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THE EFFECTIVENESS INCREASMENT ANTIOXIDANT AND REDUCTION HARDNESS OF CATFISH MEATBALL UNDER PURPLE SWEET POTATO (*IPOMEA BATATAS L.*) FLOUR

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ABSTRACT

Catfish meatball is one of children favored foods. The food is good because low colestrol and high protein. However the meatball is normally hard to bite for the children because they use a tapioca wich contain amylopectin high cocentration. Sense the meatball favored by children, this food is a good agents to delivered antioxidant. Substitution with flour of purple sweet potato (*Ipomea batatas L.)*, will increase antioxidant concentration, and at the same time would reduce the hardness of the meatball produced. Because purple sweet potato (*Ipomea batatas L.)* contain low amylopectin. To meet these goals two stages of research were conducted 1 (first) add the identity of most appropriate levels of purple sweet potato (*Ipomea batatas L.)* concentration wich was accepted by panelist to this five levels of flour cocentation where the five levels is 0% (control); 10%; 20%; 30% and 40%. Produced meatballs where evaluated by sensorically intern of color, smell (aroma), and overall. For 20% concentration flour purple sweet potato (*Ipomea batatas L.)* was preferer by panelist in term of its texture, taste and taste. However more than 20% of concentration flour purple sweet potato, make the hardness too soft and was not aceepted and the taste was dominantly by flour purple sweet potato. The research was concentrate use of two concentration flour purple sweet potato (*Ipomea batatas L.)*. The results showed that the protein wasn‘t significantly different from both concentration purple sweet potato (*Ipomea batatas L.)* between 10%; 20% and control. Where are the antioxidant will increased by substitution of both 10% concentration of flour sweet potato (*Ipomea batatas L.)* and 20% concentration flour purple sweet potato (*Ipomea batatas L.)*. The higher antioxidant is in 20% concentration of purple sweet potato (*Ipomea batatas L.)* flour. The hardness of produced meatballs treated with 10% and 20% of flour were lower than the unsubstitution (control). This analysis uses a non-parametric test for first stage. Then using test one way anova to test the effect of texture and antioxidant treatment.

Keywords: *catfish meatballs, tapioca flour, purple sweet potato*

1.INTRODUCTION

Meatball is a processed meat product that is very well liked. Beef prices is costly. Beef meatballs can be replaced with fish meat that has a fairly high protein content. Protein in catfish 17.7%. Catfish *Clarias batrachurs* by its Latin name, it is very popular with all people because the meat is very tasty and delicious. The low fat from catfish can helping a pregnant woman to growth of the fetus either for good heart health and for growing children, (Team Agriminakultura, 2008). Catfish meatballs substituted by purple sweet potato flour (Ipomoea batatas L.) because it has several advantages, namely fiber, and high anthocyanin than other types. The function of anthocyanins in purple sweet potatoes have antioxidant effects that can destroy free radicals, as a result of nicotine, air pollution and chemicals. (Iriyati, 2012). The purpose of this study to obtain the exact composition between tapioca flour with sweet potato flour on the physicochemical and sensory of catfish meatball

According Wibowo (1995), meatballs sensory quality criteria include:

1 Texture

Texture that has good quality is a compact texture, elastic, springy but not tough, no meat fibers, not mushy, not wet watery and fragile.

2 Colors

The meatballs were good for a young brown beef and white for fish balls. The resulting color depends on the color of meat is used as the base material and the addition of tapioca flour. The more tapioca flour used color fading meatballs.

3 elasticity

Good level of resilience is the meatballs were not too chewy tapioca flour as more and more were added to the clay structure gelnya that the resulting product is less good meatballs.

4. sightings

Round-shaped fish balls should be smooth, uniformly sized, clean, and not dull.

5. Odor

Distinctive odor of fresh fish stew (depending on the type of fish used), the smell of spices is quite sharp, not fishy / stale

6 Sense

Delicious, flavor of the fish in accordance with the type of fish used, not too salty seasonings.

2.MATERIAL AND METHOD

2.1.Material and Tools

The materials used in this study is the purple potato flour, tapioca flour, meat catfish, ice water, salt, spices, such as garlic, sesame oil, egg whites. The tools used are spoons, containers, pots, stoves, knives, blender, analytical balance. Tools for test hardness is Texture Analyser the brand LLOYD. Equipment to test moisture content is porcelain bowls and oven. Equipment for protein assay include kjeldahl tube, distillation and other chemical tools.

Equipment for antioxidant test vials tube, flask, aluminum and other chemical tools.

2.2.Methode

The study was conducted two phases: the first preliminary test to determine the ratio of sensory subtitusion tapioca flour and a purple potato flour against catfish meat to be used in the main study. The second main is a study protein test, antioxidant test and texture. This analysis used non parametric test for sensory. Then using one way ANOVA test for the effect of antioxidant treatment trials base on texture and self life

3.RESULTS AND DISCUSSION

3.1.Sensory

Table 1: Results of Preliminary Test of Sensory Research on Catfish Meatballs with Various Concentrations of Tapioca Starch.

Purple sweet potato flour substitution treatment	Parameter					
	Color	Aroma	Texture	Taste	After taste	Overall
Control	4,17 ± 1,05 [a]	3,40 ± 1,61 [a]	3,70 ± 1,41 [a]	3,70 ± 1,41 [a]	3,70 ± 1,29 [a]	3,97 ± 1,29 [a]
10%	3,80 ± 1,21 [a]	3,67 ± 1,21 [a]	3,27 ± 1,33 [ab]	3,70 ± 1,20 [a]	3,67 ± 1,29 [a]	3,73 ± 1,28 [a]
20%	3,07 ± 1,01 [b]	2,83 ± 1,05 [b]	3,47 ± 1,07 [a]	3,07 ± 1,38 [ab]	3,10 ± 1,39 [a]	3,03 ± 1,24 [b]
30%	1,97 ± 0,99 [c]	2,60 ± 1,22 [b]	1,97 ± 1,15 [c]	2,17 ± 1,17 [c]	2,23 ± 1,16 [b]	2,20 ± 1,18 [c]
40%	2,00 ± 1,23 [c]	2,50 ± 1,61 [b]	2,60 ± 1,40 [bc]	2,37 ± 1,18 [bc]	2,30 ± 1,26 [b]	2,07 ± 0,98 [c]

Specification:

- All values are mean ± standard deviation
- Values with different superscript in each parameter showed a significant difference at 95% confidence level ($p < 0.05$) using the Kruskal Wallis and Mann Whitney.

Based on Table 1 above it can be seen that the concentration of purple sweet potato flour substitution of 10% is most preferred by consumers in terms of color, aroma, and overall. Purple sweet potato flour substitution concentration of 20% is most preferred by consumers in terms of texture, flavor and after-taste. From the results it was found that if the starch concentration of 10% and 20% had no noticeable difference in the assessment of the panelists all parameters tested. Therefore, the main study used two concentrations of the purple sweet potato flour. The results showed that the higher the percentage the addition of flour, of which more than 20%, namely 30% and 40% giving a purple potato flour, the lower level of preference panelists. This is because the panelists prefer a scent that smells meat meatball aroma compared with flour. During ripening reaction will occur between fillers and meat, so the aroma of the meat is reduced during processing, (Montolalu, 2013). Panelists also like meatballs that color is not flashy, and not dark. Protein content in purple sweet potato caused color being brown. The more purple potato flour, make

more taste of the purple sweet potato flavor than the meat., (Montolalu, 2013). The texture of the meatballs hardness was diminished during the addition of purple sweet potato flour. Similarly, the after taste meatballs, where more and more flour is added has a sweet potato after taste purple.

3.2.Protein

Table 2. Protein Test Results on the Main Test with a concentration of 10% and 20%

Concentration purple sweet potato	Protein levels (%)
Control	36,59 ± 1,36 [a]
10%	34,75 ± 1,25 [a]
20%	34,81 ± 2,17 [a]

Specification:

- Data shown are mean ± standard deviation
- Values with different superscript in each parameter showed a significant difference between treatments at the 95% confidence level (p <0.05) by one-way ANOVA

From the data in Table 2, it is known that protein content catfish meatballs are higher than in the control catfish meatballs with purple sweet potato starch concentration of 20% in the amount of 34.81% and catfish meatballs with purple sweet potato starch concentration of 10% is equal to 34.75%. In control of catfish meatballs with purple sweet potato flour 10% and 20% there is no real difference. Catfish meatballs with purple sweet potato flour 10% with catfish meatballs purple potato flour 20% known no real difference. This means that the substitution of sweet potato flour for each different treatment does not give significant effect on the value of the protein content meatballs, (Yudanto. 2009).

3.3.Antioxidant

Table 3 Antioxidant Content of Catfish meatballs with potato starch concentration Various Purple

Concentration purple sweet potato	Antioxidant
Control	11,95 ± 7,95 [a]
10%	17,20 ± 7,62 [b]
20%	24,13 ± 7,92 [c]

Specification:

- Data shown are mean ± standard deviation
- Values with different superscript in each parameter showed a significant difference between treatments at the 95% confidence level (p <0.05) by one-way ANOVA

The highest antioxidant concentration on catfish meatballs with purple sweet potato flour 20% of 24.13% than catfish meatballs purple potato flour concentration 10% by 17.20%. Lowest antioxidant found in catfish meatballs control the amount of 11, 95%. Meatballs control of purple potato meatball starch concentration of 10% and 20% are known from the table there is a real difference. Between meatballs concentration 10% purple sweet potato flour and potato starch concentration of 20% purple had real difference. The addition of purple potato starch concentration of 20% has a higher antioxidant content than others. The presence of pigments in sweet potato can serve as a

healthy food components, such as anthocyanin compounds found in purple sweet potato, (Suprapto 2012). Anthocyanin levels in the meatballs tend to rise as more and more substitution purple sweet potato is used in making meatballs so the more the levels of anthocyanins contained in the meatballs.

3.4.Hardness

Table 4 Texture Hardness In Purple Sweet Potato Flour Concentration Different

Concentration purple sweet potato	**Hardness (gf)**
Control	1227,64± 178,67 [a]
10%	1112,07 ± 95,98 [b]
20%	1098,22 ± 133,55 [b]

Specification:

- Data shown are mean ± standard deviation
- Values with different superscript in each parameter showed a significant difference between treatments at the 95% confidence level (p <0.05) by one-way ANOVA

The meatballs were given a purple potato flour texture hardness decreased. There is a real difference between the control catfish meatballs with meatballs purple potato flour treatment concentration of 10% and 20%. While the meatballs concentration of 10% purple sweet potato flour with meatballs concentration of 20% purple sweet potato flour no real difference. Meatball texture is determined by the water content, fat content and the types of carbohydrates. High water content will cause the texture becomes soft.

The ability of the water holding capacity on meatballs, affects the texture of meatballs. The texture can also affect the level of fragility caused by gluten which when coupled with water and mechanical work will form a dough that is elastic, (Montolalu, 2013).

According to Santoso (2006), the ratio of amylose and amylopectin starch sweet potato with tapioca inversely related. Purple sweet potato flour had 69.82% amylose and amylopectin tapioca has 30.18% instead of 14% amylose and amylopectin 30.18%. The meatballs were generated by substitution of purple sweet potato has a higher level of tenderness of the meatballs without substitution purple sweet potato.

Based on table 3 and 4. The higher substitution of purple sweet potatoes flour will increase an antioxidant and decrease on harness. But as known as table 1. Substitution purple sweet potatoes 30% and 40% was not preferred because the color being too dark, aroma and taste would dominated by purple sweet potatoes as well as decreasing hardness.

4.CONCLUSIONS

The substitution of purple sweet potatoes flour as a filler to produce a percentage 20% of meatballs with good sensory properties and antioxidant as well as texture. The addition of purple sweet potato flour increase

antioxidants and decrease of hardness. 20% antioxidant arebest. Based hardness 10% and 20% were not significantly different. More than 20% the meatballs will be too soft, flashy color and more flavor from purple sweet potatoes

5.ACKNOWLEDGEMENTS

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