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The Effect of Natural Papaya Latex Tenderizer on the Organoleptic Quality of Duck Nuggets

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ABSTRACT

Duck meat is widely used as food in Asia because it has a high protein content. This study aims to evaluate the effect of papaya latex on the organoleptic quality of duck nuggets. The design used in this study was a completely randomized design (CRD) consisting of 5 treatments and 5 replications. The treatment used was without softening (P0), 5% papaya latex (P1), 10% papaya latex (P2), 15% papaya latex (P3), and 20% papaya latex (P4). The variables measured in this study were color, texture, taste, aroma, tenderness, and general acceptance. The data obtained were analyzed by analysis of variance and the treatment that had a significant effect on the measured variable was further tested using Duncan's Multiple Range Test (DMRT). The results showed that duck nuggets which were tenderized with papaya latex had no significant effect (P>0.05) on color, texture, aroma, taste, tenderness, and general acceptance.

Keyword: Black soldier fly maggots, Growth performance, Meat protein, Meat fat

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1. Introduction

Duck meat is still very popular and widely used as food in Asia because it has a high protein content. The protein content of duck meat ranges from 18.6 - 20.1% and the fat content ranges from 2.7 - 6.8% [1]. Rejected duck meat is meat obtained from female livestock that is no longer productive (laying eggs). Duck meat from rejected ducks has several weaknesses, namely having a tough texture and a higher fat content. Therefore, the processing of rejected duck meat needs to be done in order to produce a quality product that is liked by consumers, to change the dislike for rejected duck meat, it is necessary to make processed variations, for example nuggets [2]

Nugget is a form of processed meat product that is popular all over the world, made from ground beef that is printed or cut and coated with breadcrumbs and then fried. [3]. One way to improve sensory quality is by tenderizing the meat using papaya fruit sap (Carica papaya L.). Papaya fruit is a type of plant fruit that produces a protease enzyme, namely the papain enzyme which aims to change the texture of tough meat to be more tender. Tenderizing rejected duck meat before being processed into duck nuggets is expected to produce better duck nuggets than the stages of tenderizing meat with papaya latex [4].

2. Material and Methods

2.1. Time and Place of Research

This research was carried out at the Animal Products Technology Unit Laboratory, Faculty of Animal Husbandry, Halu Oleo University, Kendari, Southeast Sulawesi.

2.2. Research Materials

1. Material

The material used in this study was nuggets with the main ingredient of rejected duck meat obtained from traders in the market in Kendari City. Supporting ingredients consist of papaya latex, water, pepper or pepper, garlic, salt, chicken eggs, ice cubes, panir flour, wheat flour, eggs, cooking oil, flavorings. The equipment used in this study were basins/pans, spoons, knives, pots and pans, frying pans, chopping boards, pans, trays, stoves, labels, stopwatches, blenders, silk, scales, oil filters, blenders, plates and meat grinders.

2. Tools

The tools used in this research were copper (meat grinder), digital scales, pans, basins, spoons, pH meters, analytical scales, gas stoves, pestles, label paper, stationery and cameras.

2.3. Research Design

The experimental design used for this research was a Completely Randomized Design (CRD) using 5 treatments and 5 replications.

Table 1. Duck Nugget Material Formulation

Ingredients	Composition									
	P0		P1		P2		P3		P4	
	g	%	g	%	g	%	g	%	g	%
Culled Duck Meat	500	56	500	55	500	54	500	53	500	52
Papaya Sap	-	-	5	1	10	2	15	3	20	4
Tapioca flour	50	10	50	10	50	10	50	10	50	10
Pancake Flour	50	10	50	10	50	10	50	10	50	10
Garlic	10	2	10	2	10	2	10	2	10	2
Pepper Powder	5	1	5	1	5	1	5	1	5	1
Ice	27,5	5,5	27,5	5,5	27,5	5,5	27,5	5,5	27,5	5,5
Salt	2,5	0,5	2,5	0,5	2,5	0,5	2,5	0,5	2,5	0,5
Egg	5	1	5	1	5	1	5	1	5	1
Flour	70	14	70	14	70	14	70	14	70	14

The design used in this study was a completely randomized design (CRD) consisting of 5 treatments and each treatment consisted of 5 replications. With the following treatment:

G0= No softening (control)
G1 = 5% softening of papaya latex.
G2 = 10% softening of papaya latex.
G3 = 15% softening of papaya latex.
G4 = 20% softening of papaya latex.

2.4. Research variable

The procedure for making duck nuggets is the first step, the tools and materials used are prepared in advance. Put the ground and marinated meat in a bowl then add 2% garlic, 1% pepper, 0.5% salt, 10% tapioca flour, 1% egg, 14% wheat flour, and 5.5% ice cubes, then stir all the ingredients until smooth. The results of mixing the meat and spices are put into the dough mold, namely the gutter that has been provided. After that the mixture is steamed for 25 minutes at 180ºC, then the finished nuggets are cut into 2x2 cm sizes. Then the nugget pieces are put into the egg which has been beaten beforehand, then covered with 10% bread flour until

blended. Furthermore, the nuggets are fried a second time in hot oil at a temperature (150ºC - 180ºC). Frying time is about 2 minutes, until the nuggets are golden yellow and then drained.

The organoleptic test was assessed using a hedonic scale (like very much, like, somewhat like, dislike, really dislike) and a numerical scale (5,4,3,2,1). The panelists used in this study were 25 semi-trained panelists, namely students from the Department of Animal Husbandry with an interest in Animal Product Technology who had passed Basic Animal Product Technology, Animal Product Processing Technology, Meat Technology and Quality Control of Livestock Products. Test scale with a score of 5 highest score and 1 lowest score. The hedonic scale can be seen in Table 2. To determine the organoleptic quality of shredded duck using different filler comparisons, namely through the results of the assessment of 25 semi-trained panelists, the assessment data were processed with the hedonic scale mathematical equations which can be seen in Table 2.

Table 2. The hedonic scale used in organoleptic tests

No.	Test Indicator	Scale	Criteria
1.	Color	5	Very dark brown
		4	Dark brown
		3	Medium brown
		2	Light brown
		1	Very light brown
2.	Texture	5	Very fine
		4	Fine
		3	Slightly coarse
		2	Coarse
		1	Very coarse
3.	Aroma	5	Strongly meaty aroma
		4	Meaty aroma
		3	Moderately meaty aroma
		2	Not meaty in aroma
		1	Spicy aroma
4.	Taste	5	Very meaty taste
		4	Tastes like meat
		3	It tastes a bit like meat
		2	Doesn't taste like meat
		1	It really tastes of spices
5	Crispy	5	Very crispy
		4	Crispy
		3	Moderately crispy
		2	Not crispy
		1	Not crispy at all
6	General acceptance	5	Really like
		4	Like
		3	Just like it
		2	Do not like
		1	Really don't like it

Source: Modification of [4]; [5]; [6]; [7]

2.5. Data analysis

The data obtained were analyzed using variance with a completely randomized design (CRD). Furthermore, if the treatment shows a real effect, it is continued with the Duncan Test (DMRT). Data processing was carried out using SPSS IBM 16.

3. Results and Discussion

The organoleptic quality assessment was carried out using the level of preference (hedonic) and descriptive with a scale of 1 - 5 with a total of 25 semi-trained panelists with parameters tested including color, texture, aroma, taste, tenderness and general acceptance.

Table 3. Mean score of organoleptic quality of duck nuggets from meat tenderized with papaya latex

Variable	Treatment				
	P0	P1	P2	P3	P4
Color	3,76±0,93	3,4±0,91	3,24±0,93	3,68±0,95	3,64±0,95
Texture	3,64±0,91	3,76 ±0,72	4,16±0,75	4±0,96	4,12±0,93
Aroma	4,12±0,83	4,08±0,70	4,08±0,70	4,04±0,73	4,08±0,70
Taste	4,12±0,78	4,12±0,83	4,12±0,73	4,04±0,79	4,12±0,78
Crispy	3.40±0.63	3.32±0.79	3.36±0.74	3.44±0.80	3.48±0.75
General acceptance	3,92±0,70	3,96 ±0,84	3,84±0,85	3,84±0,85	3,92±0,76

3.1 Color

The results of the analysis of variance in Table 6 show that the duck nuggets which were tenderized with papaya latex had no significant effect (P>0.05) on the color of the duck nuggets. With an average duck nugget color value ranging from 3.4 to 3.76. The results of further tests showed that the duck nugget scores were scored with an average P0 duck nugget color with an average of 3.76, P2 with an average of 3.4, P3 with an average of 3.24, and P4 with an average of 3.64, producing a yellow-brown color. This is presumably because the color of the nuggets is not affected by the tenderizing process with papaya latex, the color of the nuggets is affected by the meat used and the cooking time. Frying for too long will make the color of the nuggets turn black, which will affect the level of preference [9].

3.2 Texture

The results of analysis of variance showed that duck meat tenderized with papaya latex had no significant effect (P>0.05) on the texture of duck nuggets. Panelist results on duck nugget texture with an average value ranging from 3.64 to 4.16 (coarse). The texture produced in this study did not differ between treatments or produced the same texture. The results showed that the texture of the nuggets produced was not affected by tenderizing with papaya latex but was affected by the cooking process. Texture is an important property in food quality, because each food product has very wide differences in its properties and structure. Food texture can be defined as the way various components and structural elements are arranged, combined into micro and macrostructures [10]. The texture of a food ingredient affects the taste of food ingredients and a good texture will support the taste of a food ingredient.

3.3 Aroma

The results of analysis of variance showed that duck meat tenderized with papaya latex had no significant effect (P>0.05) on the flavor of duck nuggets. Panelist results for the aroma of duck nuggets with an average value ranging from 4.04 to 4.12 (fragrant). The aroma of the duck nuggets produced from each treatment in this study smelled of meat (fragrant) or there was no difference. The smell of rejected duck meat nuggets tenderized with papaya sap has an average aroma. This means that the aroma produced from this duck nugget product is generally influenced by the spices added to the dough. the aroma of food products mostly also comes from the spices added. The more spices added, the stronger the aroma produced, but in this case the discussion of spices in each treatment is the same [11].

3.4 Taste

The results of analysis of variance showed that duck meat tenderized with papaya latex had no significant effect (P>0.05) on the taste of duck nuggets. The results of the panelist's assessment of the taste of duck nuggets ranged from 4.04 – 4.12 (Strong taste of meat). The taste of the duck nuggets produced from each treatment in this study was the same (strong meat taste) or there was no difference in the four treatments. The taste of the nuggets was suspected because the amount of rejected duck meat used in each treatment was the same. Another thing that determines the taste of nuggets is other ingredients added such as spices and

fillers. Taste is the most important factor because it will affect consumers' final decision to accept or reject a food product [12].

3.5 Crispy

The results of the analysis of variance showed that duck meat tenderized with papaya latex had no significant effect (P>0.05) on the tenderness of the duck nuggets. The results of the panelists' assessment of the tenderness of the duck nuggets ranged from 3.04 to 3.44 (quite soft). the tenderness of the duck nuggets produced from each treatment in this study was the same (quite soft) or there was no difference in the five treatments. This happened because the use of papaya latex was not able to affect the pH value, cooking loss and water holding capacity of the duck nuggets so that the level of tenderness of the nuggets obtained tended to be the same in each treatment. Overall there are three aspects in assessing the level of tenderness of a processed meat product, namely the initial ease of tooth penetration into the product, the ease with which the product is chewed into smaller fragments or pieces and the amount of residue left after chewing [13].

3.6 General acceptance

The results of the analysis of variance showed that duck meat tenderized with papaya latex had no significant effect (P>0.05) on the general acceptance of duck nuggets. The results of the panelists' assessment of the general acceptance of duck nuggets ranged from 3.84 to 3.96 (likes). The general acceptance of the duck nuggets resulting from each treatment in this study was the same (liked) or there was no difference in the five treatments. Color, taste, smell play a very important role in influencing consumer choice and preference for food, so it is not surprising that many food ingredients that have a less preferred color, taste, smell are not chosen by consumers [14;15].

4. Conclusion

Tenderization of rejected duck meat had no significant effect (P>0.05) on the organoleptic properties of rejected duck nuggets, especially on the variables of shape, aroma, texture, taste, tenderness and general acceptance.

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