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pH, Cooking Loss, And Yield of Chicken Nuggets with Intestine Substitution

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ABSTRACT
This research aims to study of pH, cooking loss and yield of chicken nuggets substituted chicken intestine. Treatment is substitution of chicken meat with chicken intestine consisting of five levels i.e. A0 (0% chicken intestine + 100% chicken meat), A1 (15% chicken intestine + 85% chicken meat), A2 (25% chicken intestine + 75% chicken meat), A3 (40% chicken intestine + 60% chicken meat), A4 (50% chicken intestine + 50% chicken meat), A5 (65% chicken intestine + 35% chicken meat), A6 (75% chicken intestine + 25% chicken meat), A7 (90% chicken intestine + 10% chicken meat), and A8 (100% chicken intestine + 0% chicken meat). Each treatment was repeated five times. Results showed a different substitution chicken intestines have no significant effect (p>0.05) to pH, cooking loss and yield nuggets produced. PH range nuggets ranged from 6.46 to 6.60. Cooking loss range obtained in this study were between 2.22-20%. The range of yield values generated nugget is between 129.2 to 133.9. It can be concluded that the substitution of chicken intestine showed pH, cooking loss and product yield nuggets are relatively uniform in all treatment combinations were tested. Product nugget with a composition of 50% and 50% chicken intestines chicken meat (A4) preferred by the panelists having a pH of 6:58, cooking loss of 10% and a yield of 129.9%.

INTRODUCTION

Nugget is one of the processed meat products, as a result of the restructuring, namely meat processing techniques to take advantage of tough meat or pieces of meat are relatively small and irregular, which is processed into refined products. Nugget chicken as a processed, cooked, processed chicken product made from a mixture of milled chicken fed with coating materials with or without the addition of other foodstuffs and permissible dietary ingredients (Badan Standardisasi Nasional, 2002).

Nugget products are generally made of a mixture of chicken meat, flour and seasonings called chicken nuggets. Making the nugget can be modified by utilizing meat laying hens culled in an effort utilization of byproducts of poultry farm business. This treatment is considered appropriate because laying hens afkir chicken has more tough properties than broiler meat. Producing quality livestock products with high nutritional value and low cost is the main goal of livestock processing. It requires considerable creativity by designing an economical formulation (Hafid & Syam, 2007)

The use of waste or byproduct of livestock like intestines in the preparation of preparations includes efforts to consider. Chicken intestine is a byproduct of chicken cutting. Intestine has a fairly low selling value, but has a complex nutritional content. The protein content of chicken intestine was 22.93% (Baihaki, et al., 2010). So far the utilization of chicken intestines is still limited. In Southeast Sulawesi people were new to the processed food made from waste or by-product (Tasse, et al., 2015), such as the use of chicken intestine. Most chicken intestines are discarded as waste that is not useful. If viewed from the nutritional content, chicken intestine is a potential food product of animal origin. This research aims to study of pH, cooking loss and yield losses chicken nuggets substituted chicken intestine. Expected to be a reference utilization of slaughterhouse waste in the form of intestinal hardly worth the price and can be a source of environmental pollution to process them into nutritious food products.

METHODS

The material used in this study were chicken nuggets with the main ingredient of meat and intestines of broilers obtained from the vendors in the market Anduonohu city of Kendari. The other ingredients are tapioca flour, breadfruit flour, and spices (garlic, pepper powder, salt, nutmeg flavoring powder, skim milk, bread flour, and egg).

Making the nugget follow the steps being taken by the Tanoto (1994) which has been modified. Chicken and chicken intestines (as per treatment formulation) are 300 g ground, then added ice flakes and salt, then added sugar, pepper, garlic, skim milk, corn oil and tapioca flour. All the ingredients are stirred into a homogeneous dough. The nuggets of dough in a baking dish molded aluminum, and covered by using plastic then steamed. Steaming dough made until the internal temperature reaches 60°C to 70°C for approximately 30 minutes, after steaming, the dough nuggets that have cooled to room temperature and then inserted into the refrigerator for 30 minutes. The dough that has been dense is called half-baked dough. The dough is then cut into pieces of approximately 4 x 4 cm with a thickness of one cm, then dough smeared with eggs and smeared again with bread. The initial frying using oil was submerged for 30 seconds at 200°C. Nugget packed in plastic and stored in a freezer and then performed the final frying i.e. nuggets fried for four minutes at 200 ° C. Nugget making process shown in Figure 1.

The parameters to be observed in this study was composed of physical parameters of pH, loss cooking (cooking loss), and yield nuggets (%).

RENDEMEN

Testing of rendemen is done following BSN (2009) method. The yield is calculated as the percentage of initial raw material weight with the weight of the product produced. The yield is calculated based on the following formula:

$$Nugget\ Yield\ (\%) = \frac{weight\ of\ nugget}{weight\ of\ chicken\ meat}\ x\ 100\%$$

TABLE 1. FORMULATION INGREDIENTS CHICKEN *NUGGET* SUBSTITUTED WITH CHICKEN INTESTINE

Ingredients (%)	**Treatment**								
	A0	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**	**A8**
Chicken meat	100	85	75	60	50	35	25	10	0
Chicken intestine	0	15	25	40	50	65	75	90	100
Tapioca flour	10	10	10	10	10	10	10	10	10
Garlic	3	3	3	3	3	3	3	3	3
Pepper powder	2	2	2	2	2	2	2	2	2
Salt	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Nutmeg powder	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Flavoring	1	1	1	1	1	1	1	1	1
Sugar	1	1	1	1	1	1	1	1	1
Skimmed milk powder	5	5	5	5	5	5	5	5	5

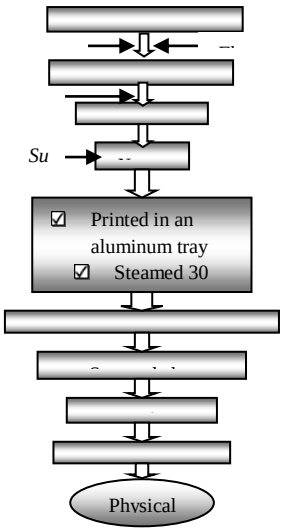


Fig 1. Stages Process Nugget, modified. [5]

LOSS COOK (COOKING LOSS)

Determination of cooking loss using the method according Soeparno (2009) by looking at the weight lost during cooking. Cooking loss value meatball was calculated with the following formula:

$$\text{Cooking loss (\%)} = \frac{sample\ weight\ (start) - sample\ weight\ (end)}{sample\ weight\ (end)} \times 100\%$$

pH

Nuggets pH testing performed using Bouton, first all samples weighed 10 g were pulverized, then insert it into the bottle, shake and add 50 ml of deionized water. After that shake with the shake machine for 30 minutes, then the sample is measured with pH meter.

RESULTS AND DISCUSSION

Physical quality observed in this research is pH, cooking loss, and yield. Pursuant to result of research, physical quality of chicken nugget substitution of chicken intestine waste can be seen in Table 2.

TABLE 2. CHICKEN *NUGGETS* QUALITY SUBSTITUTION CHICKEN WASTE GUTS

Variables	Treatment								
	A0	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**	**A8**
pH	6.60	6.59	6.63	6.55	6.58	6.58	6.49	6.47	6.46
Cooking shrubs	5	5	5	2.22	10	7.22	17.22	7.22	20
Rendemen	133.9	130.5	130	130.2	129.9	129.2	130.5	130.9	129.7

Information: did not differ significantly *(p*> 0.05)

pH

Results showed a different substitution chicken intestine no significant effect (p> 0.05) to pH *nuggets* produced. pH *nuggets* ranged from 6.46 to 6.60. The pH value changes insignificantly as the larger substitution of chicken intestine wastes.

The pH value of processed meat products is generally influenced by the ingredients used. The pH value of chicken meat 3 hours after cutting is in the range of 5.5-5.9 (Lukman, et al., 2013), while the pH value of chicken intestine ranges from 5.7 to 6.0. Choe *et al.* (2013) reported that the pH of the meat will be higher during the cooking process as a result of the release of imidazolium, basic R group of the amino acid histidine when heating. This is what causes the higher pH of processed meat products than unprocessed meat. In addition to meat, other ingredients like flour and spices also affect the final pH of the product *nuggets.* Soeparno (2009) states that the acidity level of processed products ranged from pH 5.5 to 7.2 (Soeparno, 2009).

COOKING SHRUBS

The results showed that the substitution of chicken intestinal waste into *nuggets* did not give significant differences (p>0.05) on cooking loss *nuggets* produced. The range of cooking loss obtained in this study was between 2.22-20%.

Losses cooking shows how much loss a product that occurs during the cooking process, cooking loss shows how much loss a product that occurs during the cooking process, cooking loss greater the lower the water holding capacity of the meat protein (Hafid & Syam., 2007).

RENDEMEN

One of the physical qualities that is often taken into account in the processed animal food crop is the yield. The yield is calculated as the percentage of initial raw material weight with the weight of the product produced.

Value yield *nuggets* generated in this study are presented in Table 2. The range of yield *nuggets* produced was between 129.2 to 133.9. The results showed that the substitution of chicken intestinal waste into *nuggets* did not give significant differences (p> 0.05) to the yield *nuggets* produced. The yield *nuggets* are more influenced by the proportion of the addition of fillers. Abubakar *et al.* (2011) states that the yield can be enhanced by the addition of a filler. In this study, the percentage of fillers used is the same, so it tends to produce a rendemen that is not different (Abubakar, 2007).

CONCLUSION

Chicken intestines substitution showed a pH, cooking loss and a relatively uniform rendemen of nuggets in all treatment combinations tested. Product nugget with a composition of 50% and 50% chicken intestines chicken meat (A4) preferred by the panelists having a pH of 6:58, cooking loss of 10% and a yield of 129.9%.

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