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Dendeng of cured duck meat in curcumin extract with added STPP, reviewed from chemical quality

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Abstract. The duck meat used in this study is duck meat obtained from unproductive female ducks having low tenderness and high-fat content. Curing with turmeric curcumin extract and adding STPP are ways to reduce fat and increase tenderness. Minced meat is one of the processed meat products traditionally made from ground meat plus palm sugar and other spices. Dendeng is popular in the community and is popular with young people as side dishes. The purpose of this study was to determine the chemical quality of “Dendeng” duck meat curing in the curcumin extract and the addition of STPP. The design used was a completely randomized design with a factorial pattern of 3x2, factor A (Sodium Tripolyphosphate 0%, 0.1%, and 0.2%), and factor B (Curing duck meat with curcumin 0.3 and 0.4%). The Variables observed were water content, fat content, and WHC. The data obtained were analyzed by analysis of variance (ANOVA), if there were significant differences between treatments then proceed with a real difference test of Duncan's Multiple Range Test (DMRT). The results showed that there was an effect of adding Sodium Tripolyphosphate to WHC “Dendeng” duck meat. While the fat and water content are not affected by the addition of Sodium Tripolyphosphat, curcumin extract, and its interactions. It can be concluded that the curing with turmeric curcumin extract can be used up to 0.4% and the addition of 0.2% Sodium Tripolyphosphate is the best in terms of chemical quality.

1. Introduction

One alternative in fulfilling meat is rejected duck meat. The Afkir duck meat is obtained from duck which is not productive in producing eggs. These unproductive ducks are used as ducks to produce meat. However, meat from rejects has a weakness that contains high fat, which is 2.7-6.8% [1] and the meat is hard or low tenderness and the selling value is low. One way to overcome the low tenderness of rejected duck meat and increase its selling value can be done by processing rejected duck meat into Dendeng.

Dendeng is the result of processed sliced or ground meat with the addition of herbs consisting of red onion, garlic, brown sugar, salt, coriander, tamarind and galangal [2]. According to [3] stated that the fat content of Dendeng is influenced by the type of meat used.

Ducks (*Anas platyrhynchos*) are poultry that cultivated for their meat and eggs. The amount of duck meat on the market is still very limited, usually in addition to coming from rejected females (54.35%), also from rejected males as much as 35.41%, young males and females as much as 18%. The Afkir duck meat is meat that is unproductive (duck) female and old male. The texture of cured duck meat and fat content reached 1.84%, whereas chicken meat was only 1.05% [4]. Unsaturated fatty acids (ALTJ) more than 60% of the total fatty acids, resulting in easily oxidized duck meat which can reduce flavor, nutrients and cause substances that are toxic. According to [5], during processing and storing meat can



undergo oxidation triggered by heat, light, metal, and oxygen to produce ROS (Reactive Oxygen Species) such as aldehydes, peroxides, cholesterol oxides which can lead to degenerative diseases such as cardiovascular, aging early.

Efforts to inhibit fat oxidation in duck meat have been done by [6] by adding 3% turmeric extract as a source of natural antioxidants and curing for 10 minutes. Storage is carried out for 8 weeks in the freezer. Turmeric is known to contain curcumin which can inhibit fat peroxidation [7]. The results show that turmeric extract can inhibit the increase in peroxide numbers and TBARs of duck meat and the texture of duck meat after storage becomes softer. But curcumin is yellow and has a distinctive turmeric flavor, so it can affect the acceptability of the product. In addition, the research is still limited during storage. Even though according to [8], lipid oxidation will continue during cooking.

The problem is the texture of duck meat becomes softer after storage in the freezer [6], but according to [9] storage of lamb at freezing temperature (-18oC) results in low water retention or decreased Water Holding Capacities (WHC), resulting in hard meat texture after cooking. According to [10] states that the addition of sodium tripolyphosphate (STPP) to frozen lamb can inhibit the decrease of WHC compared to control and texture of cooked meat is softer and preferred. And according to [11] using STPP on turkey meat, besides being able to control WHC, STPP can also inhibit fat oxidation by slowing the penetration of heat into the material. Therefore the aim of the study was to evaluate the effect of curing duck meat on curcumin extract and the addition of STPP to the physical and acceptability of raw duck meat and after cooking.

2. Material and Methods

This research was conducted to produce beef Dendeng with the addition of STPP with the best chemical quality, including water content, fat, and WHC.

2.1. Material

The material used for the study is duck meat that will be obtained from duck farmers in Bantul, Yogyakarta. Turmeric rhizome as a source of natural antioxidants is purchased from the local market in the Yogyakarta region. The Analysis includes: water and fat content, Water holding capacity [12].

2.2. How to research.

This study consisted of 5 stages, namely: 1) preparation of turmeric curcumin extract by means of turmeric rhizome sorted, then peeled and washed. Curcumin extraction using maceration method [13], 2) curing fresh duck meat with turmeric curcumin extract (with variations of 3% and 4%) and variations in the addition of STPP which is 0.00; 0.10 and 0.2%, 3) testing of moisture, fat and WHC).

2.3. Statistical analysis

The design used was a completely randomized design with a factorial pattern of 3x2, factor A (Sodium Tripolyphosphate 0%, 0.1%, and 0.2%), B (Curing duck meat with curcumin 0.3 and 0.4%), observed variables are water content, fat content, and Dendeng WHC. The data obtained were analyzed by analysis of variance (ANOVA), if there were significant differences between treatments then proceed with a real difference test of Duncan's Multiple Range Test (DMRT) [14].

3. Result and Discussion

3.1. Dendeng Water Content

The water content of Dendeng results showed that it was not influenced by the percentage of curcumin extract, the addition of STPP and its interaction ($P \geq 0.05$). The water content of Dendeng is influenced by the drying method. In this study the same method was used, so that the water content was relatively the same. According to [2], Dendeng water content of the highest quality is a maximum of 12%.

Tabel 1. Dendeng Water Content (%)

| STPP | Turmeric Curcumin Extract | | Average ^{ns} |
|-----------------------|---------------------------|-------|-----------------------|
| | 0.3 | 0.4 | |
| 0 | 9.09 | 12.58 | 10.84 |
| 0.1 | 12.67 | 11.54 | 12.11 |
| 0.2 | 11.31 | 11.76 | 11.54 |
| Average ^{ns} | 11.02 | 11.96 | |

ns = non-significant

3.2. Fat content

The fat content of Dendeng duck meat that was cured with turmeric curcumin extract and the addition of STPP showed a non-significant difference ($P \geq 0.05$). According to [3] Dendeng fat content is influenced by the type of meat used. Furthermore, it was stated that the fat content of lamb meat is higher than beef Dendeng and horse meat. In this study using the same type of meat so that the levels of Dendeng fat processed by duck meat have relatively the same fat content.

Tabel 2. Dendeng Fat Content (%)

| STPP | Turmeric Curcumin Extract | | Average ^{ns} |
|-----------------------|---------------------------|------|-----------------------|
| | 0.3 | 0.4 | |
| 0 | 7.32 | 7.38 | 7.35 |
| 0.1 | 6.77 | 7.42 | 7.10 |
| 0.2 | 7.26 | 7.96 | 7.61 |
| Average ^{ns} | 7.12 | 7.59 | |

ns = non-significant

3.3. Water holding capacity (WHC)

The results of this study indicate that the WHC value of duck meat is significantly affected by the addition of STPP treatment, but is not affected by the addition of curcumin and its interactions (Table 3). This study shows that the more additional STPP, the higher the WHC value. According to [15] which states that STPP FG is able to release water bonds in meat, thus causing a decrease in levels of aw (activity water) which are essential components and inhibitors of microbial growth.

Tabel 3. Dendeng WHC (%)

| STPP | Turmeric Curcumin Extract | | Average |
|-----------------------|---------------------------|-------|--------------------|
| | 0.3 | 0.4 | |
| 0 | 35,85 | 40,35 | 38.10 ^a |
| 0.1 | 52,11 | 51,22 | 51.67 ^b |
| 0.2 | 60,11 | 62,44 | 61.27 ^c |
| Average ^{ns} | 49,36 | 51,34 | |

ns = non-significant

The value of WHC shows that meat protein in Dendeng can bind meat water. Dendeng with a higher WHC value will be more elastic. This is in accordance with the study of [15] which states that an increase in the treatment of STPP FG levels is also accompanied by an increase in suppleness of the flesh and the binding capacity of the water, this means that the decrease in water content not in bound-water or free water is immobilized, but due to evaporation of free water

4. Conclusion

It can be concluded that the curing with turmeric curcumin extract can be used up to 0.4% and the addition of 0.2% Sodium Tripolyphosphate is the best in terms of chemical quality. Dendeng from

rejected duck meat with low tenderness and high fat can be overcome curing using turmeric curcumin extract with the addition of STPP and processed into Dendeng.

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