

The Effectiveness of Turmeric Extract (*Curcuma longa*) to Increase The Shelf Life of Duck Meat

Harvey Febrianta

Food Technology Department, Faculty of Engineering, Bina Nusantara University, Jakarta 11480, Indonesia

harvey.febrianta@binus.ac.id

Abstract

Duck meat is considered a healthy food because it contains various nutrients, such as protein, fat, as well as various types of vitamins and minerals, which are needed by the body. This meat can also be an option for people who don't like chicken meat. The nutritional content in duck meat is quite easy to decay. This study aims to determine the benefits of turmeric extract on sensory parameters consisting of taste, odor, and overall acceptability. Duck meat is marinated using turmeric extract with a percentage of between 2% - 6%, then stored at 4°C for 6 days. On 0, 3rd, and 6th days the sensory parameters were observed. The research treatments were as follows: DB0: Control duck meat, DB1: Duck meat with the addition of 2% turmeric extract, DB2: Duck meat with the addition of 4% turmeric extract, DB3: Duck meat with the addition of 6% turmeric extract. Assessment of sensory parameters are as follows: (1) dislike a lot; (2) dislike a little; (3) neutral; (4) like a little; and (5) like a lot. The panelists who assessed each sensory parameter were somewhat trained panelists of 30 people. The results of the sensory quality research found that the DB3 treatment was the best treatment. Panelists preferred the BD3 treatment compared to other treatments, especially from the taste factor and overall acceptability. The conclusion obtained from this study is that the addition of turmeric extract is able to inhibit the process of decomposition of duck meat until the 6th day, as evidenced by the taste and overall acceptability that the panelists can still accept.

Keywords: *marination, duck meat, turmeric extract*

A. INTRODUCTION

Duck meat is one type of meat that is used as a food ingredient derived from poultry besides chicken. Duck meat refers to the meat produced from the body parts of the duck, especially the chest and thighs. Duck duck thigh meat is dark and more fatty than her chest. Because ducks are one type of poultry, duck meat has a layer of fat under the skin to maintain body heat. Duck meat that is commonly consumed by the community comes from the male duck which is kept for 10-2 weeks commonly called the duck meat (Omojola, 2007). In addition to low meat production, duck meat has a stronger rancid aroma (off-odor) when compared to chicken (Ali *et al.*, 2007). This makes some people less like the aroma of duck meat. Fat content in duck meat which is high enough when compared to chicken meat makes duck meat more easily decay due to oxidation of fat (Aronal *et al.*, 2012).

Oxidation reactions occur due to oxygen exposure to unsaturated fatty acids contained in oil or fats that produce peroxide compounds. Fat oxidation can be inhibited by antioxidant compounds, one of the natural antioxidant ingredients is turmeric (*curcuma longa*). The chemical content of turmeric includes phenolic components, namely diarylheptanoids and diarylpentanoids, curcumin includes diarylheptanoids (phenol), turmeric rhizomes contain curcumin and their derivatives by 3-15% (curcumin 71.5%, demetoxicurcumin (Li *et al.*, 2011). The process of adding turmeric extract to duck meat by marinating. Marination is the process of immersing meat in marinade, before further processing. Marinade is a seasoned liquid that functions as a meat soaking ingredient, usually used to increase the yield (yield) of meat, improve flavor, increase the diligence, increase the impression of juiciness, increase water binding capacity (WHC), reduce cooking shrinkage, and extend the shelf life meat (Farhadian *et al.*, 2012). The method of mixing turmeric extract that is harmonized into duck meat is evenly expected to increase the shelf life of the meat so as to inhibit the process of decay due to fat oxidation.

B. MATERIALS AND METHODS

The process of making turmeric extract is done by peeling turmeric, then wash it thoroughly. Turmeric is mashed using a food processor until turmeric powder is formed. Then turmeric powder is mixed with water with a ratio of 2:1, the number of 1000 g of turmeric mixed with 500 mL of boiled water. Furthermore, extracted using filter paper and maserat is accommodated as much as 500 mL of turmeric extract. The marinating process is done by mixing 500 g of the chest duck with turmeric extract each treatment as DB0: Control Duck Meat, DB1: Duck meat with the addition of 2% turmeric extract, DB2: Duck meat with the addition of 4% turmeric extract, DB3: Duck meat with the addition of 6% turmeric extract. Furthermore, the research sample duck meat is packaged in aluminum foil and put in a refrigerator with a temperature of 4 °C. Observation of sensory parameter was carried out on days 0, 3rd, and 6th by 30 semi-trained panelists. The research sample was steamed for 60 minutes before being tested to 30 panelists. Sensory parameter assessment is as follows: (1) dislike a lot; (2) dislike a little; (3) neutral; (4) like a little; and (5) like a lot. Sensory quality observations include taste, odor, and overall acceptability.

C. RESULTS AND DISCUSSION

Data in Table 1 showed that the parameters of steamed duck meat on days 0, 3rd, and 6th experienced a significant increase ($p < 0.05$) in each treatment from DB0 to DB3. The DB3 treatment shows the highest taste value among other treatments. This is triggered by giving turmeric extract to increase flavor when compared to control. The panelists like duck meat with the addition of turmeric extract to a level of 6% of the weight of meat. The increase in shelf life up to day 6 still shows the same pattern, namely DB3 treatment shows the highest taste value compared to other treatment. This shows that turmeric extract can maintain the quality of taste even stored at refrigerator temperatures (4°C) for 6 days. Research from Abdeldaiem (2014) and Sharma *et al.* (2012) states that natural ingredients such as turmeric have antibacterial properties, thus inhibiting the process of decay in meat.

The odor result of duck meat showed an increase in sensory scores along with an increase in the percentage of turmeric extract that is marinated to duck meat. The fishy aroma in duck meat can be neutralized by turmeric extract, this is because the role of bioactive compounds in turmeric such as kuruminoids and essential oils that can minimize the fishy aroma of duck meat. Linear with Chattopadhyay *et al.* (2004) that curcuminoids and essential oils are the main bioactive found in turmeric plants, with the most curryinoids accumulate in the rhizome of turmeric plants. The increase in shelf life from days 0, 3rd, and 6th shows the same pattern, namely DB3 treatment shows

the highest odor value compared to other treatment. This shows the panelists prefer duck meat with the addition of turmeric extract when compared to control duck meat.

Table 1. Sensory results in duck meat with the addition of turmeric extract at different days of storage (0, 3rd, and 6th days)

Treatment	Storage period (day)		
	0	3	6
Taste			
DB0	4.13±0.45 ^c	3.47±0.26 ^b	2.88±0.36 ^b
DB1	4.57±0.79 ^{bc}	3.85±0.16 ^{ab}	3.04±0.86 ^{ab}
DB2	5.17±0.14 ^b	4.24±0.52 ^{ab}	3.59±0.64 ^{ab}
DB3	5.89±0.78 ^a	5.14±0.22 ^a	4.64±0.73 ^a
Odor			
DB0	4.05±0.33 ^a	3.51±0.35 ^{ab}	2.72±0.25 ^b
DB1	4.42±0.42 ^b	3.79±0.62 ^{ab}	3.31±0.78 ^{ab}
DB2	4.79±0.45 ^{ab}	3.84±0.15 ^b	3.57±0.56 ^{ab}
DB3	5.21±0.74 ^a	4.68±0.35 ^a	4.02±0.71 ^a
Overall acceptability			
DB0	4.43±0.37 ^a	3.46±0.25 ^a	3.14±0.56 ^b
DB1	4.78±0.42 ^{ab}	3.95±0.37 ^{ab}	3.32±0.68 ^{ab}
DB2	4.92±0.81 ^b	4.66±0.95 ^b	4.05±0.85 ^{ab}
DB3	5.45±0.93 ^a	5.05±0.82 ^{ab}	4.74±0.66 ^a

^{abc} Means in the same rows are different at $p < 0.05$

The results of the overall acceptability state that the most preferred DB3 treatment panelists with a score of 5.45 ± 0.93 on day 0, and then in line with the shelf life until the 6th day, the score from the overall acceptability drops to 4.74 ± 0.66 . The results obtained in the DB3 treatment are still significantly higher ($p < 0.05$) when compared to DB0, DB1, and DB2 treatment. Panelists prefer duck meat with the addition of turmeric extract compared to control duck meat. Research from Kohli *et al.* (2005), stating that curcumin has antioxidant activity, superoxide scavenger and inhibits lipid peroxidation. In addition, curcumin is also considered to have a function as a reactive oxygen cleaner species and reactive nitrogen species, or is responsible for protecting DNA against damage caused by free radicals and protecting hepatocytes from various poisons. This causes the quality of duck meat with the addition of turmeric extract is still better when compared to control.

D. CONCLUSION

Based on the results of the study it can be concluded that the length of storage on days 0, 3rd, and 6th show the significant results ($p < 0.05$) in reducing sensory scores in each teste parameter, odor, and overall acceptability. However, duck meat with the addition of turmeric extract shows a sensory score higher than the control duck meat. DB3 treatment is the best treatment in terms of all sensory parameters, this shows that the bioactive compound of turmeric extract up to 6% is able to prevent physical damage to duck meat when compared to other treatment.

E. REFERENCES

- Abdeldaiem, M.H. (2014). Use of Yellow Pigment Extracted from Turmeric (*Curcuma Longa*) Rhizomes Powder as Natural Food Preservative. *Am. J. Food Sci. Technol*, 2, 36–47.
- Ali, Md.S., Kang, G., Yang, H., Jeong, J., & Hwang, Y. (2007). A Comparison of Meat Characteristics Between Duck and Chicken Breast. *Asian-Aust J Anim Sci*, 20(6), 1002–1006.
- Aronal, A.P., Huda, N., & Ahmad, R. (2012). Amino Acid and Fatty Acid Profiles of Pekin and Muscovy Duck Meat. *Inter J Poult Sci*, 11(3), 229-236.
- Chattopadhyay, I., Biswas, K., Bandyopadhyay, U., & Banerjee, R.K. (2004). Turmeric and curcumin: Biological actions and medicinal applications. *Current Science*, 87, 44-50.
- Farhadian, A., Jinap, S., Faridah, A., & Zaidu, I. S. M. (2012). Effects of marinating on the formation of polycyclic aromatic hydrocarbons (benzo[a]pyrene, benzo[b]fluoranthene and fluoranthene) in grilled beef meat. *Food Control*, 28, 420-442.
- Kohli, K., Ali, J., Antasari, M.J., & Raheman, Z. (2005). A Natural antiinflammatory agent. *Edu. For*, 37(3), 141-143.
- Li, S., Yuan, W., Deng, G., Wang, P., Yang, P., & Aggarwal, B.B. (2011). Chemical composition and product quality control of turmeric (*Curcuma longa* L.). *Pharmaceuti Crops*, 2, 28-54.
- Omojola, A.B. (2007). Carcass and Organoleptic Characteristics of Duck Meat as Influenced by Bred and Sex. *Inter J Poult Sci*, 6(5), 329-334.
- Sharma, J., Pazhaniandi, P.P., Tanwar, V.K., Das, S.K., & Goswami, M. (2012). Antioxidant effect of turmeric powder, nitrite and ascorbic acid on stored chicken mince. *J. Food Sci. Technol*, 47, 61–66.