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Organoleptic Quality of Beef Meatballs Using Chicken Giblets

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Abstract. Meat is a food of animal origin that has high nutritional value, because meat contains several nutrients including protein, fat, minerals and vitamins. This study aims to determine the physical and organoleptic quality of beef meatballs using giblets. The materials used in this study were beef, giblets, tapioca flour, garlic, salt, flavourings, and ice cubes. This study used a completely randomized design consisting of 4 treatments and 4 replications P0 (100%) beef without giblets, P1 (80%) beef + 20% liver, P2 (80%) beef + 20% gizzard, P3 (80) beef + 20% heart. The parameters measured in this study were pH, cooking loss, yield, shape, aroma, color, texture, taste, elasticity and general acceptance. The results of this study indicate that the addition of giblets to chicken meatballs. beef meatballs. However, it did not have a significant effect (P>0.05) on the organoleptic test of beef meatballs, especially on the variables of shape, aroma, texture, taste, and general acceptance.

Keyword: Meatballs, pH, Cooking Loss, Yield, Organoleptic

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1 Introduction

Meat is one of the foodstuffs that has nutritional value in the form of protein which contains an arrangement of essential amino acids and other substances that the body really needs. Beef contains the amino acids leucine, lysine and valine which are higher than other meats. Beef is usually processed into rendang, satay, meatballs, beef jerky, and other preparations.

Meatballs are processed meat, where the meat is mashed first and mixed with spices, tapioca flour is then formed into small balls and then boiled in hot water. The term meatball is usually followed by the name of the type of meat, such as fish meatball, shrimp meatball, chicken meatball, beef meatball, rabbit meatball, buffalo meatball, and goat or lamb meatball [1]. Giblets are chicken by-products that can still be used or consumed and have not been utilized optimally. Diversification of processed giblet products needs to be done in order to increase the variety and attractiveness of consumers to consume meatballs.

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The use of chicken giblets in making meatballs is done in order to create a different taste. However, this can also affect the taste of the meatballs it produces such as the level of elasticity, texture, taste and aroma compared to meatballs in general so that it can affect people's consumption interest. Therefore, it is necessary to make meatball formulations using giblets so that they can be accepted by the community.

2 Research Methods

2.1 Research Materials

The tools used are knives, cutting boards, grinding machines, analytical scales, pots, spoons, plates, labels, mica plastic, hecter, blender, freezer, stove, basin, pH meter and hedonic test blanks. The materials used in this study were beef, giblet consisting of liver, gizzard and heart. The meatball dough ingredients consist of tapioca flour, ground pepper, garlic, salt and ice water, each of which has been cleaned and is ready to be processed into beef meatballs. The composition of the ingredients for making beef meatballs using chicken giblets can be seen in table 1.

Tabel 1. Meatball dough composition per sample unit

Ingredients	Perlakuan (%)			
	P0 (Control)	P1 (Liver)	P2 (Gizzard)	P3 (Heart)
Meat	100	80	80	80
Giblet	-	20	20	20
Tapioca Flour	20	20	20	20
Pepper powder	0,75	0,75	0,75	0,75
Garlic	4	4	4	4
Salt	2	2	2	2
Ice Water	20	20	20	20

Modification : [2] ; [13] >

2.2 Research Procedure

The first stage in making meatballs is weighing the meat according to the treatment. Beef and giblets are cleaned and then washed. Then cut into small pieces to facilitate the milling process. The meat is then ground until smooth while adding ice cubes from the weight of the meat. After the two ingredients are smooth, mix the tapioca flour according to the specified treatment along with the spices consisting of salt, pepper, garlic and ice cubes to make it easier to mix the dough. The dough is stirred continuously until it is evenly mixed. After the dough is finished, it is then printed and boiled. Printing is done using a spoon so that the dough forms into small spheres. These small spheres are then put into a pot of boiling water. Meatballs that have been cooked are marked by the appearance of the meatballs on the surface of the water. After 5-10 minutes, the cooked meatballs are removed and then drained and stored in the container that has been prepared.

Organoleptic testing using hedonic tests on the preference of aroma, shape, taste, texture, color, elasticity and general acceptance. The panelists used were 15 semi-trained panelists, namely students from the Department of Animal Husbandry, Faculty of Animal Husbandry, Halu-Oleo University who had passed basic courses in livestock product technology and meat processing technology and liked meat products such as meatballs. Testing scale with a score of 1-5 (1 lowest score and 5 highest score). The scoring data test was carried out by tasting each meatball sample and then filling out a questionnaire with an assessment score. The hedonic scale can be seen in Table 2.

Tabel 2. The hedonic scale used in organoleptic test

Organoleptic Test	**Hedonic Scalee**	**Criteria**
Form	5	Very Round
	4	Round
	3	Somewhat Round
	2	Flat
	1	Irregular
Colour	5	Red
	4	Reddish Brown
	3	Pink Chocolate
	2	Gray
Scent	5	Very Meaty
	4	Flesh-scented
	3	
	2	Giblet-scented
	1	Very giblet flavorless
Taste	5	Very deliciouc
	4	Nice
	3	Pretty tasty
		Not good
	1	Very not
Texture	5	Very smooth
	4	Fine
	3	Rather rough
	2	Rough
	1	Very rough
Elasticity	5	Very chewy
	4	Springy
	3	Currently
	2	Not chewy
	1	Not very chewy
General Acceptance	5	Very deliciouc
	4	Suka
	3	Cukup Suka
		Not good
	1	Very not

Source : Modification [3] ; [7]

The research design used in this study was a completely randomized design (CRD) with 4 treatments and 4 replications. The mathematical model used for RAL is as follows :

$Y_{ij}=\mu + \alpha_i + \varepsilon_{ij}$

Y_{ij} = Response treatmen to-i
μ = Expected (general average value)
α_i = Effect of treatment to-i
ε_{ij} = Error of the to-i and replication to-j
i = 1, 2, 3, 4 replitition to-j (j = 1, 2, 3, 4).

The form of treatment was the addition of giblets to beef meatballs which consisted of 4 treatments as follows:
P0 = 100 % giblet free beef
P1 = 80 % beef + 20 % liver
P2 = 80 % beef + 20 % gizzard
P3 = 80 % beef + 20 % heart

The data obtained were analyzed using variance. Furthermore, if the treatment shows a significant effect, then it is continued with the Duncan test (DMRT) data processing is 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 15 semi-trained panelists with parameters tested including shape, color, aroma, texture, taste, elasticity and general acceptance/favorability.

3.1 Organoleptik Quality

Tabel 1. Mean score of organoleptic quality of beef meatball using giblet Chicken.

Parameter	Perlakuan			
	P0	P1	P2	P3
Form	3,67±0,48^{a}	3,13±0,35^{b}	3,47±0,83^{ab}	3,53±0,64^{ab}
Color	2,93±1,03^{ab}	3,53±1,19^{a}	3,07±0,96^{ab}	2,60±0,91^{b}
Scent	3.67±0.62	3.67±0.49	3.67±0.49	3.60±0.51
Texture	3,40±0,83	3,73±0,80	3,47±0,74	3,73±0,80
Taste	3,40±0,83	3,40±0,91	3,47±0,92	3,67±0,62
Elasticity	4,40±0,51^{a}	3,67±0,98^{b}	3,67±0,82^{b}	3,40±0,99^{b}
Generalacceptance	3,87±0,35	3,87±0,52	4,07±0,46	4,07±0,59

Description : Different superscript numbers onthe same line indicate significant (P<0,05), or very significant (P<0,01).

3.1.1. Form

Table 1. Shows that making beef meatballs using chicken giblets had a significant (P<0.05) effect on the shape of beef meatballs with an average shape value ranging from 3.13 to 3.67. From 15 panelists, the average level of P0 was higher with a mean value of 3.67 (round) compared to or significantly different from P1 3.13 (slightly round), but P2 (3.47) was not different from P3 (3.53). According to [4], good quality meatballs must be uniform in shape, round, not moldy, not slimy and look shiny.

The printing process manually by hand is one of the factors that influence the differences in the shape of the meatball products. According to [5] meatballs are finished products made from meat and shaped into rounds of various sizes. Meanwhile, research [6] showed that almost all respondents to a consumer survey (95.0%) liked round beef meatballs.

3.1.2. Color

Table 1. Shows that making beef meatballs using chicken giblets has a significant effect (P<0.05) on the color of beef meatballs. These results indicate that the use of chicken giblets has an effect on the color of the meatballs with an average value ranging from 2.60 to 3.53, from 15 panelists it was obtained that the average P1 level was higher with an average of 3.53 (reddish brown) compared to or significantly different from P3 with average 2.60 (pink brown), P0 with an average of 2.93 (pink brown) and P2 with an average of 3.07 (gray brown). The color of the beef is bright red, after undergoing the cooking process the color of the meatballs changes to reddish brown. This also shows that the panelists prefer reddish brown flesh color P1. According to [7], the higher the myoglobin of the meat, the redder the color of the meat, the red color of the meat will change to reddish brown during cooking due to the oxidation process. Not much different opinion [8], the color of the meatballs is determined by the raw materials and binders used.

The color of cooked meat is generally gray, the discoloration is caused by globin denaturation and the Maillard reaction [9]. Apart from being caused by pigments, discoloration in cooked meat is also due to globin denaturation and is influenced by caramelization of carbohydrates and Maillard reactions between reducing sugars and amino acids [10].

3.1.3. Scent

Table 1. Shows that making beef meatballs using chicken giblets had no significant effect (P>0.05) on the meatball aroma. The average value of meatball aroma ranges from 3.60 to 3.67, which is meaty. According to [11], panelists liked the aroma of meatballs because of the strong aroma of boiled meat. The aroma of cooked meat is influenced by the age of livestock, type of feed, species, sex, nation, length of time and conditions of storage of meat after slaughter and cooking temperature. [12], aroma is a flavor that shows a pleasant or delicious aroma, in the aroma test the senses that play a role are the sense of taste (tongue) and the sense of smell (nose).

The aroma of meatballs is influenced by the aroma of meat and spices. Cooking can affect the color, smell, taste and meat products [13]. According to [14] that the aroma of the meatballs produced is mainly caused by the spices used during processing, namely pepper, garlic and nutmeg, giving rise to a distinctive aroma. [15] added that the aroma is influenced by the presence of volatile compounds and water vapor released during cooking.

3.1.4. Texture

Table 1. Shows that making beef meatballs using chicken giblets had no significant effect (P>0.05) on the mean meatball texture score. The texture value of meatballs ranges from 3.4 to 3.73, which is rather coarse. According to [16], the coarser texture of meatballs is caused by the protein content found in meat and has the ability to emulsify fat, resulting in a compact and rough texture. The smoother texture of the meatballs is due to the starch content contained in the filler which has a tighter structure making it difficult to break down. The texture of meatballs is determined by the water content, fat content and type of carbohydrates, high water content will produce a mushy texture as well as high fat content will produce meatballs with holes so that it can affect the texture of meatballs [17]. The aspect that is assessed from the texture of the meatballs is characterized by the coarseness or fineness of the resulting product. [18], the aspect that is assessed from the texture of the meatballs is characterized by the roughness or smoothness of the product produced, besides that, the elasticity is a texture-forming part that is taken into account by consumers in assessing the liking and acceptance of meat and its products. Protein coagulation, collagen gelatinization, water release as well as swelling and starch gelatinization are factors that influence textural changes [19]. According to [20], the level of addition of fillers aims to improve the elasticity of the final product and form a dense texture.

3.1.5. Taste

Table 1. Shows that making beef meatballs using chicken giblets has no significant effect (P>0.05). The taste value of the meatballs ranged from 3.47-3.67 (tasty and quite tasty). This is presumably because the taste of each meat used is the same, that is, it has a distinctive beef taste. Apart from the taste of the meat, other things that determine the taste of meatballs are other ingredients added such as spices and fillers. [21] stated that the taste assessors that determine consumer acceptance are the level of spiciness, saltiness and taste of the meat. Taste is a sensation generated by receptors on the tongue in the mouth [22]. Taste is influenced by several factors, namely chemical compounds, their concentration and interactions with other components [23].

3.1.6. Elasticity

Table 1. Shows that making beef meatballs using chicken giblets had a significant effect (P<0.01) on the elasticity of beef meatballs. The elasticity of meatballs at P0 (4.40 = very chewy) was higher than P1 (3.67 = chewy), P2 (3.90 = chewy) and P3 (3.40 = moderate). Elasticity is. the texture-forming part that consumers take into account in assessing the liking and acceptance of meat and its products. Elasticity is the ability of a food product to return to its original shape

before the product breaks, chewy meatballs will feel elastic when chewed [24]. Dullness is based on the ease of chewing without loss of proper tissue properties. Elasticity is a texture-forming part that consumers take into account in assessing the liking and acceptance of meat and its products [25].

3.1.7. Generalacceptance

Table 1. Shows that making beef meatballs using chicken giblets has no significant effect (P>0.05) on the general acceptance of beef meatballs. This shows that the addition of giblets to beef meatballs is acceptable to the panelists, such as beef meatballs using giblets. General acceptance of beef meatballs ranges from 3.87 to 4.07 (likes). According to [26], the test of preference for the taste of the meatballs depended on the panelists' preference for the meat used. The taste of a food is one of the factors that determine consumer acceptance. The power of food acceptance is determined by the stimulation caused by food through the senses of sight, smell, taste, or maybe even hearing [27].

4 Conclusion

Based on the results and discussion, it can be concluded that the addition of giblets to beef meatballs had a significant effect (P<0.05) on the organoleptic properties of beef meatballs, especially on the color variable, while the elasticity had a significant effect (P<0.01) on the organoleptic test of beef meatballs. However, it did not have a significant effect (P>0.05) on the organoleptic test of beef meatballs, especially on the variables of shape, aroma, texture, taste, and general acceptance.

REFERENCES

[1] Hafid, H. dan P. Patriani, "Tekhnologi Pasca Panen Peternakan". Cetakan Pertama. Penerbit Widina Bhakti Persada. Bandung. 2021

[2] Chakim, B. Dwiloka Dan Kusrahayu,"Tingkat Kekenyalan, Daya Mengikat Air, Kadar Air Dan Kesukaan Pada Bakso Daging Sapi Dengan Substitusi Jantung Sapi". *Animal Agriculture Jornal*, vol. 2, no.1. pp 97-104. 2013.

[3] Hafid, H. dan A Syam, "Pengaruh daging dan lokasi otot terhadap kualitas organoleptik daging sapi". *Buletin Peternakan*, vol. no.4, pp. 209-216. 2007

[4] Kartika, L.R., B.S. Hertanto, A.S.D. Pamungkas, I.S. Saputri, dan A.M.P. Nuhriawangsa, "Kualitas fisik dan organoleptik bakso berbahan dasar daging ayam broiler yang diberi pakan dengan suplementasi tepung purslane (*portulaca oleraceae*)". *Jurnal Sains Peternakan*, vol. 18, no.1, pp. 66-7. 2015.

[5] Herpandi H, I Widiastuti, A Baehaki, S Sudirman dan GD Nugroho, "Pemberdayaan Santri dan Masyarakat Sekitar Pondok Pesantren Rhaudul Ulum Sakatiga, Ogan Ilir Melalui Diversifikasi Produk Perikanan", *Jurnal Pengabdian Pada Masyarakat*, vol. 7, no. 1, pp. 59-65. 2022.

[6] Hermanianto J dan RY Andayani, "Studi Perilaku Konsumen dan Identifikasi Parameter Bakso Sapi Berdasarkan Preferensi Konsumen di Wilayah DKI Jakarta [Study of Consumer Behaviour and Identification of Meat Ball Characteristics Based on Consumer Preferences in DKI Jakarta]". *Jurnal Teknologi dan Industri Pangan*, vol. 13, no. 1. 2002.

[7] Soeparno, "Ilmu dan teknologi daging". Gajah Mada University Press, Yogyakarta. 2005.

[8] Zakaria, H., S. Rauf dan S. Alam, "Daya Terima dan Kandungan Protein Bakso Ikan Pari *(Dasyatis* sp.) dengan Penambahan Karaginan". *Media Gizi Pangan*, vol. 10, no. 2, pp. 21-25. 2010

[9] Rosita F, H Hafid dan R Aka, "Susut masak dan kualitas organoleptik bakso daging sapi dengan penambahan tepung sagu pada level yang berbeda", *Jurnal Ilmu Teknologi Peternakan Tropis*, vol. 2, no. 1, pp. 14-20. 2015.

[10] Lawrie, R. A., "Ilmu Daging". Penerjemah : Aminuddin Parakkasi. Universitas Indonesia Press. Jakarta. 2003.

[11] Soeparno., "Ilmu dan Teknologi Daging". Gadjah Mada University Press, Yogyakarta. 2009.

[12] Susilorini, T.E. dan Manik Elny Sawitri, "Produk olahan susu". Penebar Swadaya. Jakarta. 2006.

[13] Kartika, B. Uji Mutu Pangan, "Pusat antar Universitas pangan dan gizi". UGM. Yogyakarta1988.

[14] Fellows, J.P., "Food Processing Technology, Principles and Practise". 2nd ed.Woodhead Pub. Lim., Cambridge, England. 2000.

[15] Irmawaty, "Uji organoleptik bakso daging ayam dengan filler tepung". *Jurnal ilmu dan industri perternakan*, vol 3, no. 1, pp. 182-193. 2016.

[16] Octavianie, Y., "Kandungan gizi dan palatabilitas bakso campuran daging dan jantung sapi". Fakultas Peternakan: Institut Pertanian Bogor. 2002.

[17] Nurhayati E., "Sifat fisik dan organoleptik bakso daging domba pada lama pasmortem dan taraf penambahan tepung tapioka yang berbeda". Fakultas peternakan. Institute pertanian bogor. 2009.

[18] Buckle, K.A., R.A. Edwards, G.H. Fleet dan M. Wooton, "Ilmu Pangan". Terjemahan : H. Purnomo dan Adiono. Universitas Indonesia Press, Jakarta. 2009.

[19] Komariah, Rahayu S, Sartijo, "Sifat fisik daging sapi, kerbau dan domba pada lama postmortem yang berbeda". Buletin Peternakan vol. 33, no.3, pp. 183-189. 2009.

[20] Pratama, Fili, "Evaluasi sensori". Universitas Sriwijaya. Palembang. 2013.

[21] Montolalu, S., N. Lontaan, S. Sakul, dan A. Dp. Mirah, "Sifat fisik-kimia dan mutu organoleptik bakso broiler dengan menggunakan tepung ubi jalar *(Ipomoea batatas L)" Jurnal Zootek*, vol. 32, no. 5, pp. 1-13. 2013.

[22] Hafid H, F Nasiu, Nita, Nuraini, LOA. Sani, "Daya ikat air, kekenyalan dan kekenyalan rendemen bakso ayam broiler menggunakan bahan agar komersial dengan level berbeda", *Jurnal ilmu dan teknologi peternakan tropis*, vol.8, no.1, pp. 37-42. 2020

[23] Nurhayati T, "Analisis performans ayam broiler pada kandang tertutup dan kandang terbuka". *Jurnal Peternakan Nusantara*, vol. 5, no. 2. 2009.

[24] Ningsih, Fitrianingsih dan H Hafid, "Kualitas fisik dan organoleptik abon sapi dengan penambahan nangka muda". *Jurnal Ilmiah Peternakan Halu Oleo*, vol. 2, no. 2, pp. 215-216. 2020.