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# Assessing Chicken Rendang in Padang: Quality, Nutrition, and Sensory Analysis

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## ABSTRACT

Chicken rendang is loved by children and adults alike but is still often found in restaurants in Padang City. As a representative of the Minang Region, the city of Padang is very representative of sampling chicken rendang because each rendang has a different process and taste. This research examined the quality, nutritional value, and taste of chicken rendang sold in Padang City. The method used in this research was a survey method with random sampling (purposive sampling), and then laboratory analysis was carried out. Data processing used a 9x2 randomized block design (nine samples and two groups), with samples being places where chicken rendang was taken from 8 restaurants in the city of Padang and one chicken rendang sold commercially (packing) as a control, while quality test without using controls. The parameters observed were quality (FFA, TBA, and cholesterol levels), nutritional value (moisture content, protein content, fat content, ash content), and sensory analysis (color, aroma, texture, and taste of 30 untrained panelists) of chicken rendang. Sample G had the highest nutritional value but was lower than the sensory analysis. On the other hand, the sample I had the highest sensory assessment and high-fat content. Sample D was the best sample regarding quality, nutritional value, and sensory with FFA 0.800%, TBA 0.021 mg malonaldehyde/kg, cholesterol levels 44.35 mg/dl), nutritional value (moisture content 45.03%, protein content 14.48%, fat content 15.44%, ash content 2.80%), and sensory analysis neutral.

**Key words:** Chicken rendang; nutritional value; quality; Ranah Minang; taste

## INTRODUCTION

Chicken meat is an animal protein popular with the public, especially children, in various preparations. Chicken is famous for its processed meat, such as fried chicken, spiced chicken, soy sauce chicken, nuggets, sausages, meatballs, curry chicken, and various modern and traditional chicken dishes. One of the chicken dishes that is familiar to the Minang people's tongue is chicken rendang.

Rendang was the number one most delicious food in the world in 2011 and 2017 based on CNN's (2023) coronation results. This fact proves that rendang is no longer just a culinary dish that Minang people like but is loved worldwide. Along with Google Trend data for worldwide coverage, interest in rendang from 2004 until now continues to increase until 2024 (Figure 1), a sharp increase especially in April 2018 for chicken rendang and May 2020 for beef rendang. Interest in chicken rendang is based on region; Indonesia ranks fourth; the highest ranks are Malaysia 64%, India 53%, Singapore 40%, Indonesia 31% and Ireland 27%. The increased interest in chicken rendang beats beef rendang in Malaysia, but beef rendang is easier to find in the cities of Padang and West Sumatra (Google Trend, 2024).

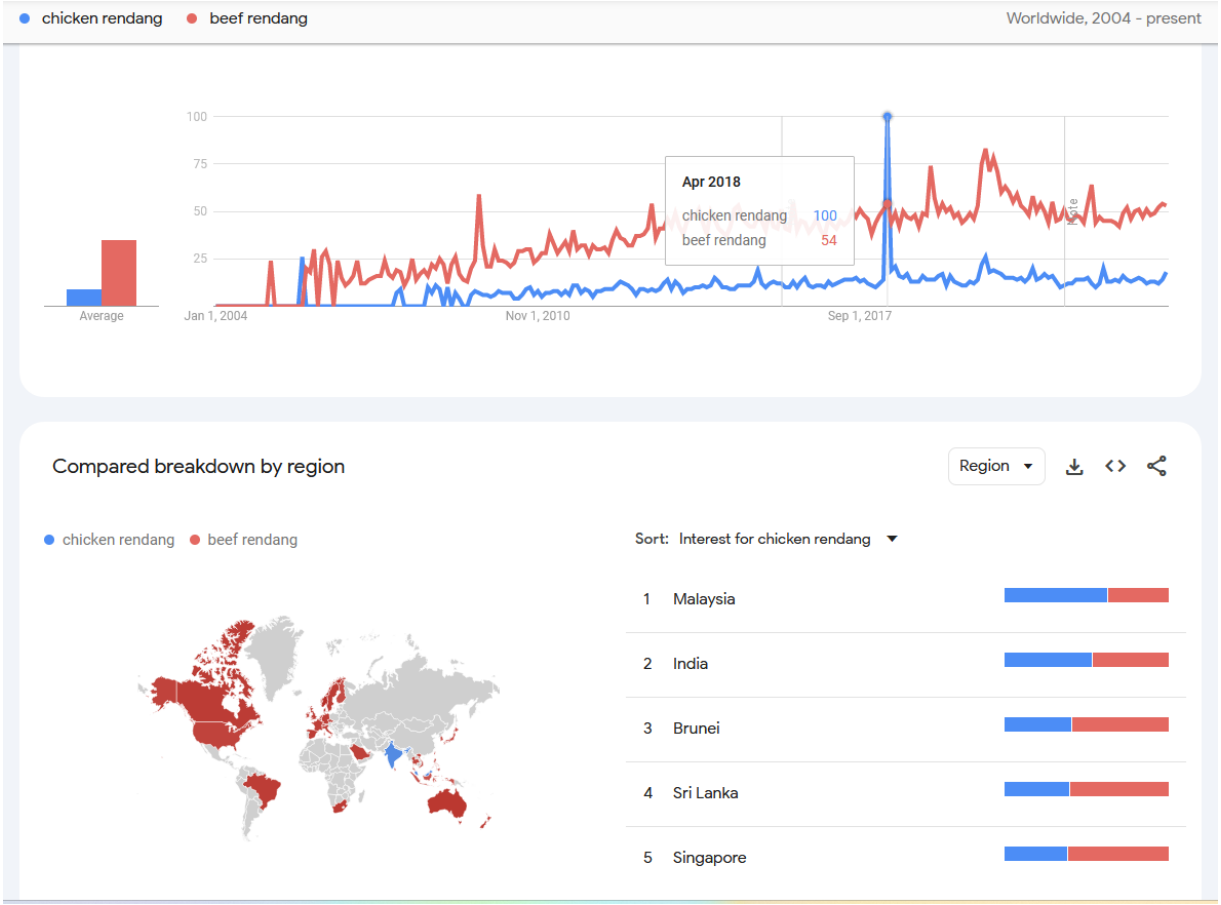


**Figure 1.** Interest graph for chicken rendang and beef rendang (Google Trend, 2024)

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In the Minangkabau language, Rendang is a food or side dish that is always present at every party or traditional banquet and has been a favorite menu for generations. There are many types of rendang; crispy rendang is an egg rendang growing in Payakumbuh (Novia et al., 2019). The effort to socialize egg rendang was also carried out through training for FSI Keputrian Faculty of Animal Husbandry Unand students to improve its quality and selling value (Novia et al., 2017).

The most famous rendang is beef rendang. The meat rendang industry during and after the COVID-19 pandemic will survive by collaborating and cooperating well with the chain of institutions involved (Sartika et al., 2023). Investigations into chicken rendang have delved into diverse areas, including the utilization of various binding agents (Annisa and Holinesti. 2020.), the creation of rendang with altered texture suitable for individuals with dysphagia (Zarim et al., 2018), and the assessment of its nutritional content (Rini et al., 2016).

Preserving rendang can be done by adding gambier extract (Melia et al., 2015) and mangosteen peel extract as a natural antioxidant in making rendang with a concentration of up to 1%, which is still acceptable organoleptically (Melia et al., 2019). An innovative creation, known as kebab rendang, has been introduced with the aim of boosting the appeal and popularity of rendang (Nevriansyaha et al., 2022).

Padang City, the capital of West Sumatra province, has people from various tribes and ethnicities in almost all regions in West Sumatra. This difference causes the taste of rendang sold in Padang City to vary significantly. Choosing the right meat, spice mixture, heat control, cooking time, and stirring technique influence the taste of rendang. Traditionally, rendang is served on special occasions and to particular people (Nurmufida et al., 2017). Based on the results of the pre-research, almost all restaurants and amperas in the city of Padang provide beef rendang, but only a few provide chicken rendang. Rendang has the potential to become a functional food because it has a high antioxidant capacity, namely the antioxidant activity of spices (62.46 ± 1.43%) and rendang meat (46.23 ± 1.43%) (Fajri et al., 2023). Apart from that, chicken rendang has the potential to be sold overseas with guaranteed quality. Research by Nazir et al. (2018) on beef rendang taken from several regions in West Sumatra shows that each rendang has the intensity of specific sensory attributes characteristic of each region (Nazir et al., 2018). This research aims to determine the quality, nutritional value, and taste of chicken rendang sold in Padang.

## MATERIALS AND METHODS

This research was conducted in the city of Padang, West Sumatra. The material used was new chicken rendang (less than one day old), which was taken simultaneously at several restaurants in Padang City using aseptic plastic and commercial rendang as control. An analysis of the chicken rendang was carried out.

The method used was a survey method with random sampling (purposive sampling) of eight restaurants (R.M.) that sold chicken rendang and one chicken rendang as a control. The design used for data processing was a randomized block design with eight samples and two replications as groups, while the quality test did not use controls.

The samples are several restaurants that provide chicken rendang with varying cooking times (1-4 hours), that provide chicken rendang as their menu, such as: A: RM Tugu Monas, B: RM Singkarak, C: RM Pauh Jaya, D: RM Ganti Salero, E: Ampera Keluarga, F: RM Malalo, G: RM Umega, H: RM Tujuh Koto and I: Rendang Asese/control (packaging rendang). If there is an influence ($P<0.05$), proceed with Duncan's test. Analysis was conducted at the Animal Product Technology Laboratory, Faculty of Animal Husbandry, Andalas University, Padang.

The research was carried out in three stages: 1) pre-research, which involved surveying restaurants that sell chicken rendang in the city of Padang; There are eight restaurant choices based on restaurants that meet the criteria (cook rendang at least three times a week, provide chicken rendang in quantities of at least two chickens). The results of the survey show that randomly selected houses provide chicken rendang. 2) Fill out a questionnaire about the process and materials used. 3) Carrying out the research, namely purchasing three pieces of chicken rendang, breast, and wings at each restaurant and taking them to the laboratory for analysis in each processing group.

The parameters observed were quality tests, nutritional value, and taste of chicken rendang. Chicken rendang quality tests include free fatty acid (FFA), thiobarbituric acid (TBA), and cholesterol levels. Nutritional value is water content using the oven method, protein content using the Kejedhal method, fat content using the Soxhlation method, and Furness ash content (AOAC, 2005), while sensory analysis includes color, aroma, texture, and taste of 30 untrained panelists with criteria 1- 5 (1 = really do not like, 2 = do not like, 3 = neutral, 4 = like and 5 = really like).

**Free Fatty Acid (FFA) Analysis**

The examination of free fatty acids (FFA) in chicken rendang, as outlined by Sudarmadji et al. (2003), involves the following procedure: 3 grams of the sample are placed into a 25 ml Erlenmeyer flask, followed by the addition of 5 ml of 95% ethanol and 3-5 drops of pp indicator (phenolphthalein). The blend is subsequently titrated using a 0.1 N NaOH standard solution until the color changes to pink (with no change observed for 15 seconds).

This process is repeated three times. The percentage of free fatty acid content can subsequently be determined using the following formula:

$$\%\ FFA = \frac{mL NaOH\ x\ Fatty\ acid\ molecular\ weight\ x\ 100\%}{Sample\ weight\ x\ 1000}$$

**Thiobarbituric acid (TBA) Analysis**

The progression of thiobarbituric acid (TBA) levels was observed over time using a spectrophotometric method to determine TBA values. According to Dandago et al. (2004), this involved macerating 10g of minced fish with 50 ml of distilled water at 2-minute intervals, then washing and transferring the mixture to a distillation flask containing 47.5 ml of water. Additionally, 2.5ml of 4N HCl (antifoam liquid) and 5 glass beads were added to the flask. The mixture was then distilled at a rate of 5ml/min, and 5ml of the distillate was collected in a glass-stoppered tube. Subsequently, 5 ml of TBA reagent was added to the tube and then heated in boiling water for 35 minutes. After cooling, the absorbance was measured against a blank at 538nm. Each absorbance reading was used to calculate the TBA value.

Furthermore, the deterioration rate of this rendang was monitored and rated on a scale of 1-10, with a value of 1 indicating excellent condition, 2-3 representing good condition, 4-5 indicating lousy condition, and 5-10 indicating spoilage.

**Cholesterol Content Analysis**

The method for extracting materials to analyze cholesterol levels, as described by Plummer (1978), involves the following steps: 1) Taking 1 gram of the sample and placing it into a reaction tube, then adding 10 ml of acetone: ethanol (1:1) solution, 2) Heating the mixture within a water bath set at 60°C until the solvent volume decreases by half from its original amount, and then evaporating it for 15 minutes afterward, 3) Filtering the remaining solvent using Whatman 41 filter paper, 4) Dissolving the sample residue with 5 ml of acetone ethanol, then evaporating again in a water bath at

60°C for 10 minutes, filtering the remaining solvent again, 5) Heating the filtered solution in a water bath at 60°C until the solvent volume reduces to 1 ml, then analyzing the extraction solution for cholesterol levels.

Cholesterol level analysis utilizing the enzymatic color method (SHM, 2000) is conducted through the following steps: 1) Pipetting 1 ml of the cholesterol kit into a test tube, followed by the addition of 0.01 ml of the extraction result, 2) Incubating the solution for 20 minutes until the color turns red, 3) Preparing a blank by pipetting 1 ml of cholesterol kit into a test tube, with a series of blanks made for each analysis series, 4) Inserting the blank into the spectrophotometer cell (Clinicon Autoanalyzer), ensuring that the reading shows 0 at a wavelength of 500 nm before inserting the sample for measurement. Cholesterol levels are determined by the numbers displayed on the spectrophotometer monitor.

**Statistical analysis**

Statistical analysis was conducted through variance analysis (ANOVA). Should the outcomes indicate notable or highly significant variances, subsequent examination will involve employing Duncan's Multiple Range Test (DMRT).

## RESULTS AND DISCUSSION

### General Overview of Chicken Rendang in Padang City

Padang stands as the principal city situated along the western shoreline of Sumatra Island and serves as the capital of West Sumatra Province, Indonesia. This city is Indonesia's western gateway to the Indian Ocean (Wikipedia, 2023). The city of Padang is located at the coordinates 0° 44' 00" and 1° 08' 35" South Latitude and between 100° 05' 05" and 100° 34' 09" East Longitude. West Sumatra Province has an area of 694.96 $km^2$ of the total area of Padang City; the majority, or 51.01%, is forest-protected by the government. The borders of Padang City are: to the north, it borders Padang Pariaman Regency; to the south, it borders Pesisir Selatan Regency; to the west, it borders the Mentawai Strait; and to the east it borders Solok Regency (Figure 2). The typical menu served at restaurants in Padang City is rendang.

Beef rendang is one of the restaurant menus always available in Padang City, but only a few restaurants provide chicken rendang on the menu. Chicken rendang uses the primary raw material, broiler chicken (100%), which is taken from collecting traders (88.8%) and small traders (11.1%). The highest weight of chicken used was 1.8 kg (33.3%), while the consequences for 0.9 kg, 1.5 kg, 2 kg, and 2.5 kg were 11.1%, respectively. The percentage of chicken requirements per week in the cooking process is 21 chickens and 70 chickens; each sample is 33.3%, followed by 28 chickens from 22.2% of the sample and 35 chickens from 11.1%.

The ratio of chicken and coconut used also varies; the highest percentage is 33.3% with a balance of 3:1, while the 1:2, 1:3, and 1:4 ratios are 11.1% each. The coconuts used are freshly harvested and old, and only the concentrated coconut milk is taken. Groundwater (88.8%) and PDAM water (11.1%) are the water sources. The cooking process does not add additives other than MSG and without adding cooking oil.

Most of the spices used in cooking rendang come from self-mixed 44.4%, 33.3% from the market, and finally % from stalls 11.1%. The cooking process using only a stove as a heat source has the highest percentage, namely 44.4%, followed by using *tungku* and a stove at 22.2% and a *tungku* alone at 22.2%. The highest percentage of cooking was 33.3%, namely for 2 hours, 1 hour, and 3 hours, 22.2% and 4 hours, respectively (11.1%). Usually, cooking starts at 05.30 and 11 at the latest, finishing at 8.30 at the earliest and 14.00 at the latest. Workers do not wear unique clothes when processing chicken rendang but wear daily clothes (100%). Usually, the chicken rendang produced is marketed in

local markets (100%), with prices fluctuating starting from IDR 6000 (11.1%), IDR 8000 (22.2%), IDR 9000 (22.2%) and IDR 10 000 (33.3%) (prices in 2014).




**Figure 2**. Map of Padang City, West Sumatra, Indonesia (Wikipedia, 2023)

## The Quality of Chicken Rendang

The average free fatty acid (FFA) can be seen in Figure 3. Based on the diversity analysis, the chicken rendang from the research results was not significantly different from the FFA value. The same FFA value is caused by the product being 0 days old, so it has not affected product changes to FFA. FFA is influenced by the hydrolysis reaction of oil with water in chicken rendang. Ramadhani et al. (2022) research results show that beef rendang has an FFA value 2x higher, namely 2.02±0.15%, compared to this study with a 0.470 – 0.800% range.

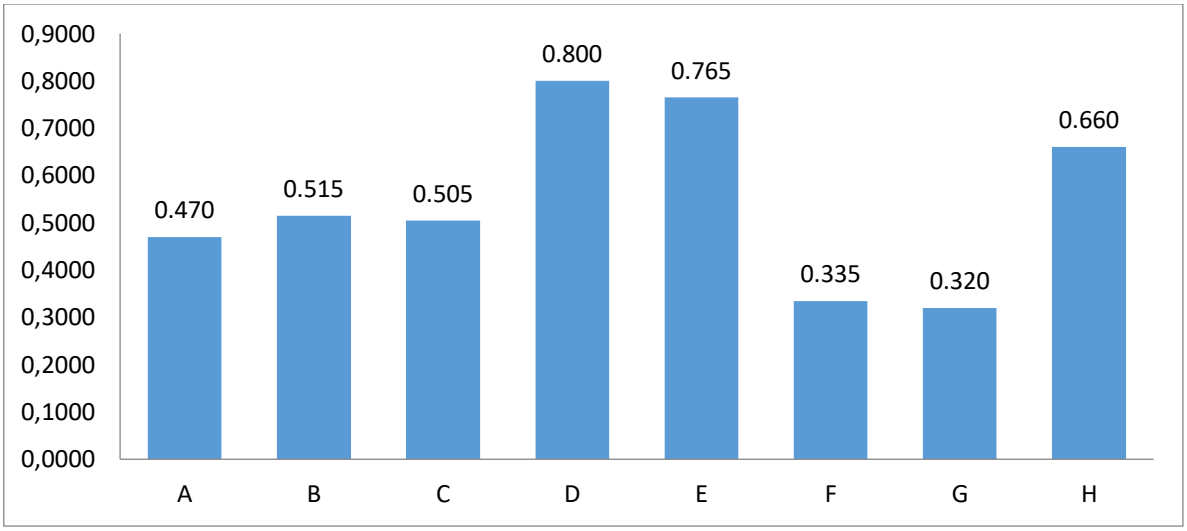


**Figure 3**. Average FFA (%) of chicken rendang

Table 1 shows the research's average value of thiobarbituric acid (TBA) and cholesterol levels for chicken rendang. The diversity analysis showed that chicken rendang from the study significantly affected TBA values and cholesterol levels. The highest mean TBA was obtained in sample C, 0.294 mg malonaldehyde/kg sample, and the lowest was in sample D, 0.021 malonaldehyde/kg sample.

**Table 1**. Average TBA value and cholesterol level for chicken rendang

| Samples | TBA (mg malonaldehyde/kg sample) | Cholesterol Levels (mg/dl) |
|---|---|---|
| A | 0.022±0.0021 $^{b}$ | 59.10±0.14 $^{ab}$ |
| B | 0.025±0.0156 $^{b}$ | 53.05±12.66 $^{abcd}$ |
| C | 0.294±0.1330 $^{a}$ | 63.00±2.83 $^{a}$ |
| D | 0.021±0.0226 $^{b}$ | 44.35±2.33 $^{bcd}$ |
| E | 0.030±0.0042 $^{b}$ | 42.50±3.54 $^{cds}$ |
| F | 0.034±0.0042 $^{b}$ | 39.30±0.42 $^{d}$ |
| G | 0.037±0.0078 $^{b}$ | 57.40±6.22 $^{abc}$ |
| H | 0.043±0.0057 $^{b}$ | 46.10±9.48 $^{bcd}$ |

Description: Superscripts with different lowercase letters indicate significantly different ($P<0.05$)

Based on Duncan's further tests, sample C's results significantly differed from the other samples regarding the TBA value. The high oxidation reaction process influences the high TBA value in sample C. Oxidation is affected by cooking time. The longest cooking time for rendang in sample C was 4 hours.

Longer contact with heat will speed up the oxidation reaction due to the cooking process using heat from the stove or *tungku*. A cooking process that is too long is susceptible to oxidation reactions; increasing the cooking time for beef rendang will increase the EC50 value (Ithnin et al., 2023). The flavonoid content found in many spices also contributes to antioxidant activity (Ioannou et al., 2019).

Rendang, a classic Minangkabau cuisine, has been observed to maintain a consistent peroxide value, suggesting minimal oxidation (Azima et al., 2016). This stability is attributed to inherent antioxidants, like those discovered in the pericarp of Garcinia mangostana (Melia et al., 2019). The TBA value of beef rendang stored for a week in retort pouch packaging is 0.240 ± 0.070 mg malonaldehyde/kg sample (Praharasti et al., 2019). The TBA value from Ramadhani et al. research was

2.94 ± 0.17 ppm (Ramadhani et al., (2022). The average cholesterol in chicken rendang from research results (Table 1) is based on Duncan's advanced test; sample C is significantly different from samples D, E, F, and H and not significantly different from samples A, B, G.

The cholesterol content in chicken rendang is influenced by the number of ingredients. Ingredients that can reduce cholesterol content include shallots, garlic, ginger, galangal, turmeric, and others. All chicken rendang comes from broiler chickens but with different weights; the older the chicken, the more fat it contains, which affects its cholesterol content. The amount of chicken needed in one cooking process is also different. The spices come from our mix, bought at the market, and some are purchased at the stall. Sample C uses a chicken weighing 1.8 kg, a daily production volume of 10 chickens, and its concocted spices. Sample F uses a chicken weighing 1.8 kg and a daily production volume of 4 chickens and its concocted spices.

**Nutritional Value of Chicken Rendang**

Based on the results of the analysis of variance, it was found that the results of the chicken rendang study in the city of Padang had a significant effect on nutritional value, moisture, protein, and fat content but had no significant effect on ash content. The research results on chicken rendang at several restaurants in Padang showed that the highest average water content was in sample B, 66.06%, and the lowest in sample I, 26.54%. The highest moderate protein content was in sample G (21.60%), and the lowest was in sample F (12.88%). Meanwhile, the highest average fat content was in sample I (24.01%), and the lowest was in sample B (9.26%). The ash content has varying values but generally ranges between 2.04% and 3.36%. More details about the nutritional value of chicken rendang can be seen in Table 2.

**Table 2.** Average nutritional value of chicken rendang

| Samples | Moisture content (%) | Protein content (%) | Fat content (%) | Ash content (%) |
|---|---|---|---|---|
| A | 56.90±0.66 $^{bc}$ | 14.24±0.10 $^{b}$ | 15.35±0.09 $^{bcd}$ | 2.57±0.30 |
| B | 66.06±0.21 $^{a}$ | 13.93±1.23 $^{b}$ | 9.26±0.89 $^{f}$ | 3.30±0.08 |
| C | 45.67±2.90 $^{d}$ | 14.67±0.93 $^{b}$ | 16.90±0.28 $^{b}$ | 3.36±0.62 |
| D | 45.03±0.22 $^{d}$ | 14.48±1.36 $^{b}$ | 15.44±1.40 $^{bc}$ | 2.80±0.74 |
| E | 58.68±0.74 $^{bc}$ | 15.57±2.12 $^{b}$ | 13.99±1.14 $^{cde}$ | 2.07±0.29 |
| F | 63.69±0.35 $^{ab}$ | 12.88±0.74 $^{b}$ | 12.59±0.78 $^{e}$ | 2.28±0.01 |
| G | 53.88±4.28 $^{cds}$ | 21.60±3.49 $^{a}$ | 13.99±1.52 $^{cde}$ | 2.16±0.16 |
| H | 63.82±1.39 $^{ab}$ | 13.60±0.21 $^{b}$ | 13.64±0.10 $^{de}$ | 2.04±0.34 |
| I | 26.54±10.15 $^{e}$ | 14.12±0.34 $^{b}$ | 24.01±1.02 $^{a}$ | 2.31±0.05 |

Description: Superscripts with different lowercase letters indicate significantly different (P<0.05)

Duncan's further test results show that the average moisture content of sample B chicken rendang is significantly different from samples A, C, D, G, and I but not significantly different from samples F and H. The average water content of sample I is the lowest compared to the other samples, namely 26.54%. The traditional dish rendang is synonymous with using more coconut than other dishes. Coconut from which only concentrated coconut milk is taken produces dominant oil after cooking for a long time (1-4 hours). Sample I was cooked for 3 hours using a stove as the heat source.

Sample B has the highest average moisture content, 66.06%, and the lowest fat content, 9.26%. The high moisture content of sample B is caused by the fastest cooking, namely 1 hour, causing it to come into contact with the heat of the stove faster than the other samples so that a small portion of

the coconut milk still turns into oil, causing the chicken rendang fat content to be low. The contact length with a heat source will affect chicken rendang's water and fat content. The water content of beef rendang stored for a week in retort pouch packaging was 39,116 ± 0.923% (Praharasti et al., 2019). Close to the water content of sample D, namely 45.03 ± 0.22.

The high protein content of sample G is caused by short cooking, namely around 2 hours, but using a ratio of chicken to coconut (3:1), where the amount of coconut used is the least compared to other samples so that the stove heat source heats the thinner coconut milk so that the temperature is lower than Concentrated coconut milk resulted in lower protein damage by heating than other samples. Duncan's test results showed that the fat content of chicken rendang in sample B significantly differed from the other samples. Based on the research results, the fat content increases as the moisture content decreases and vice versa. The fat content of beef rendang researched by Ramadhani et al. was much higher, namely 32.57 ± 1.77% (Ramadhani et al., 2022) compared to this study with a range of 9.26 ± 0.89 - 24.01 ± 1.02%. The ash content of each sample was not significantly different because the mineral content of the chicken rendang from the research results is almost the same as the ingredients used. Excessive mineral content in rendang indicates that rendang was contaminated with certain minerals during the rendang-making process. Thus, the results showed significant variations in nutritional value between the various chicken rendang samples. Sample I had the lowest moisture content of 26.54% but the highest fat content of 24.01%. The high water content is caused by the long cooking process, namely four hours using a stove and *tungku* at a lower temperature, so that the cooking is more complete and the protein content of the rendang can be maintained at the same value as other treatments, namely 14.12%. Cooking rendang lokan uses traditional wood as fuel and more coconut milk than Lokan, namely one kilogram of Lokan and four liters of coconut milk. (Fatimah et al., 2021), while making lokan rendang, according to Nadra and Nora (2020), uses one kilogram of lokan and 2 liters of coconut milk. Research on heating beef rendang using wet seasonings for 3 hours and 15 minutes produced the lowest water content, 16.36% (Faridah and Holinesti, 2021). Such low moisture content is beneficial in some cases as it increases product shelf life and reduces the risk of microorganism growth. High-fat content like these can cause health-related concerns, especially if consumed excessively. The high-fat content of sample I was caused by the more significant amount of coconut used compared to the other samples.

The use of chicken with coconut in this sample is 1:4 higher in the amount of coconut compared to other samples with a comparison of 3:1, 1:2, and 1:3. Coconut will provide a source of fat in the rendang products produced. Apart from that, it is influenced by the cooking time of four hours, which is longer than other samples, namely 1-3 hours. In line with research results, meat rendang using wet seasonings for 3 hours 15 minutes has a fat content of 26.66% (Faridah and Holinesti, 2021).

**Sensory Analysis of Chicken Rendang**

The sensory values of color, aroma, texture, and taste from chicken rendang research are shown in Table 3. The sample I dominated in color, aroma, texture, and taste had the highest scores of 4.10, 3.73, 3.57, and 4.17, respectively, with the meaning of like. On the other hand, the lowest color is sample G with 2.17 respectively. Sample F had the lowest aroma rating, with 2.07. Sample B has the lowest texture value of 3.10. However, samples F and G had the lowest taste ratings, with 1.97 and 2.30, respectively. Thus, the results show that sample I excels in all assessed sensory aspects, while samples F and G show the lowest performance overall. Further analysis is needed to understand the factors underlying these differences.

**Table 3.** Average sensory value of chicken rendang

| Samples | Color | Aroma | Texture | Taste |
|---|---|---|---|---|
| A | 3.27±0.91 $^{b}$ | 3.33±0.76 $^{ab}$ | 3.27±0.91 $^{ab}$ | 3.40±0.81 $^{b}$ |
| B | 2.90±0.92 $^{bc}$ | 2.73±0.74 $^{cd}$ | 3.10±0.84 $^{abc}$ | 2.77±0.90 $^{c}$ |
| C | 3.17±0.83 $^{b}$ | 2.70±0.88 $^{cd}$ | 3.17±1.05 $^{abc}$ | 2.77±0.97 $^{c}$ |
| D | 3.17±0.99 $^{b}$ | 3.33±0.80 $^{ab}$ | 3.33±0.88 $^{ab}$ | 3.40±0.89 $^{b}$ |
| E | 3.10±0.92 $^{b}$ | 2.90±0.96 $^{bc}$ | 2.90±0.88 $^{bc}$ | 2.83±0.95 $^{c}$ |
| F | 2.33±1.15 $^{cd}$ | 2.07±0.94 $^{e}$ | 2.33±1.03 $^{d}$ | 1.97±0.93 $^{d}$ |
| G | 2.17±0.91 $^{d}$ | 2.40±0.93 $^{de}$ | 2.73±0.94 $^{cd}$ | 2.30±0.70 $^{d}$ |
| H | 3.07±0.74 $^{b}$ | 3.27±0.87 $^{b}$ | 3.23±0.77 $^{ab}$ | 3.20±0.92 $^{bc}$ |
| I | 4.10±0.66 $^{a}$ | 3.73±0.94 $^{a}$ | 3.57±0.73 $^{a}$ | 4.17±0.75 $^{a}$ |

Description: Superscripts with different lowercase letters indicate significantly different (P<0.05)

Based on further tests of Duncan's chicken rendang in Table 3, sample I significantly differs from the other samples regarding sensory color. The high color rating of sample I (4.10) was caused by the blackish color of chicken rendang, which is similar to rendang in general. The black color arises from cooking for a long time, namely four hours. In line with research by Fajri et al. (2023), the browning intensity value of rendang meat (0.322 ± 0.001) is higher than that of kalio meat (0.163 ± 0.001), indicating that the Maillard reaction occurs in rendang meat compared to kalio meat. Lund and Ray (2017) said that the Maillard reaction can cause changes in food color, organoleptic properties, protein function, and protein digestibility. The low sensory assessment of the color of sample G was caused by the short cooking time of around two hours. It was also influenced by the spices used, causing the rendang to have a yellowish color (not similar to rendang).

Duncan's test results for the aroma of chicken rendang, sample I, significantly differed from the other samples. The high aroma assessment of sample I was due to the spices used, which gave rise to the distinctive aroma of rendang, which was liked. Meanwhile, the low aroma assessment of sample F was caused by the spices used and the relatively short cooking time, namely one hour, so it did not give off the typical rendang aroma. According to Syukri et al., absorbing spices into the meat is responsible for the taste of rendang (Syukri et al., 2023).

Duncan's test results (Table 3) show that sample I is significantly different from samples E, F, and G and not significantly different from samples A, B, C, D, and H in terms of texture. The high texture rating of sample I (3.57) was caused by the chicken rendang's better texture than the others. Meanwhile, the low organoleptic assessment of the texture of sample G was caused by the short cooking time of around 1 hour, plus the spices used.

Based on further tests of Duncan's chicken rendang in Table 3, sample I significantly differs from the others in terms of taste. The high taste rating of sample I (4.17) was caused by the typical taste of chicken rendang rendang in general. Taste assessment is influenced by the spices used, the cooking process, the penetration of the herbs into the chicken during the cooking process, the ratio of coconut to chicken used, the heating source from *tungku*, and the cooking art of the chef. The low organoleptic assessment of the taste of sample F was caused by the short cooking time of around one hour, plus the spices used caused the rendang to taste less close to the taste of rendang. Incorporating a variety of spices, including red chili, red onion, garlic, turmeric, and lemongrass, amplifies the dish's fragrance and flavor (Melia et al., 2019). The sensory characteristics of rendang can be influenced by the quantity of coconut milk utilized in its preparation, as reduced volumes have been associated with improved sensory attributes (Nurjanah et al., 2022).

Table 3 shows that the organoleptic values of chicken rendang are the best in sample I regarding color, aroma, texture, and taste. The lowest sensory assessment was in sample F and was similar to sample G regarding color, aroma, texture, and taste. Sample I, as a comparison, is chicken rendang, marketed in polyethylene plastic packaging as pouches. The best chicken rendang from the restaurant is sample D. Sample I had the highest sensory rating; this is supported by the highest fat content in chicken rendang, which can contribute to increasing sensory acceptance. Cooking rendang using the stove and wood-fired *tungku* causes rendang to have a distinctive, well-liked taste. Making rendang lokan is the same as cooking beef rendang, which does not use a stove but wood, producing rendang with a different taste (Fatimah et al., 2021).

Fat gives chicken rendang a rich and chewy taste. Fat taste can increase the umami taste and provide a soft or creamy sensation when eaten. Fat also carries a distinctive and attractive aroma. When fat is heated during the cooking process of chicken rendang, the aroma compounds produced can enrich its aromatic profile, giving it a mouth-watering aroma and making it more appealing to the sense of smell. Fat can also provide a softer and oilier texture to chicken rendang. It can increase the enjoyment of food by providing a smoother, oilier mouthfeel, which some consumers prefer. Fat can help create a balance of taste between sweet, salty, sour, and bitter in chicken rendang. With the presence of fat, these flavors can combine well to create a complex and satisfying flavor profile.

## CONCLUSION

Based on the research that has been carried out, sample conclusions can be drawn: G had the highest nutritional value but was lower than the valuation taste. Sample D is the best sample regarding quality, nutritional value, and taste, but sample I is the most preferred comparison.

### *Disclosure and conflict of interest*

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