

THE EFFECT OF VARIOUS FAT ON NATIVE CHICKEN SAUSAGE CHEMICAL COMPOSITION AND SENSORY ANALYSIS

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Abstract

The aim of this study was to determine the effect of various fat that used in the manufacture of native chicken sausage, to understand their effect on chemical composition and sensory analysis of low fat sausages produce. Low fat sausages are very popular now, because the consumer needs well-being and healthy foods. In this study, native chicken sausages was produced using corn oil, margarine and beef fat, to studied the effect on chemical composition and sensory analysis. On the other hand, high fat sausages still had the highest acceptability, not only due to their appearance but also to their sensory characteristics such as texture and flavor. So, it is necessary to determine the effect of fat replacement on consumer acceptability in order to elucidate the limit of fat reduction. The experiment was used a completely randomized design and repeated six times. All analysis were performed in duplicate, and the data were evaluated through a variance analysis (ANOVA). Three formulation of native chicken sausages were prepared; F-1 with 10% corn oil; F-2 with 10% margarine and F-3 with 10% beef fat. Consumer acceptance testing (n= 30 panelist) was conducted to measure the sensory analysis of sausages. Results indicated that using corn oil, margarine and beef fat in producing sausages, had no influence on chemical composition and the sensory analysis of native chicken sausages.

Key words: native chicken sausage, corn oil, margarine and beef fat

INTRODUCTION

Chemical and sensory or acceptability attributes are important factors that influence food acceptance and choices. The acceptability of sausages product by the consumer is strongly influence by the flavor of the product. It is known that the fat content in the sausages is one of the factors that influenced to the acceptability of the product. People seek to have a balance diet, consisting of healthy food but are still appealing to the senses. Meat products are perceived as healthy foods, due to the perceived image of meat, especially the nutrient content. On the other hand, the potential health risks associated with the consumption of high fat foods has led to develop new formulations to modify

traditional food product to contain less fat [6]. Several alternative strategies have been used in the produced low fat sausages, such as the substitution of saturated fat with vegetable oil [4, 9, 5]. Studies using partial fat replacement by lean meat as a formulation strategy also have explored possible fat reduction in sausages [7]. However, these reformulation processed often increase the toughness due to higher water loss during processing. Visual differences in the product appearances also occur as there is less granulated fat as the fat content is reduced. The substitution of animal fat with vegetable oils has been suggested to improve the fatty acid profile and to decrease the cholesterol levels of meat products [10], several vegetable oils have already been used as fat substitutes [9,5]. From the processing point of view, meat with pH 5.6-6.0 is better for products where good water binding is required, looks like sausages, as meat with higher pH has a higher binding capacity

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[2]. The chicken carcass fat content, did not exceed than 7.8% [8]. Fat is responsible for sausages, acts as a source of essential fatty acids, fat soluble vitamins and constitutes as source of energy. Fat also contributes to the flavor, texture, juiciness, which determined the quality and acceptability of sausages. Beef fat, is considered less suitable for further processing than pork fat, due to its firmer texture, yellowish color and more intensive flavor [2]. But in Indonesia, with most moslem population, pork is not allowed for sausages products, except the product are declared that used pork fat. The aim of this experiment is to evaluate the effect of using various fats in sausages formulation, especially on chemical composition and sensory analysis.

MATERIAL AND METHOD

2.1. Materials

Commercial native chicken breast fillets, corn oil, margarine and beef fat were used in this experiments. The materials were purchased from local wholesaler.

2.2. Methods

2.2.1. Formulations and Preparation of Sausages

Three formulation of native chicken sausages were prepared F-1 (with 10% corn oil); F-2 (with 10% margarine) and F-3 (with 10% beef fat). Two kilograms of sausages batter each, was prepared from fresh native chicken meats, corn oil and margarine were purchased from local wholesaler. Beef fat were frozen, tempered at -2°C , chopped and mixed in a rotating bowl meat cutter. The sausages batter were added with same amount of ingredients 2% salt, flour as filler 10%, white pepper 0.2%, garlic powder 0.1%, and then the mixture was filled in casing. Sampling was carried out on production day.

2.3. Chemical analysis.

In this experiment, the chemical analysis are protein, fat and water content. The chemical composition of sausage was determined in the following manner : protein content by Kjeldahl method and multiplying by factor 6.25; fat content by Sohxlet method, and water content by drying samples at 105°C . The chemical analyses were performed in duplicate. Analyses were performed on production day.

2.4. Sensory analysis

The evaluation of sensory characteristics of sausages was conducted by 30 students with previous experience in the evaluation of sausages. A nine-points system was used to evaluate the flavor, juiciness and acceptability of sausage. Sausages samples were evaluated after the preparation of production. Prior to each evaluation, preparatory meetings were held to discuss in detail the defined characteristics of sausages which were to be evaluated. The presented data are mean values of the panelist. Chemical composition and sensory analyses were performed on production day.

2.5. Statistical analysis

The experiment was used a completely randomized design (CRD) and repeated six times. Analysis were performed in duplicate, and the data were evaluated through a variance analysis (ANOVA). The average were compared by Tukey's test at a confidence level of 5% ($p \leq 0,05$).

RESULTS AND DISCUSSIONS

Chemical composition of native chicken

In Table 1, the chemical composition of the native chicken (g/100g) manufactured with 10% corn oil, 10% margarine and 10% beef fat.

Table 1. Chemical composition of native chicken

| Parameters | Formulation | | |
|------------|--------------------|--------------------|--------------------|
| | F-1 | F-2 | F-3 |
| Moisture | 64.03 ^a | 61.52 ^b | 60.30 ^c |
| Protein | 19.02 ^b | 18.48 ^a | 19.05 ^b |
| Fat | 19.38 ^a | 19.51 ^b | 19.60 ^a |

Note: ^{a to c} Means in the same row followed by different letters indicates significant differences ($p \leq 0.05$). Formulations : F-1 : native chickens+10% corn oil, F-2: native chickens+10% margarine, 3: native chickens+10% beef fat.

From Table 1, the moisture content of the sausages was different between the native chickens. The moisture content of each fat source (corn oil, margarine and beef fat) was also different. The effect of 10% corn oil, margarine and beef fat in native chicken moisture content (64.03; 61.52 and 60.30% respectively). When the moisture content was low, and then the fat content was high. Fat contributes to the flavor, texture, juiciness, which determine the quality and acceptability of sausages. The differences were reflect of modification due to the modification of sausages formulation. To obtain the lower fat sausages, due to the using vegetable oils, will increase the water content in the sausages. The moisture content in native chicken sausages was high, because the fat content of the native chicken meat was lower compared to other meat fat. Native chicken carcass has

low fat, and the fatness did not exceed than 7.8% [8]. Many studies have reported about healthier fat formulation for sausages, using vegetables oil to substitutes for animal fat. This product prepared with different type of oils (corn oil, and margarine) and also used beef back-fat. Both results, products with corn oil and margarine were lower than the animal fat, in native chicken sausage. This results described that vegetable oils could be used as animal fat replacers in low fat sausages. This results are in line with [1], has been used oil as healthier lipid combination in water emulsions as pork back-fat replacers in low-fat frankfurters. According to [3], animal fat has higher fat percentage than vegetable oil. So the vegetable oil could be used to improve the fat content of sausages, because could be reduced the fat content.

Table 2. Sensory analysis of native chicken

| Parameters | Formulation | | |
|---------------|-------------------|-------------------|-------------------|
| | FA1 | FA2 | FA3 |
| Flavor | 7.70 ^a | 7.71 ^a | 7.70 ^a |
| Juiciness | 7.69 ^a | 7.70 ^a | 7.70 ^a |
| Acceptability | 7.70 ^a | 7.69 ^a | 7.71 ^a |

Note: ^a Means in the same row followed by different letters indicates significant differences ($p \leq 0.05$). Acceptance of sausages was scored on a 9 point hedonic scale (1 - dislike extremely and 9 - like extremely). The presented data are mean values of evaluations.

Formulations : F-1 : native chickens+10% corn oil, F-2: native chickens+10% margarine, 3: native chickens+10% beef fat.

Sensory analysis.

Table 2 shows the sensory scores for native chickens sausages. Even fat also contributes to the flavor, juiciness, which determine the quality and acceptability of sausages, but the acceptance of all sausages in this experiment was similar ($p > 0.05$). The acceptability values attributed to the products were around seven (7.69 to 7.71), indicating that the panelists moderately like the sausages, and the sausages with beef fat (F-3), has the highest score. Based on flavor acceptance, sausages with 10% margarine (F-2) was the highest preferred sausages by panelist. Based on the juiciness, sausages with 10% corn oil were the least preferred sausages by panelist and sausages with 10% margarine and beef fat, has the same acceptance. And for acceptability, the sausages with 10% margarine were the least preferred sausages by

panelist. Although the sensory acceptability of the sausages depended on some preference patterns of the panelist, but from the acceptance of this sausages, it can be concluded that native chickens sausages was accepted by the panelist. The use of various fats in native chicken has no significant results for acceptability of the panelist. Results indicated that using corn oil, margarine and beef fat in native chicken sausages production, did not affect the acceptability of the products.

CONCLUSIONS

The effects of corn oil, margarine and beef fat in producing sausages, were investigated, and had no influence on the acceptability of final products, in native chicken sausages. The results values were similar in all sausages. Sensory quality was

acceptable in all sausage variants. The results of this study suggest that using some fat sources (10% corn oil, 10% margarine and 10% beef fat) should be considered in native chicken sausages formulations.

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