one of the sensory test parameters that determines the panelists' preference for the softness and tenderness of the brownies produced.

Data from the study of high-fiber steamed brownies ranged from 3.65-3.81. The lowest organoleptic results of steamed brownie texture were obtained in P4 treatment with the use of 50 grams of wheat flour and 50 grams of cassava flour, while the highest organoleptic results of steamed brownie texture were obtained in P1 treatment with the use of 100 grams of wheat flour. Organoleptic results on the tenderness parameters of steamed brownies as high-fiber food can be seen in Figure 4.



**Figure 4.** Organoleptic Value of Steamed Brownie Tenderness

Based on the results of ANOVA showed that the combination of wheat flour and cassava flour in making steamed brownies had no significant effect (sig. 0.000) at the level of 5% ( $p < 0.05$ ) on the texture of the steamed brownies produced. The results obtained showed that steamed brownies using 100 grams of wheat flour had the highest value of 3.81 (likes) with a soft texture, while steamed brownies using 50 grams of wheat flour and 50 grams of cassava flour had the lowest value of 3.65 (likes) with a rather dense texture. This is because wheat flour has a higher gluten content than cassava flour, where the gluten has the property of trapping air and forming a good texture in brownies so that the brownies become softer [20]. Therefore, panelists tend to prefer brownies with a composition of using more wheat flour. This is in accordance with the research of Siswanto et al., (2015) that the gluten content in wheat flour can form a good texture by producing air cavities that can soften the texture of brownies.

### 3.5 Effectiveness Test

The effectiveness test aims to determine the main factors in a study and to determine the relationship or significance to the test parameters used. Based on the results of effectiveness tests on all research parameters including chemical tests and organoleptic tests (can be seen in Appendix 22) that formulation 3 with the use of 60 grams of wheat flour and 40 grams of cassava flour has the highest NH value. The average NH value in all research parameters of the effectiveness test can be seen in Table 4.

**Table 4.** The Value of the Test Results of the Effectiveness of Research Variables

Parameter	Weight	Weight Value	NH Formula Value			
			P1	P2	P3	P4
Rought fiber content	9	0,15	0	0,075	0,12	0,15
Calory content	9	0,15	0,15	0,105	0,09	0

Water content	8	0,13	0,13	0,117	0,104	0
Tenderness	8	0,13	0,13	0,078	0,078	0
Color	7	0,11	0,11	0,088	0,1	0
Taste	7	0,11	0,11	0,088	0,1	0
Aroma	6	0,1	0,05	0	0,1	0,08
Total	59	1	0,68	0,551	0,692*	0,23

Description: \* is the best treatment because it has the highest yield value

Based on the determination of the effectiveness test on all research parameters attached to (Appendix 22) shows that formulation 3 (P3) with the use of wheat flour as much as 60 grams and cassava flour as much as 40 grams is the best treatment with a yield value (NH) of 0.692 with parameters criteria of crude fiber content of 22.9%, calorie content of 6.74 cal, water content of 19.04%, tenderness is 3.68 (likes), color is 3.96 (likes), taste is 3.78 (likes), and aroma is 3.89 (likes).

## 4 Conclusion

The results showed that different proportions of wheat flour and cassava flour had a real effect on crude fiber content, had a very real effect on calorie content and did not differ significantly on the moisture content of *steamed brownies* produced in this study.

Based on the determination of effectiveness tests on all research parameters, it shows that formulation 3 with the use of 60 grams of wheat flour and 40 grams of cassava flour is the best treatment with a yield value (NH) of 0.692 with parameter criteria in the form of crude fiber content of 22.9%, calorie content of 6.74 cal, water content of 19.04%, tenderness of 3.68 (like), color of 3.96 (like), taste is 3.78 (likes), and aroma is 3.89 (likes).

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