Evaluation of Nutritional Content of Beef Rendang Using Wet and Dry Seasonings

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Abstract. Beef rendang is a traditional West Sumatra dish made from beef cooked with coconut milk and seasoning. Seasoning has an important role, to give a distinctive flavor for beef rendang. It can be processed using wet and dry seasoning. This research is an experiment by conducting a direct experiment of making beef rendang using wet and dry seasoning. Then the proximate test was carried out to determine the nutritional content in beef rendang. The object of this research is the nutritional value of beef rendang using wet and dry seasoning including fat, air, ash, protein and carbohydrates. Fat content in the two beef rendang shows a difference, rendang using wet seasoning has more fat content than meat rendang using dry seasoning. The water content in beef rendang using wet seasoning is lower (16.36%) than dry seasonings (17.57). Ash content is not that different. The higher protein and carbohydrate content was found in dry seasoning with the value of protein content (29.88%) and carbohydrate content (29.28%). The cooking time of beef rendang has an effect on nutritional value. The faster the cooking time, the more nutritional value that can be preserved. Beef rendang using wet and dry seasoning cooked at the same time has different nutritional values. More fat and water levels are found in beef rendang using wet seasoning. Meanwhile, the ash, protein and carbohydrate content of rendang using dry seasoning has a higher value. The results revealed that there were differences in nutritional content between beef rendang using dry seasoning and wet seasoning. The nutritional content of beef rendang using dry seasoning is better than fat, ash, protein, and carbohydrates.

1. Introduction
Beef rendang is a native West Sumatra meal prepared with beef, coconut milk, and spice. [1]. Seasoning plays a crucial role in giving beef rendang its unique taste. Wet and dry seasoning can be used on beef rendang [2]. Wet seasoning is a fresh spice that is mashed, this spice is better used directly in cooking [3]. Dry seasoning is a fresh seasoning that is dried and then mashed into a powder, it is more durable, easy to carry and ready to use [4].

The various types of seasoning used in the processing of beef rendang make people who do not come from Sumatra less confident in using them, and not all of these seasoning are easy to find, such as in America and Europe. Innovations regarding the manufacture of dry seasoning need to be done, in order to make it easier for people in Indonesia and abroad who want to cook beef rendang with a traditional taste of West Sumatra.
Beef rendang is cooked by using “marandang technique”, which is a food processing technique using low heat for a long time [5]. Heating food for a long time can lead to reduced nutritional content in food. The use of dry seasoning can minimize food processing time [6]. It is important to do a research to use dry seasoning in making beef rendang, in order to have better nutritional content.

There is no discernible change in sensory attributes of beef rendang with wet and dry seasoning [2]. There has been no research on the nutritional value of beef rendang seasoning, both wet and dry. It is critical to undertake a study to assess the nutritional composition of beef rendang utilizing wet and dry seasonings such as fat, water, ash, protein, and carbs.

2. Methodology

This study is an experiment in which wet and dry seasoning are used to make beef rendang. The nutritional content of beef rendang was then determined using the proximate test. The goal of this study is to determine the nutritional composition of beef rendang using wet and dry seasoning, which includes fat, water, ash, protein, and carbs.

Rendang processing equipments are digital scales, cutting boards, knives, bamboo tray, millstone, blender, sieve, frying pan, wooden spoon, and gas stove. The ingredients used can be seen in table 1. The ground seasoning and dry seasoning use the same ingredients, but the spice processing techniques are different. Ground seasoning are processed by finely grinding all the seasoning after cleaning, while dry seasoning are processed by drying the seasoning first, mashing them after dry, and then sieving them. In table 1 there are the number of ingredients used, the amount of dry seasoning has been extracted from the wet seasonings so that they have got a measure appropriate. The amount and materials used can be seen more clearly as follows:

| No | Ingredients     | Wet seasoning | Dry seasoning |
|----|----------------|---------------|---------------|
| 1  | Beef           | 1 kg          | 1 kg          |
| 2  | Coconut milk   | 1000 ml       | 1000 ml       |
| 3  | Shallot        | 180 gr        | 24 gr         |
| 4  | Garlic         | 35 gr         | 12.4 gr       |
| 5  | Bay leaf       | 2 gr          | 0.4 gr        |
| 6  | Lime leaf      | 2 gr          | 2 gr          |
| 7  | Turmeric leaf  | 5 gr          | 0.4 gr        |
| 8  | Lemongrass     | 20 gr         | 3.6 gr        |
| 9  | Ginger         | 30 gr         | 3.2 gr        |
| 10 | Galangal       | 100 gr        | 17.2 gr       |
| 11 | Red chili      | 150 gr        | 44 gr         |
| 12 | Nutmeg         | 2 gr          | 2 gr          |
| 13 | Coriander      | 4 gr          | 4 gr          |
| 14 | Salt           | 32 gr         | 32 gr         |
| 15 | Cooking oil    | 60 gr         | 60 gr         |

The process of making beef rendang using dry and wet seasonings can be seen in Figure 1
Figure 1. Flow diagram of making beef rendang

3. Result and Discussion

The results showed that the content of water, fat, ash, protein in Wet and dry seasonings used on beef rendang met the SNI requirements. As well as sensory analysis on both rendang treatments also meet SNI requirements, including color (blackish brown), aroma (fragrant rendang), taste (typical savory rendang). This can be seen in Table 2.

Table 2. SNI of Beef Rendang

| Criteria       | Unit | Requirements          |
|----------------|------|-----------------------|
| Aroma          | -    | Normal                |
| Taste          | -    | Typical Rendang       |
| Color          | -    | Brown to blackish brown |
| Water content  | %    | Max 20,00             |
| Ash content    | %    | Max 5,00              |
| Fat content    | %    | Max 30,00             |
| Protein content| %    | Min 25,00             |
Table 3. Nutritional value of beef rendang prepared with wet and dry seasonings

| Nutrition Content | Beef rendang using wet seasonings | Beef rendang using dry seasoning |
|-------------------|----------------------------------|---------------------------------|
| Fat (%)           | 26.66                            | 19.41                           |
| Water (%)         | 16.36                            | 17.57                           |
| Ash (%)           | 3.16                             | 3.85                            |
| Protein (%)       | 27.26                            | 29.88                           |
| Carbohydrate (%)  | 26.54                            | 29.28                           |

It can be seen in Table 3 that the fat content of the two beef rendangs differs; rendang made with wet seasoning contains more fat than meat rendang made with dry seasoning. When wet seasoning is used, the water content of beef rendang is lower (16.36 percent) than when dry seasoning is used (17.57). The ash content is not much different. Dry seasoning had a greater protein and carbohydrate content, with the protein content (29.88 percent) and carbohydrate content (29.28 percent).

Table 4. Nutritional value of beef rendang with wet and dry seasonings based on the duration of cooking time

| Treatment                        | Cooking time | Fat   | Water  | Ash   | Protein | Carbohydrate |
|----------------------------------|--------------|-------|--------|-------|---------|--------------|
| Beef rendang using wet seasonings| 2 hours 15 minutes | 20.39 | 17.72  | 3.5   | 29.82   | 28.553       |
|                                  | 2 hours 45 minutes | 23.96 | 17.47  | 3.28  | 29.59   | 25.67        |
|                                  | 3 hours 15 minutes | 26.66 | 16.36  | 3.16  | 27.26   | 26.54        |
| Beef rendang using dry seasoning | 2 hours 15 minutes | 19.41 | 17.57  | 3.85  | 29.88   | 29.28        |

It can be seen in Table 4 that the nutritional value of beef rendang is affected by the cooking time. The more nutritious value that can be retained, the faster the cooking time.

Table 5. Differences in nutritional value of beef rendang using wet and dry seasonings based on cooking time

| Treatment                        | Cooking time | Fat   | Water  | Ash   | Protein | Carbohydrate |
|----------------------------------|--------------|-------|--------|-------|---------|--------------|
| Beef rendang using wet seasonings| 2 hours 15 minutes | 20.39 | 17.72  | 3.5   | 29.82   | 28.553       |
| Beef rendang using dry seasoning | 2 hours 15 minutes | 19.41 | 17.57  | 3.85  | 29.88   | 29.28        |
The results of the research in Table 5 show that the nutritional value of beef rendang with wet and dry seasonings cooked at the same time varies. Wet seasoning results in higher quantities of fat and water in beef rendang. Meanwhile, the ash, protein, and carbohydrate content of rendang made using dry spice is greater.

In table 4 it can be observed that the highest fat content is found in the treatment of beef rendang using wet seasoning (3 hours 15 minutes), which is 26.66%. This looks very different from meat rendang using dry seasoning (2 hours 15 minutes) which is 19.41%. This is presumably due to the lengthy process of cooking. The longer the process, the higher fat content produced. The increasing in fat content is also due to the use of cooking oil and coconut milk in beef rendang. Cooking oil can absorb into food so that the fat content in food increases [7]. The long cooking of beef rendang causes the coconut milk to release oil and makes the fat content in rendang increase.

The water content in food ingredients varies. Water content is an important thing to know the quality of a food product. Table 4 shows the water content of beef rendang with wet and dry seasoning. The lowest water content is 16.36%, which is obtained by using wet seasoning (3 hours 45 minutes). This is presumably because beef rendang using wet seasoning is processed in a duration of 3 hours 45 minutes of cooking, which is the longest duration. The longer the food is exposed to heat, the less water it contains.

Ash content determination is carried out to determine the amount of minerals from the combustion residue. It depends on the type of food and how it is ignored. The ash content in a food stuff indicates the presence of mineral content. The highest ash content was obtained from dry seasoning (3.85%). This is thought to be influenced by the drying factor of the dry seasoning before cooking them into beef rendang. The longer and higher drying temperature, the higher ash content produced [8].

The highest protein content was obtained 29.59% from beef rendang using dry seasoning. While the lowest protein content was 27.36% using wet seasoning with a cooking duration of 3 hours 15 minutes. The differences in protein content is due to the denaturation of proteins. Protein is a substance found in food, which functions as a builder and regulator in the body. If Protein heated, it will denature (Winarno, 2004). This might explain why the protein level of beef rendang with wet seasoning is significantly lower than that of rendang with dry seasoning. The long duration of cooking meat rendang causes the protein in meat rendang to be exposed to heat for a long time, so that the protein content is reduced.

Carbohydrates is the main source of calories for the human body (Indrayeni, et al., 2020). The results of the study in table 4 show that the highest carbohydrate content in beef rendang uses dry seasoning (29.28%). This is presumably because, the process of cooking meat rendang using dry seasoning is not during the cooking of meat rendang using wet seasoning. Carbohydrate levels seem to decrease after a long heating.

4. Conclusion
The findings indicated that there were nutritional differences between beef rendang prepared with dry seasoning and beef rendang prepared with wet seasoning. Beef rendang with dry seasoning has a higher nutritional value than fat, ash, protein, and carbs.
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