Utilization of Chicken Meat in terms of Physical and Chemical Contamination

Harvey Febrianta
Food Technology Department, Faculty of Engineering,
Bina Nusantara University, Jakarta 11480, Indonesia
harvey.febrianta@binus.ac.id

ABSTRACT

Chicken meat products in the presentation process need to pay attention to quality and safety. The nutritional content of broiler chicken meat is quite high when it is stored for more than 2 days it will be easily damaged. This study aims to determine the utilization of ginger by curing method on broiler chicken meat. The research treatments were as follows: T0: Control chicken meat, T1: Chicken meat with the addition of 1% ginger powder, T2: Chicken meat with the addition of 2% ginger powder, T3: Chicken meat with the addition of 3% ginger powder. The scores given are: (1) do not like; (2) rather like; (3) likes; and (4) really like it. Assessment based on a score of 1 - 4 was given by the panelists on the questionnaire that had been provided. The panelists who were asked to carry out the organoleptic assessment were panelists with slightly trained criteria of 8 people. Before carrying out the organoleptic assessment, the panelists were introduced to the material (sample) to be tested by practicing organoleptic testing. The results showed that the T3 treatment was the best treatment in the sensory tests conducted. Based on sensory data regarding the use of chicken meat that is free from physical and chemical contamination, it can be concluded that the quality of chicken meat can be improved in several ways, one of which is by adding ginger so that sensory quality increases. Ginger is proven to be able to reduce the fishy smell of chicken meat and its bioactive components can prevent physical and chemical damage to chicken meat.

Keywords: *chicken meat, zingiber officinale, curing*

A. INTRODUCTION

Broiler chickens are produced by technological cultivation that have economical characteristics, with the characteristics of fast growth as a meat producer, low feed conversion, ready to be slaughtered at a relatively young age, and produce quality soft fibrous meat. Kasih *et al.* (2012) stated that broilers are modern hybrid strains of male and female breeds bred by chicken breeding companies. Broiler chickens have fast growth and have a wide chest with a good pile of meat and lots of it. Broiler chickens grow very fantastic from the age of one week to five weeks. At the age of

three weeks, livestock have shown satisfactory growth in body weight, so that broiler chickens can be sold before the age of 6 weeks.

Broiler chickens have undergone genetic selection (breeding) as meat producers with rapid growth so that their rearing time is relatively short, feed is more efficient and meat production is high. According to Prior *et al.* (2003) the growth of broilers is very fast starting from hatching to the age of 6 weeks, after that the growth will decrease. Broiler chickens for males and females are marketed between 1.8 – 2 kg in carcasses or commercial carcass pieces and are also sold live. Broiler chickens have been developed as a source of meeting protein needs. Broiler chicken farming is currently growing, because it can meet the needs of animal protein in a short time and at a low price. However, this chicken farming business is a business that has a high risk, because digestive function disorders often occur due to bacterial infections. Therefore, management needs to be done efficiently and professionally.

Meat in particular consists of a wide variety of highly bioavailable nutrients. At present people consume more broiler chicken meat because of its advantages such as high nutritional value so that it can meet the nutritional needs of the body. Broiler meat products in the presentation process need to pay attention to quality and safety. The nutritional content of broiler chicken meat is quite high when it is stored for more than 2 days it will be easily damaged. One of the damage to chicken meat is the oxidation of fat which can cause rancidity in the meat. The use of synthetic food additives containing antioxidants has many negative impacts on health and is carcinogenic (Charles, 2005). Efforts to reduce the use of synthetic food additives are to use natural alternative antioxidants that are harmless for consumption, one of which is ginger (*Zingiber officinale*).

Ginger is a plant whose rhizome is often used as a spice and raw material for traditional medicine (Harbone, 1996). The rhizome is in the form of a bulging finger in the middle sections. The dominant spicy taste felt from ginger is caused by a ketone compound called zingeron. Ginger also contains antioxidant compounds in the form of oleoresin around 4.0% - 7.5% of which are

gingerols and shogaols (de Man, 1997). These two compounds give ginger its spicy taste. Gingerols and shogaols are the compounds that make ginger spicy. The method of giving ginger powder to meat is by curing method. Curing is a way of preserving food by giving a combination of preservatives with the aim of removing liquid from the food in the process of osmosis. The advantages/benefits of cured meat are to obtain a stable and good color, and reduce the wrinkling of the meat, maintain the color of the meat more stable to heat treatment, texture, and delicacy, and extend the shelf life of meat products. Ginger contains natural antioxidant and antibacterial compounds that have the potential to prevent oxidation reactions and inhibit the growth of pathogenic bacteria when used as a curing agent in meat. Giving ginger powder to broiler chicken meat using the curing method is expected to prolong the shelf life of broiler chicken meat (Goswami *et al.,* 2014). One of the methods used to determine the quality of chicken meat is sensory testing. Sensory evaluation is a scientific method used to measure, analyze, and interpret responses to a product based on what is captured by the human senses, such as sight, smell, taste, touch (Lawless, 2013). Through sensory evaluation, it can be concluded that the feasibility of chicken meat quality in this study.

B. MATERIALS AND METHODS

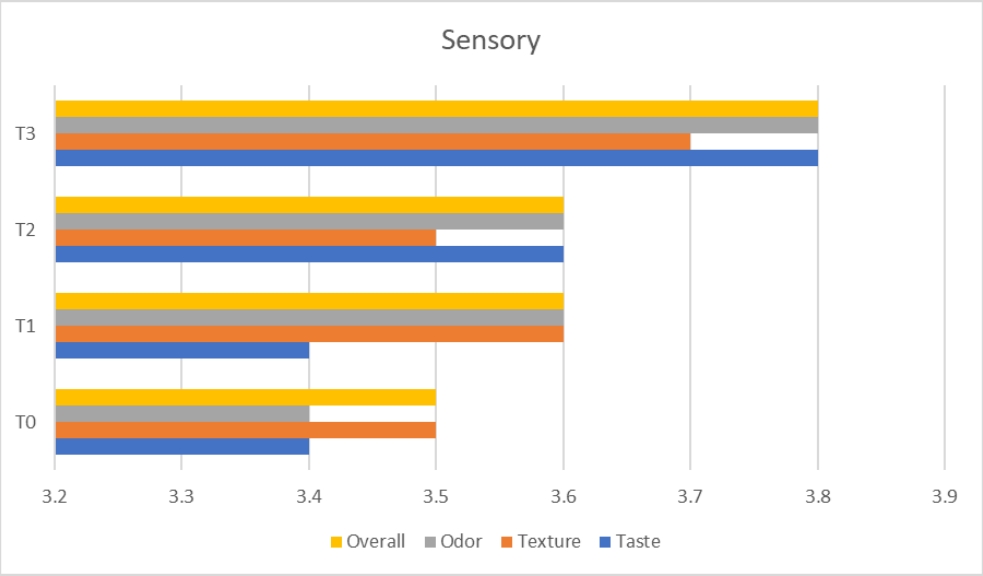
Ginger powder is made by peeling the ginger, then grinding it using a food processor, then extracting the ginger by maceration using Lawrie's method. (2003). Maceration is carried out using water, as much as 500 mL of water is used to soak 1000 grams of ginger powder. Then the ginger paste is formed from the maceration process for 1 day. Then the paste was dried using a drying oven for 12 hours. After drying, flouring was carried out from the research sample using a blender. The ginger powder that is formed is then sprinkled on the chicken meat with different concentrations. The research treatments were as follows: T0: Control chicken meat, T1: Chicken meat with the addition of 1% ginger powder, T2: Chicken meat with the addition of 2% ginger powder, T3:

Chicken meat with the addition of 3% ginger powder. Then the chicken meat is steamed for 45 minutes and the sensory quality is observed, including taste, aroma, texture, and overall acceptability. The criteria for assessing meat samples include texture, aroma, taste and overall acceptability. The scores given are: (1) dislike a lot; (2) dislike a little; (3) like a little; and (4) like a lot. Assessment based on a score of 1 - 4 was given by the panelists adapted from Lawless and Heymann (2010). The panelists who were asked to carry out the organoleptic data assessment were 8 semi-trained panelists. Before carrying out the organoleptic assessment, the panelists were introduced to the material (sample) to be tested by practicing organoleptic testing.

C. RESULTS AND DISCUSSION

Fulfilling the needs of animal protein in Indonesia still depends a lot on livestock products, especially from chicken livestock. Broiler chicken meat is a livestock product that contributes a lot to meeting the demand for meat. Broiler chicken meat is in great demand by the public due to its elastic texture, meaning that if pressed with a finger, the meat will quickly return to normal. If pressed the meat is not too soft and not runny. The color of fresh chicken meat is yellowish with a distinctive aroma of broiler chicken meat, not fishy, not slimy, and does not give off a bad smell (Kasih *et al.*, 2012). The quality of meat is generally determined by the level of palatability, physical properties of the material and its nutritional content in the form of water, protein, fat and minerals and vitamins. Sensory data on chicken meat that received curing treatment using ginger with a concentration of 1 to 3% can be seen in Figure 1.

Figure 1. Average sensory test results (taste, texture, odor, *overall acceptability*)



T0: Control chicken meat, T1: Chicken meat with the addition of 1% ginger powder, T2: Chicken meat with the addition of 2% ginger powder, T3: Chicken meat with the addition of 3% ginger powder

The taste test showed that there were differences between the treatments T0, T1, T2 and T3. The T0 treatment had the lowest sensory score among the other treatments. This is possible because of the bland taste possessed by the meat at T0 (control) without getting ginger, there is a slightly fishy taste because the chicken does not get any additional seasoning. While in the treatment of T1, T2, and T3. The sensory results showed an increase with increasing the percentage of ginger given. The T3 treatment showed the highest sensory (taste) score among other treatments. The addition of ginger as much as 3% of the weight of chicken meat can improve the taste. This is because ginger is able to reduce the fishy taste of chicken meat. Hi, this is in accordance with the opinion of Sharma *et al.* (2017) that there are several benefits of ginger plants such as antibiotic compounds and being able to reduce the fishy smell of chicken meat.

The texture test showed that there were differences between the T0, T1, T2, and T3 treatments. The T0 treatment had the lowest sensory score among the other treatments. Whereas in the T1, T2, and T3 treatments the results began to show an increase. The T3 treatment showed the highest

sensory (textural) score among other treatments. The addition of ginger as much as 3% of the weight of chicken meat can improve the texture quality. This is because ginger is able to give a soft texture to chicken meat. This is in accordance with the opinion of Shahidi and Ambigaipala (2015) that there are several benefits of the ginger plant which can increase the tenderness of chicken meat. Meanwhile, the aroma test showed that there were differences between the treatments T0, T1, T2, and T3. The T0 treatment had the lowest aroma score among the other treatments. This is possible because of the very high fishy aroma possessed by the meat at T0 (control) without getting ginger.

The overall acceptability shows that there are differences between the treatments T0, T1, T2, and T3. Treatment T0 has the lowest overall acceptability score among the other treatments. This is presumably due to the bland taste possessed by the meat at T0 (control) without getting ginger, because the chicken meat did not get any additional spices. While in the treatment of T1, T2, and T3. The sensory results showed an increase with increasing the percentage of ginger given. The T3 treatment showed the highest overall acceptability score among other treatments. The addition of ginger as much as 3% of the weight of chicken meat can increase overall acceptability. This is because ginger is able to reduce the fishy taste of chicken meat. Hi, this is in accordance with the opinion of Gorinstein et al. (2002) that there are several benefits of ginger plants such as antibiotic compounds and being able to reduce the fishy smell of chicken meat. According to Kasih *et al*. (2012), Indonesian people are more familiar with broiler chicken meat as broiler meat which is commonly consumed because of its advantages such as high nutritional content or value. Broiler chicken meat is able to meet the nutritional needs of the body, is easy to obtain, has thicker meat, and has a softer texture compared to free-range chicken and is easily available in markets and supermarkets at affordable prices. People's nutritional needs will be met if they consume meat because it contains complete nutrients and nutrients.

D. CONCLUSION

Based on sensory data regarding the use of chicken meat that is free from physical and chemical contamination, it can be concluded that the quality of chicken meat can be improved in several ways, one of which is by adding ginger so that sensory quality increases. Ginger is proven to be able to reduce the fishy smell of chicken meat and its bioactive components can prevent physical and chemical damage to chicken meat. Suggestions that can be submitted are adding ginger with a concentration higher than 3%.

F. REFERENCES

Charles, A.L., Chang, Y.H., Ko, W.C., Sriroth, K., & Huang, T.C. (2005). Influence of amylopectin structure and amylose content on gelling properties of five cultivars of cassava starches. *J. of Agriculture and Food Chem*. 53, 2717-2725.

De Man. (1997). *Kimia Makanan Edisi Kedua*. Penerbit Institut Teknologi Bandung, Bandung.

Gorinstein, S., Leontowicz, H., Lojek, A., Ciz, M., Krzeminski, R., & Gralak, M. (2002). Olive oil improve lipid metabolism and increase antioxidant potential in rats fed diets containing cholesterol. *J. Agric. Food. Chem*, 50(21), 6102-08.

Goswami, M., Prabhakaran, P.P., & Tanwar. V.K. (2014). Antioxidant and antimicrobial effects of condiments paste used as nitrite replacer in chicken mince. *Vet. World*, 7(6), 432-438.

Harborne, J.B. (1996). *Metode Fitokimia: Penuntun Cara Modern Menganalisa Tumbuhan*. Terbitan Kedua. ITB. Bandung. Hal: 123-129.

Kasih, N.S., Jaelani, A., & Firahmi, N. (2012). Pengaruh lama penyimpanan daging ayam segar dalam refrigerator terhadap pH, susut masak dan organoleptik. *Media Sains*, 4(2), 154-159.

Lawless, H. (2013). *Quantitative Sensory Analysis Psychophysics, Models and Intelligent Design*. John Wiley and Sons, USA.

Lawless, H., & Heymann, H. (2010). S*ensory Evaluation of Food Principles and Practices Second Edition*. Springer, New York.

Lawrie, R. A. (2003). *Ilmu Daging*. Edisi kelima diterjemahkan oleh A. Parakkasi. Penerbit Universitas Indonesia, Jakarta.

Prior, R. L., Hoang, H., Bacchiocca, M., & Jacob, R. (2003). Assays for hydrophilic and lipophilic antioxidant capacity (oxygen radical absorbance capacity (ORACFL)) of plasma and other biological and food samples. *J. Agric. Food Chem*, 51, 3273-3279.

Shahidi, F. & Ambigaipala, P. (2015). Phenolics and polyphenolics in foods, beverages and spices: Antioxidant activity and health effects. *Journal Functional Foods*, 18, 820-897. https://doi.org/10.1016/j.jff.2015.06.018

Sharma, H., Mendiratta, S.K., Agarwal, R.K., Kumar, S. & Soni, A. (2017). Evaluation of anti-oxidant and anti-microbial activity of various essential oils in fresh chicken sausages. *Journal of Food Science and Technology*, 54(2), 279-292. https://doi.org/10.1007/s13197-016-2461-z