Physical characteristics and organoleptic of chicken crepes

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Abstract. Crepes are one of the fast-food snacks from France. Crepes are round pancakes that are folded like a fan and thin. It can be added using chicken meat. This study aimed to determine the physical characteristics and organoleptic of chicken crepes substituted with mocap flour with bamboo shoots. This study used a completely randomized design with six treatments and three replications. There were P0 (rice flour, maize flour, and mocap flour 4.5%, without using bamboo shoot flour); P1 (2.5% mocap flour and 2% bamboo shoot flour); P2 (2% mocap flour and 2.5% bamboo shoot flour); P3 (1.5% mocap flour and 3% bamboo shoot flour); P4 (2% mocap flour and 2.5 percent bamboo shoot flour), P5 (1% mocap flour and 3.5 percent bamboo shoot flour). The data obtained were analyzed using ANOVA and continued using the Duncan Multiple Rate test if there was a significant or very significant difference (P˂0.05). The study concluded that the best treatment was on chicken crepes with P1 treatment (2.5% mocap flour and 2% bamboo shoot flour) from the water content test, Water Holding Capacity (WHC), pick up, hygroscopic and organoleptic. The results of the research on chicken crepes did not affect Water Holding Capacity (WHC) and pick-up values obtained (P> 0.05), while the water content and hygroscopic had a significant effect on chicken crepes with a significance value of 0.001 (P< 0.05). The organoleptic test results on chicken crepes significantly affected the texture (P<0.05). Meanwhile, chicken crepes had no significant effect on color, taste, and aroma (P>0.05).

1. Introduction

Chicken meat has high-quality protein, and is easily digested and contains essential amino acids needed by the human body, such as: Arginine, Cystine, Histidine, Isoleucine, Leucine, Lysine, Methionine, Phenylalanine, Threonine, Tryptophan, Tyrosine, and Valine. The composition of chicken meat consists of 73.7% water, 20.6% protein, 4.7% fat, and 1% ash [1]. According to [2], cooking/processing broiler chicken meat, especially in steaming, which causes food processing with steam/boiling, can affect the meat substances the fat in beef itself. Processing of meat increases the aesthetic and economic value, and enables consumers to get animal food products with different processed and flavors. At the same time, [3] states that along with the increase in existing science and technology, the creativity in processing meat into products will also increase food itself to be a favorite dish of people. The processing of meat products can increase high selling prices. One of the foods made from meat is crepes.

Crepes are one of the fast-food snacks from France. Crepes are thin pancakes made using wheat flour and no yeast. Nevertheless, the essential ingredients of crepes can be substituted with mocap flour with bamboo shoot flour. Crepes are rarely served plain and are served as desserts stuffed, coated, or served with a variety of toppings [4]. Mocaf substituted crepes with bamboo shoot flour were added using chicken.
Mocap flour is fermented product from cassava that has been modified. It has characteristics like flour. The microbes that grow during the fermentation process produces pectinolytic and cellulolytic enzymes that will destroy cell walls in cassava so that starch granules are liberated. This process will cause changes in the characteristics of the flour made. Thus, it increases the viscosity (adhesiveness), gelatin ability, rehydration power, and ease of solubility. The protein content of mocaf flour is low so that in making crepes to increase the protein content, it is necessary to mix bamboo shoot flour with high protein in protein [5]. Similarly, the taste of Mocaf became neutral by covering the cassava flavor by 70%. Although the chemical composition is not much different, mocap has specific physical and organoleptic characteristics compared to cassava flour in general.

Bamboo shoot (Dendrocalamus Asper) is one of the agricultural products that are cheap, easy to obtain, a lot in production. [6] The content in bamboo shoots, such as antioxidants, potassium, and high fiber helps to reduce cholesterol levels and blood pressure (hypertension). Bamboo shoots contain protein, carbohydrates, vitamin A, vitamin B6, vitamin E, and 12 kinds of amino acids, which are tremendously useful for body health. Bamboo shoots are one type of vegetable that has high nutritional content. Therefore, they are suitable for health, especially in fiber and potassium content. Besides, the bamboo shoot flour is able to act as an alternative to wheat flour. Dietary fiber is a compound in complex carbohydrates that are widely found in the cell walls of food plants. The fiber content of bamboo shoots is relatively high: 2.56%, higher than other types of tropical vegetables, such as soybean sprouts (1.27%), napa cabbage (1.58), cucumber (0.61), and mustard greens (0.61). 1.01).

2. Material and method

2.1 Sample collection
This study used broiler breast chicken meat. The crepes substituted with mocaf flour with bamboo shoot flour were weighed according to the ratio, rice flour, cornstarch, milk, baking soda, chicken powder, salt, and eggs. The sampling was carried out for 6 treatments with 3 replications, in April 2021. The making of crepes and testing were conducted at the Animal Products Engineering and Processing Technology Laboratory, Faculty of Animal Science, Brawijaya University.

2.2 Physical characteristics
Physical characteristics of chicken crepes substituted with mocaf flour with bamboo shoot flour were based on physical quality, consisting of water content, Water Holding Capacity (WHC), pick up, hygroscopic and organoleptic tests comprised of color, taste, texture, aroma, and acceptability.

3. Result

3.1 Based on the results of the research on the physical characteristics of chicken crepes, the data obtained on Table 1.

Table 1. The average value of Water Holding Capacity (WHC) crepes.

| Treatment | WHC (%) ± SD   |
|-----------|----------------|
| P0        | 306.609 ± 47.55a |
| P1        | 302.497 ± 47.55a |
| P2        | 283.435 ± 47.55a |
| P3        | 319.710 ± 47.55a |
| P4        | 334.755 ± 47.55a |
| P5        | 285.532 ± 47.55a |

Information: Superscript numbers followed by lowercase letters in the same column is not significantly different at the 5% level.

Table 1 shows that the average value of Water Holding Capacity (WHC) % ranges from 283.435% to 334.755%, with a significance value of 0.989 (p>0.05). This shows that the effect of treatment P0, P1, P2, P3, P4, and P5 has no significant difference. Therefore, there is no need to precede the multiple
comparison tests. Water Holding Capacity (WHC) is closely related to the level of tenderness of meat when cooked, the higher the water holding capacity, the better the quality of the beef related to consumer palatability [7]. The tendency of higher water binding capacity of chicken meat can be due to the presence of high intramuscular fat content that has not been oxidized.

Table 2. The average value of hygroscopic crepes.

| Treatment | Hygroscopic (%) ± SD |
|-----------|----------------------|
| P0        | 0.00 ± 0.00a         |
| P1        | 0.98 ± 0.10b         |
| P2        | 1.14 ± 1.15b         |
| P3        | 1.40 ± 0.044b        |
| P4        | 1.39 ± 0.23ab        |
| P5        | 1.80 ± 0.45c         |

Information: Superscript numbers followed by lowercase letters in the same column is significantly different at the 5% level.

Table 2 showed that the average of hygroscopic value ranged from 0.00% to 1.80%, with a significance value of 0.001 (P<0.05). This indicates that the five treatment formulas were significantly different between P0, P1, P2, P3, P4 and P5. Afterwards, the Duncan's further test was carried out to find the fundamental differences in each treatment. The results of the analysis of variance showed that the hygroscopic characteristics were significantly different in treatment P0 with treatments at P1 and P5. Hygroscopic is the ability of a product to absorb water. This is because the amylopectin structure is less compact and less intense in the development process during frying. The development of larger crackers has a weakness that will cause the crackers to quickly absorb water (hygroscopic) or become more sluggish. The high level of crispness can make it easier for crackers to drink water in the air during storage at room temperature. The nature of the cracker product is the ease of absorbing water (hygroscopic). If it is easier and faster to absorb water, the cracker product will become sluggish so that it is not crunchy [8].

Table 3. The average value of pick up crepes.

| Treatment | Pick up (%) ± SD |
|-----------|-----------------|
| P0        | 56.06 ± 1.745a  |
| P1        | 55.90 ± 0.313a  |
| P2        | 54.40 ± 2.240a  |
| P3        | 55.87 ± 2.385a  |
| P4        | 56.16 ± 1.765a  |
| P5        | 54.82 ± 1.767a  |

Information: Superscript numbers followed by lowercase letters in the same column is not significantly different at the 5% level.

Table 3 shows that the average value of pick-up ranges from 54.40% to 56.16%, with a significance value of 0.780 (p>0.05). This indicates that from the six treatment formulas, there was no significant difference between treatments P0, P1, P2, P3, P4 and P5.

Table 4. The average value of water content crepes.

| Treatment | Water Content (%) ± SD |
|-----------|------------------------|
| P0        | 1.26 ± 0.061a          |
| P1        | 1.32 ± 0.064ab         |
| P2        | 1.38 ± 0.075ab         |
| P3        | 1.54 ± 0.263b          |
| P4        | 2.40 ± 0.137c          |
| P5        | 2.51 ± 0.090c          |

Information: Superscript numbers followed by lowercase letters in the same column is significantly different at the 5% level.
Table 4 showed that the average value of water content ranged from 1.26% to 2.51%, with a significance value of 0.001 (P<0.05). This indicates that from the six treatment formulas, there were significant differences between P0, P1, P2, P3, P4, and P5. Based on the results of the analysis of variance, it was found that chicken crepes had a significant effect (P<0.05) on the water content characteristics of crepes in treatment P0 which was significantly different from P3, P4, and P5. Crepes are hollow snacks, containing low water content. The rate of water absorption depends on the surrounding environmental conditions, so the level of sluggishness in the crepes will decrease. The water content in food ingredients will determine the shelf life of food. The water content in broiler meat is 72.2-73.6% and protein is 20-23% [9]. The moisture content plays a vital role in determining the durability of foodstuffs, which affects the physical properties, chemical, enzymatic, and microbiological changes of foods [10].

3.2 Based on the results of the research on the physical characteristics of chicken crepes, the data were obtained in Table 5. Organoleptic testing was conducted to determine the level of consumer preference (hedonic) for chicken crepes substituted with mocaf flour with bamboo shoot flour. The test method used was scoring. The numerical scale used ranged 1 to 5. The parameters observed were color, taste, aroma, and texture of the chicken crepes substituted with mocaf flour with bamboo shoot flour. The color parameter showed the color of the crepes based on the panelists' preference level. The flavoring offered the taste of the crepes based on the panelists' preferences. The texture of organoleptic testing was the ease of biting and chewing.

Table 5. The average value of texture, color, aroma, and taste of crepes.

| Treatment | Texture ± SD | Color ± SD | Aroma ± SD | Taste ± SD |
|-----------|-------------|------------|------------|------------|
| P0        | 4.73 ± 0.45a | 4.80 ± 0.41a | 3.26 ± 0.59a | 4.33 ± 0.72a |
| P1        | 4.50 ± 0.51b | 4.60 ± 0.50a | 3.80 ± 0.56a | 4.33 ± 0.72a |
| P2        | 4.20 ± 0.67ab | 4.60 ± 0.50a | 3.80 ± 0.57a | 4.20 ± 0.86a |
| P3        | 3.73 ± 0.70bc | 4.60 ± 0.50a | 3.80 ± 0.56a | 4.46 ± 0.63a |
| P4        | 3.26 ± 0.88ab | 4.46 ± 0.63a | 3.80 ± 0.77a | 4.33 ± 0.48a |
| P5        | 2.86 ± 0.74ab | 4.20 ± 0.77a | 3.60 ± 1.05a | 4.06 ± 0.70a |

Information: Superscript numbers followed by lowercase letters in the same column were not significantly different at the 5% level. Whereas, the superscript numbers followed by lowercase letters in the same column showed a very significant difference at the 5% level.

Based on the results of analysis of variance on texture, it can be seen that chicken crepes substituted with mocaf flour with bamboo shoot flour obtained a significance value of 0.001 (P<0.05). Therefore, it can be concluded that there is an effect of texture on chicken meat crepes. Afterwards, the Duncan test should be conducted to determine the difference among the six treatments. The results of the Duncan test showed that the textures with the addition of rice flour, maizena flour, mocaf flour and bamboo shoot flour were significantly different, where the P0 treatment (rice flour, maizena flour and mocaf flour 4.5%, without using bamboo shoot flour) was substantially different from the treatment P5 (1% mocaf flour and 3.5% bamboo shoot flour). The texture has complex effect and it related to the structure of the material which consists of three elements, such as mechanical (hardness, elasticity), geometric (sandy, crumbly), and mouthful (oily, watery) [11].

Based on the results of the analysis on color variance, it was known that chicken crepes substituted with mocaf flour did not have a significant effect (P>0.05) on the color of the crepes. The average value of the color of chicken meat crepes based on the panelists' assessment is in Table 5, ranging from 4.20 to 4.80. The average value is the score of the deviant-dark brown color. The resulting brown color is from the color of the bamboo shoot flour used. The cut bamboo shoots were soaked in a 0.3% Na2S2O5 solution with variations in time of 15 minutes, 30 minutes, 45 minutes, and 60 minutes and then dried in the dryer cabinet for ±13-15 hours, after drying the flour, it was conducted flour milling process. The flour milling process was carried out twice [12].
Based on the results of the analysis on the aroma variance of chicken crepes substituted with mocaf flour with bamboo shoot flour, there was no significant effect (P>0.05) on the aroma of the crepes. The average value of crepes based on the smell of the panelists is in table 5 with an average deal ranging from 3.26 to 3.80. The average value is the score of the deviant-very smell of chicken. The components contained in bamboo shoots are hexadecanoate acid and octadecadienoate acid as compounds that make up the aroma of bamboo shoots [13].

Based on the results of the analysis on the taste variance of chicken crepes substituted with mocaf flour with bamboo shoot flour, it did not have a significant effect (P>0.05) on the taste of the crepes. The average value of the taste of chicken crepes on the panelists is in table 5 ranging from 4.06 to 4.46. The average value is the score of the deviant-savory taste. Taste is a response to chemical stimuli that reach the tongue, including 4 basic tastes as sweet, salty, sour, and bitter [14].

4. Conclusion
The conclusion of the study showed that the best treatment was on chicken crapes with P1 treatment (2.5% mocaf flour and 1.5% bamboo shoot flour) from the water content, Water Holding Capacity (WHC), pick up, hygroscopic and organoleptic tests. The formulation in making chicken crepes substituted with mocaf flour with bamboo shoot flour consists of mocap flour, bamboo shoot flour, cornstarch, rice flour, milk, eggs, sugar, margarine, baking powder, chicken powder, salt and chicken meat. The difference in the proportion of the use of mocaf flour and bamboo shoot flour has a significant effect on the physical properties of the resulting chicken crepes.

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Acknowledgments
Thank you to my parents who have funded my research, provided support and motivated me.