Analysis Characteristics Organoleptic of Sorghum Pie for Quality Entrepreneurial Products with The Influence of Varieties and Concentration of Flour

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Abstract
The purpose of the research was to analyze sorghum pie products from the type and concentration of flour as a product diversification. **The method used** quantitative research with the study used a randomized block design (RBD) of 2 factors with 3 replications. I: type of flour (T): T1: red flour (Sorghum bicolor) and T2: white flour (KD 4). II: Concentration (K): K1: 25%; K2: 50%; K3: 75% and K4: 100%. Observations: organoleptic tests on the parameters of taste, color, taste and crispness, water content and carbohydrate. Organoleptic test using the Friedman test, while water and carbohydrate levels used variance test analysis followed by 5% duncan. **The results showed**: 1) Sorghum pie as one of alternative product diversification based on sorghum flour; 2) combination of sorghum pie best treatment: T1K3 (type of sorghum flour treated (T): T1 = Red Flour / Sorghum bicolor and concentration (K): K3 = 75 %); and the second sorghum pie: T2K3 (type of sorghum flour treatment (T): T2 = white flour / KD4 and concentration (K): K3 = 75%); 3) Sorghum pie is supporting diversification of alternative design products in higher education entrepreneurship.

Keywords
Sorghum_flour1, Pie_Sorghum2, Organoleptic_Testing3, Alternative_Food_Industry4, and Entrepreneurship High Education5

1. Introduction
Sorghum has good nutrition, in addition to carbohydrates, proteins, fats also contain minerals calcium, iron, phosphorus, and vitamin B1. Sorghum nutrition compared to other staple foods, sorghum calories 332cal per 100g, and carbohydrate content of sorghum 73g per 100g. But these grains have a high protein content (11 g per 100 g), calcium content (28 mg per 100 g), iron (4.4 mg), phosphorus (287 mg), vitamin B1 (0.38 mg). Based on this, sorghum can be used as an alternative source of food. Sorghum can be used as raw material for semi-finished products which is directed at enriching the potential of sorghum, namely sorghum flour, one form of its use is to substitute wheat flour for making pie products (Kangama, 2005; Noerhartati, 2010, 2012, and 2014). Pie is a savory snack, usually also

many are served when Eid remember besides serving pastries that tend to be sweet and also the host wants to present something that is salty and light to serve as snacks. Pie can be added various tastes, among others, is a very strong taste of cheese, can use grated edam cheese or parmesan cheese powder, milk pie, fruit pie, and others. Pie products have a low water content, so it will cause the product to be more hygroscopic, and easy absorption of moisture from the surrounding environment and can increase water content. Research is continued by doing business in order to maintain the water content in the product, namely by carrying out the right packaging process, so that it can eventually extend the shelf life (Cano, et al. 2013; Ministry of Health RI, 1996; Imran, 2014).

The purpose of this research:

a. diversification of sorghum-based food products
b. Increasing the potential of sorghum flour into pie products that have added value (value added)
c. Get the best combination treatment of sorghum pie

2. Research Methods

This research uses the Randomized Block Design (RBD) method which consists of 2 (two) factors with 3 (three) replications. I: Sorghum Flour Type (T), T1: red sorghum flour *(Sorghum bicolor),* T2: white sorghum flour *(KD* 4), Factor II: Sorghum Flour Concentration (K), K1: 25%, K2: 50%, K3: 75%, K4: 100%.

The process of making pie begins with mixing egg yolks, butter, and sugar using a mixer. Then add water slowly and add sorghum flour and wheat flour (according to the treatment) slowly as well while still stirring using a mixer. The dough is then stamping pie sorghum. The last stage, pie soghum is printed according to taste and fried in 15 minutes. Pie flow chart can be seen in Figure 1.

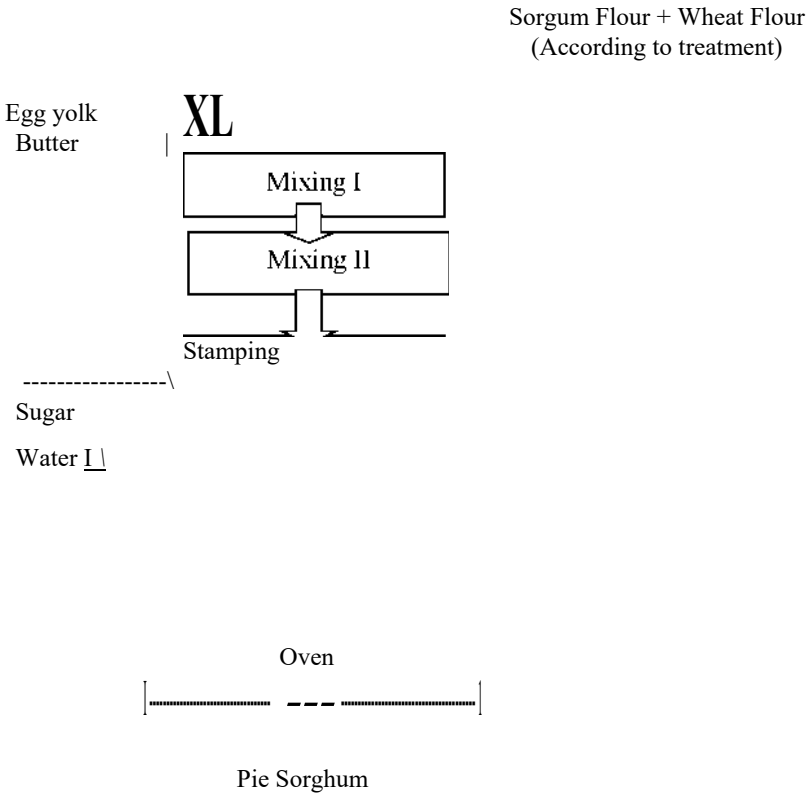


Figure 1. Process of Making Sorghum Pie

Analysis carried out on pie products was an analysis of moisture content and the consumer preference test is carried out by organoleptic tests using the scoring method. In this method the respondents are asked to assess the level of liking for the taste, and the crispness of the stick products by giving the following values or scores: 5 = really like, 4 = likes, 3 = neutral, 2 = rather like, 1 = dislike. Data processing for moisture content of sorghum pie was carried out by analysis of variance if there were differences, then Duncan test was carried out with a confidence level of 5%, while for organoleptic test with Friedman

test (Sudjana. 2009).
The selection of alternatives aims to determine the best alternative process. The choice of alternatives is based on the concept of obtaining expectations. The concept of the expected value decision is to choose a decision that has the maximum pay off (profit or usability). The mathematical equations for expected pay-off values are as follows (Siagian , 1987):

$$E_{pj} = Z \sum_{i=1}^{n} P(x_i) \cdot f(x_i, d_j)$$

Note:
Epj = Expected pay off value P (xi) = Probability of each base state xi xi = Different basic conditions dj = Calculated decision
f (xi, dj) = Acquisition of basic conditions and decision dj

3. Result and Discussion

3.1 Organoleptic Test

The results of observations of organoleptic sorghum pie with taste, colour, aroma, and crisp parameters are shown in Figures 2. Based on the results of organoleptic sorghum pie test, the parameters of taste, colour, flavour, and crispness showed that the highest score for taste parameters was T1K3 treatment (T1 = Red flour (T1) and K3 flour concentration = 75%), with a percentage of 66.6% score 5 (very fond), colour parameters was in the treatment of T2K3 (T1 = white flour (T2) and the concentration of sorghum flour K3 = 75%), with a percentage of 54.7% score 5 (very fond)), flavour parameters was in the treatment of T1K1 (T1 = Red flour (T1) and the concentration of sorghum flour K1 = 25%), with 63.3% score 5 (very fond), crispy parameters was treatment T2K3 (T1 = white flour (T2) and the concentration of sorghum flour K3 = 75%), with a percentage of 63.4% score 5 (very fond) (Yilmaz and Aydeniz, 2012; Ackbarali, 2014; Carbonell and Barrachina, 2007).

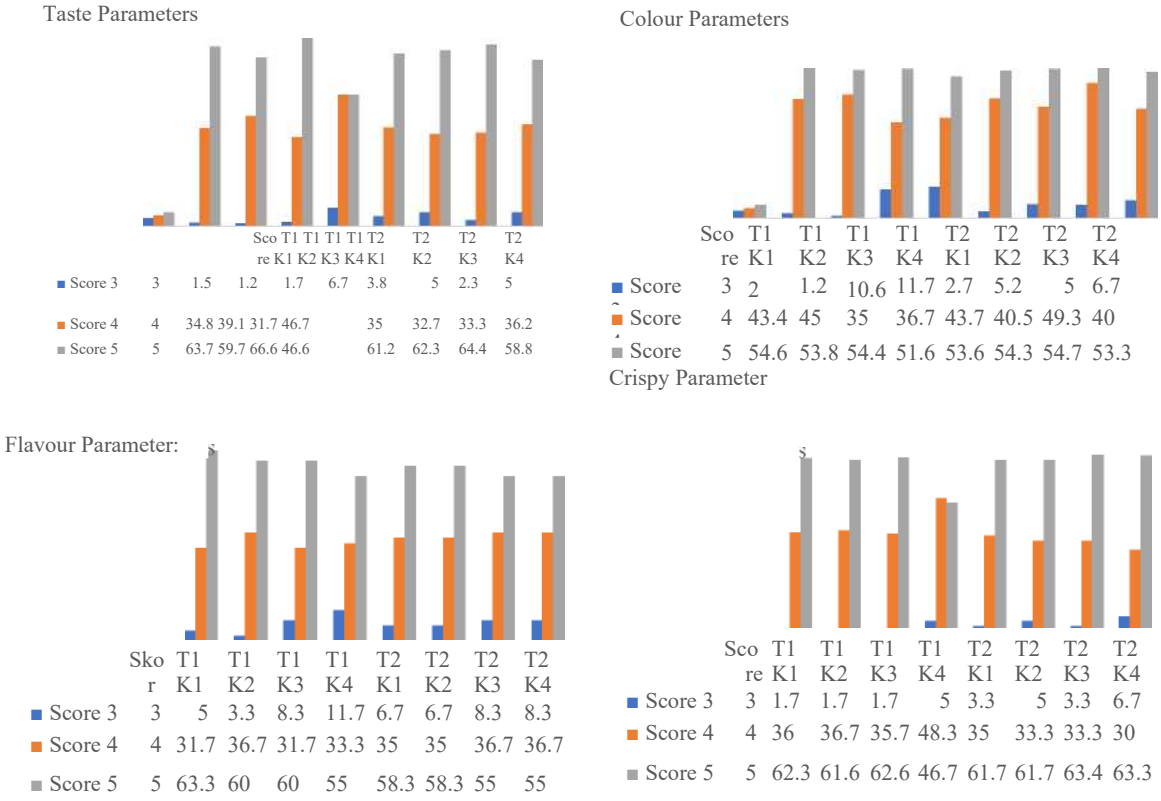


Figure 2. Organoleptic Test Pie Sorghum

The test results of the sorghum Friedman product showed that the colour parameters were significantly different (Sig 0.006 <0.05), while the taste parameters (Sig 0.086> 0.05), flavour (Sig 0.382> 0.05) and crispness (Sig 0.845> 0, 05) not significantly different. This means that the parameters of sorghum pie colour are influenced by both type factors and the concentration of sorghum flour. The colour of sorghum pie is strongly influenced by the colour of sorghum flour and the more flour is used, the colour will darken (FAO, 1999).

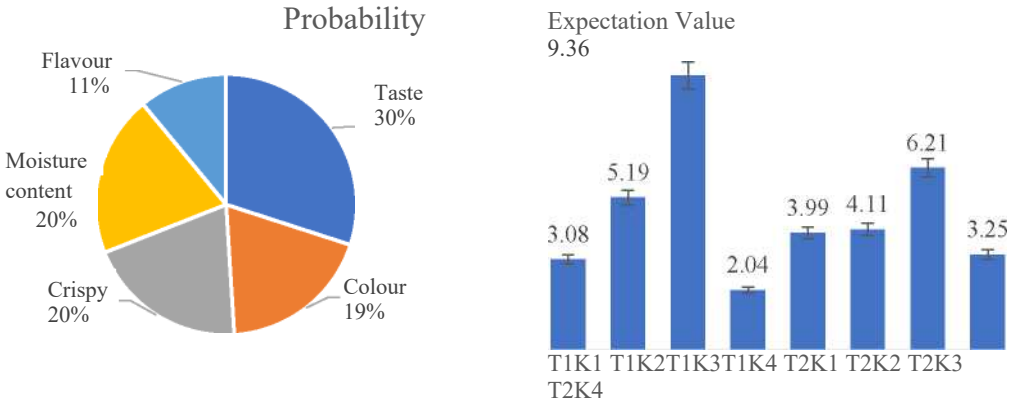
3.2 Moisture Content Test

The results of sorghum pie moisture content 2.17-2.22%, the variance analysis showed that sorghum pie moisture content levels Sig 0.144> 0.05, meaning that the sorghum pie moisture content was not significantly different (Kim , 2018).

3.3 Alternative Selection

The probability value indicates the level of importance of a basic state, the greater the probability value of a ground condition, the more important is the basic condition. For sorghum pie products, taste parameters (30%) are considered to be the most important parameters when compared with other parameters, which are moisture content (20%), crispness (20%), colours (19%), and flavour (11%). Alternative processes are compared to determine the optimal process. The selection of this alternative is done by calculating the expected value obtained by each alternative process. The results of the calculation of the expectation value for each alternative process are presented in Figure 3.

Figure 3. Probability and Expectation Value Pie Sorghum



Based on the results of the calculation of the expected value, the chosen treatment alternative is the treatment of T1K3 (T1 = Red flour / Sorghum bicolor (T1) and the concentration of sorghum flour K3= 75%), with the calculation of expectation value = 9.36, the second is the treatment T2K3 (T2 = White flour / KD4 (T2) and the concentration of sorghum flour K3 = 75%), with the calculation of the expectation value = 6.21. This means that the treatment is based on the best quality when compared to other treatments. Alternative processes are compared to determine the optimal process. The selection of this alternative is done by calculating the expected value obtained by each alternative process (Siferow, 2014).

4. Conclusions

Sorghum pie as one of alternative product diversification based on sorghum flour; combination of sorghum pie best treatment: T1K3 (type of sorghum flour treated (T): T1 = Red Flour / Sorghum bicolor and concentration (K): K3 = 75 %); and the second sorghum pie: T2K3 (type of sorghum flour treatment (T): T2 = white flour / KD4 and concentration (K): K3 = 75%).

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