

Original Research Article

The Effect of Smoking Duration Use of Kesambi Leaf Biobriquette-Processed Torrefaction on Cooking Shrinkage and Characteristics Organoleptic Sei's Meat

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Abstract: Study this aim for knowledge of the influence of smoking time, use biobriquettes of leaf kesambi torrefied against shrinking, as well as the characteristics of organoleptic colour and texture of sei meat. The study used a random design complete with durations of 60 minutes, 90 minutes, and 120 minutes. Meat weighs 8 kg, is sliced transversely 2-3 cm thick, and is soaked with 16 grams of salt, 2.4 grams of saltpetre, and 2 cloves of white onion. The meat was then hushed up for 2 hours inside a Sokal (a basket made of palm leaves) and closed thermocouple meat entered into meat For measuring internal temperature. Temperature room smoking is guarded between 100°C and 150°C and controlled by four thermocouple sensors. The internal temperature of meat is monitored between 63°C and 77°C. Analysis results show that old curing is influential in shrinking Cook's meat. shrink cooks highest found in the long smoking treatment of 60 minutes (22.96%), and no different with the long curing treatment of 90 minutes. The curing time also affects the colour and texture parameters. Long smoking treatment of 60 minutes No different real with a long smoking treatment of 90 minutes, however different real with a long smoking treatment of 120 minutes. The highest colour parameter value was obtained in the long smoking treatment of 60 minutes (4.50), while the lowest value was obtained in the long smoking treatment of 120 minutes (3.70). The highest colour score was achieved in the long smoking treatment of 60 minutes (4.57), and the lowest score was obtained in the long smoking treatment of 120 minutes (3.33). Long smoking affects shrinkage as well as characteristic organoleptic colour and texture. The treatment that works best is the long smoking time of 60 minutes, which produces shrinkage of 8.6430% as well as colour and texture.

Keywords: Cooking Time, Kesambi Leaf Biobriquette, Cooking Loss, Organoleptic, Cow Sei.

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INTRODUCTION

Study this aim is to know the influence of smoking time using biobriquettes, leaf kesambi, processed torrefaction to shrink cook, and the characteristics of organoleptic meat from a cow. Smoking is a method of processing meat that traditionally involved the exposure of food to the smoke produced from source material by burning organic materials like processed bio briquettes. With torrefaction, use biomass leaf kesambi. Biomass refers to organic materials, whatever comes from a plant or animal, not including the required material that takes

millions of years to form, such as coal or oil (Basu, 2010). Saidur *et al.*, (2011) stated that in the most intensive biomass scenario, modern biomass will contribute around half of the total demand for energy in developing countries by 2050. Some related problems with raw biomass compared to source power material burn fossil (low-density bulk, high water content, hydrophilic properties, and low-calorie value) make biomass raw difficult to use on a large scale (Tumuluru *et al.*, 2011). Torefaction is a pyrolysis process lightly used to increase the quality of biomass, make it more solid, and make it suitable for generating electricity from coal (Acharya *et al.*, 2012). Antwi-Boasiako *et al.*,

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(2016) stated that the density of wood affects the whole characteristic of briquettes and has a positive correlation with mark heat. Chaloupková *et al.*, (2018) tested briquettes made from miscanthus, industrial hemp, and powder-sawn pine with the use of a hydraulic press machine.

More particles are concentrated in the middle cross-section, whereas more particles are concentrated in the lower cross-section (Chaloupková *et al.*, 2018). Loss Cook refers to changing the cooking method of meat after the smoking process. Long smoking uses bio briquettes, leaf kesambi, and processed torrefaction that could potentially affect level shrinkage. Cook the meat for a cow. The smoking process can cause moisture in the meat to evaporate, resulting in a weight decline. Change This can impact value nutrition and quality meat, as well as potentially affect availability as material food. duration and temperature of cooking in a manner proportional to the characteristics of physicochemistry and palatability of meat (Park *et al.*, 2020). Additionally, the most significant increase in cooking occurs in the range of 50–65 °C (van der Sman, 2007), as appropriate with the temperature at which the volume of the cell changes the most and muscle changes the most, as demonstrated by Hughes *et al.*, (2014). Lost cook For whole muscle and flesh, the grind is similar at all temperatures from 45 to 80°C, except at 65 °C, where all muscle loses more cooking time compared to hamburger meat (Tornberg, 2005).

Apart from the shrinking cook, characteristics organoleptic is an important parameter in the evaluation of sensory something food. Effect of smoking time on the use of bio briquettes, leaf kesambi, and processed torrefaction on the characteristics of organoleptic meat Sapi sei includes taste, aroma, texture, and visual appearance. Biobriquettes of leaf-processed cassava with torrefaction can give a distinctive taste and aroma to the meat of the cow, while smoking can affect texture and visual appearance. Cooking makes food safe for consumption and enjoyment. To ensure security, food is cooked at a higher temperature for a longer time, however, practice reduces quality nutrition and organoleptic food. because of loss and oxidation of soluble vitamins in water and vitamins that do not stand heat, fat loss due to fusion, reaction browning chemistry, etc. (Xiong *et al.*, 2017). Compound existing chemistry _ in the smoke has function preservation (antioxidant and bacteriostatic), flavour enhancement, colouring, and impregnation (Duma-Kocan *et al.*, 2020). Denaturation of myosin happens at a range of temperatures, and depreciation of myofibril structure is generally associated with this protein, although other proteins such as desmin also possibly play a role (Hughes *et al.*, 2014).

Studies previously show that old curing with the use of source material different burns _ can affect shrink cook and characteristics organoleptic various types of meat. However, to influence the meat of the cow, Sei

uses bio briquettes and leaf kesambi, which result in processed torrefaction. Still need to research more continue. Cooking at 80–90 °C and baking at 150–175 °C contribute to more textural parameters. preferred, and treatment hot affects the enhancement colour yellow and brightness of meat (Chang *et al.*, 2021). Texture is considered an indicator of quality in an essential food and is understood during warm-up. Protein denaturation reduces the capacity to hold water, shrinks fibre muscle, and causes degradation of connective tissue, so it produces a harder texture (Ovissipour *et al.*, 2013). Use the internal temperature of the meat until it reaches a point of transition of 48 or 54° C at 80 or 100°C oven temperature, and reaching 60°C at 220°C gives a fat reduction of 44.2% in comparison with 27.8% on conventional roasting, while meanwhile guarding the softness of the meat (Ko *et al.*, 2011). Lorenzo *et al.*, (2014) show that treatment with heat causes an increase in total volatile compounds and lipid oxidation that significantly affects the taste of cooked meat.

Understanding the influence of smoking time, using bio briquettes, leaf kesambi, processed torrefaction to shrink cook, and the characteristics of organoleptic meat Sei beef is important in processing meat and marketing products. Lost significant ripening _ can show change quality and availability of meat, meanwhile characteristics resulting in organoleptic _ can affect the reception consumer to product the. Effect of smoking time on the use of bio briquettes, leaf kesambi, and processed torrefaction on the characteristics of organoleptic meat Sei cows also have an important aspect: sensory Changes in taste, aroma, texture, and visual appearance can affect consumer preference and acceptance of a product. Information this will give a guide for producers in choosing the duration of proper smoking _ Use biobriquettes leaf kesambi results processed torrefaction for reach, shrink, desired cook, and characteristics (preferred organoleptic, preferred consumer).

Studying it also delivers practical benefits for consumers. With knowledge of the influence of smoking time and the use of bio briquettes and leaf kesambi processed torrefaction, consumers can choose products like meat cow Sei with shrink cooking and characteristics suitable for organoleptic use with their favourite. Further research This is relevant to the industry of food in developing technology to smoke more sustainably. The utilization of bio briquettes and leaf kesambi results in processed torrefaction as material burn smoking, which can become an alternative environmentally friendly environment and potentially reduce the use of material fossil fuels.

Study this is important For increased understanding We talk about the influence of smoking time, using biobriquettes, leaf kesambi, processed torrefaction to shrink cook, and the characteristics of organoleptic meat from a cow. Research results provide

an outlook valuable for producers, consumers, and the food industry in optimizing quality product meat cow Sei, developing sustainable technology smoking, and leveraging material burn alternatives in the curing process.

MATERIALS AND METHODS

Research Materials

Materials used in the study This is fresh beef (muscle biceps femoris) obtained from a cattle slaughterhouse. My bio, weighing 8 kg, and bio briquettes leaf kesambi For smoking of the meat (smoked meat). Equipment used includes tools such as grills, meat, thermometers, stopwatches, scales, packaging plastic, and quality test equipment. Study This will be held in May 2023 at the Laboratory Processing Faculty, Technology, Artha Wacana Christian University, Agriculture. Organoleptic tests are carried out in the Laboratory Processing Faculty Technology Artha Wacana Christian University Agriculture Kupang, while quality product analysis of meat and cattle is carried out in the Laboratory Biosciences.

Experimental design

Study This use design is random, complete with long smoking treatments of 60 minutes, 90 minutes, and 120 minutes.

Procedure Preparation Sei's meat

Ordinances for making sei meat are as follows: Meat was washed clean with clean water. Cut or slice 8 kg of meat transverse fibre, each slice sized 2-3 cm wide, thick the same, and no longer than 50 cm long. Mix 16 g of table salt, saltpetre (300 mg/kg of meat; in this study, we used 2.4 g of saltpetre), and 2 cloves of white onion grease meat with salt and onion mixture. The meat was hushed up for 2 hours inside a Sokal (basket made from palm leaves) covered with paper tissue. Prepare the smoking drum and place the thermocouple and thermometer where they have been determined. Burn bio briquettes of leaf kesambi until they change into coals and place them at the bottom of the room smoking. Enter the thermocouple into the meat to measure the internal temperature of the meat. Put the meat on the grill rack, covered with aluminium foil. Customize the duration of smoke by the order experiment. Smoked or grilled meat, turn over every 30 minutes. Add briquettes at a momentary temperature of up to 100°C. Keep the room temperature for smoking between 100°C and 150°C. Temperature monitoring uses four thermocouple sensors housed inside the smoking room, next to the embers, below the meat, above the meat, and inside the chimney. A thermometer was placed on the wall of the lower room smoking, before meat, and inside the chimney. The temperature part of meat observed using a thermometer ranged between 63°C and 77°C. After Sei meat is prepared, cooled, and packaged, for more analysis, continue.

Research Parameters

Measurement shrink Cook done based on Soeparno's (2005) method on cooked meat smoked, then cooked in a water bath (Setia DK-98-(II)A, China) at 80 °C for 30 minutes. shrink Cook counted with the formula:

$$\text{Loss cook (\%)} = (\text{Cook before cook (g)} - \text{Cook after cook (g)}) / (\text{Cook before cook (g)}) \times 100\%$$

Organoleptic tests are done for colour and texture. hedonic scale ranges from really liking (score 5) to not liking (score 1). Obtained data was analyzed with analysis of variance (ANOVA) and analyzed more using Duncan's test to determine the best treatment. Organoleptic colour and texture are analyzed using the Kruskal-Wallis test, followed by the Mann-Whitney test to determine the difference between treatments (SPSS 27.0.1).

RESULTS AND DISCUSSION

Loss Cook

Analysis of variance (ANOVA) results shows that long-curing treatment is influential (P 0.05) in shrinking cooked meat and cows. In Figure 1 Duncan's test results show that long smoking treatments of 120 minutes produce the lowest cooking (8.64%) and different results with treatment durations of 60 minutes and 90 minutes. Loss value Cook is highest obtained in the long curing treatment of 60 minutes (22.96%), and is no different with the long curing treatment of 90 minutes.

In general, the longer the time for smoking of meat cows, then shrink cook, the more consequence evaporation, fat shrinkage, and drying of smoked meat will be. The smoking process involves exposing meat and cows to hot smoke. High-temperature smoking _ causes deep-water meat to evaporate, so that resulted in shrink cooking. The longer the meat is exposed to hot smoke, increasingly lots water evaporates from the meat causing it to shrink and cook more big. shrink Cook more low when using an air oven cooking hot for 23 minutes (32.0%) on beef cooked at 165°C oven temperature with an internal temperature of 76.6°C (Yancey *et al.*, 2011).

During cooking at temperatures above 60 °C to 80°C, toughness increases because there is tightening (consistency) in the fibres of the muscle, especially in the direction of elongation (Jeek *et al.*, 2019). Gelatinization of sarcoplasmic proteins happens when the temperature is raised to 65°C, and the gel becomes softer, making it easy to break below-pressure teeth. That is why softness increases in temperature between 50°C and 65°C (Jeek *et al.*, 2019). The proportion of free water retained by the force capillaries in the space between filament actin and myosin myofibril was issued along with the depreciation of fibre muscle. Intensity depreciation consequence is stated as loss of cooking meat during cooking. In the case of security food, reaching an internal temperature of 70°C requires a minimum time of 2 minutes or a

combination of temperature and time with equivalent effect. _ because _ that, is recommended for cooking meat to taste (Jeek *et al.*, 2019).

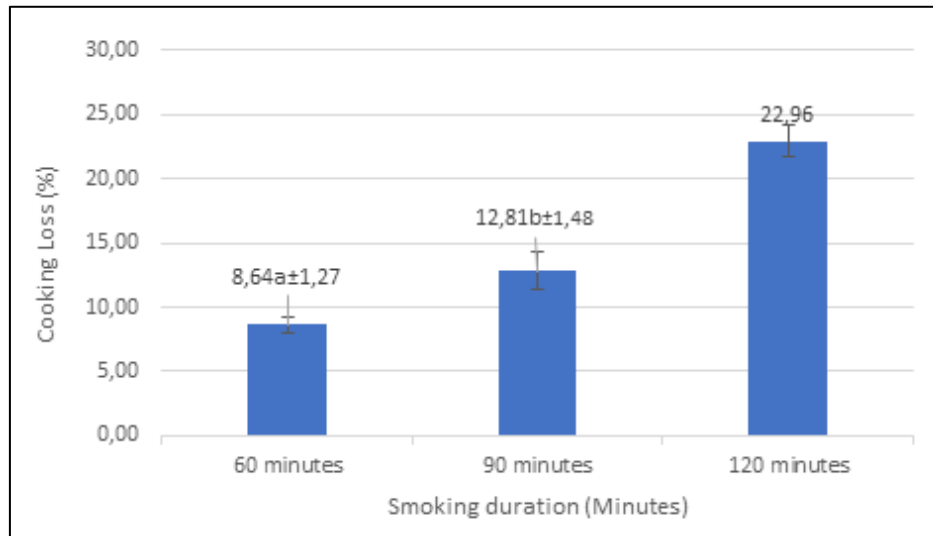


Figure 1: Effect of smoking time on shrinkage

During smoking, the temperature of the smoke is high. Melt the fat on the meat cow. Melted fat this flow goes out from the meat, resulting in loss of cooking. If the smoking process lasts a long time, then there will be lots of melted fat, which will cause the shrink to cook more.

Temperature, height, and exposure to smoke can cause dehydration in meat. The longer the meat is exposed to hot smoke, the more Lots lose moisture, so _ contributes to the magnitude shrink cook. shrink Cooking during the smoking process can vary depending on a variety of factors, like temperature smoking, humidity relative, and the characteristic meat used. However, lose more dishes. A big no always means a bad ending. Some people even consider that enhancement shrink cooking can result in a richer taste and texture in more meat.

Colour

Organoleptic test results are coloured in Figure 2. Kruskal-Wallis test for colour parameters shows a significant difference ($P < 0.05$) and rejects hypothesis zero (H_0) because there is a significant influence of treatment (60 minutes of smoking and roasting, 90 minutes of smoking and roasting, and smoking and roasting for 120 minutes) on the colour of the meat of the cow with different curing times. Testing is further analyzed using the Mann-Whitney test to determine the difference between treatments.

Kruskal-Wallis for colour parameters shows a significant difference ($P < 0.05$), rejecting hypothesis zero (H_0) because there are significant differences in treatment (60 minutes of smoking and roasting, 90 minutes of smoking and roasting, and smoking and roasting for 120 minutes) on the colour of the meat of the

cow with different curing times. _ Testing is further analyzed using the Mann-Whitney test to determine the difference between treatments.

In Figure 2 Mann-Whitney test results for colour parameters show that treatment smoking and roasting for 60 minutes showed no significant differences ($P > 0.05$) when compared with treatment smoking and roasting for 90 minutes; however, there was a real difference with treatment smoking and roasting for 90 minutes. Maintenance of smoking and grilling for 120 minutes. The highest colour parameter score was obtained in treatment smoking and roasting for 60 minutes (4.50), while the lowest score was obtained in treatment smoking and roasting for 120 minutes (3.70).

Organoleptic test differences: colour smoked sirloin beef with curing times of 60 minutes, 90 minutes, and 120 minutes use torrefied Biobriquettes leaf kesambi can be caused by smoking, temperature smoking, caramelization, and composition material burn. Duration of different smoking _ can give different smoke intensities on the meat sei cow. Smoke can donate pigment or compounds that give meat colour, e.g., the Maillard reaction that occurs during smoking. Duration: Longer smoking gives ___ more There is lots of time for pigment or compound to interact with meat, so produce a colour change that is intense or different. Temperature smoking can also affect the colour of the smoked meat. More temperature can speed up the reaction chemistry going on during smoking and cause more colour change, which is significant in meat. Longer smoking increases the possibility of caramelization on the surface of smoked beef. Caramelization is reaction chemistry going on when heat is applied to the existing sugar in meat, so it produces the colour brown on smoked beef. Composition chemistry from torefified biobriquette leaf

kesambi can affect compound or formed pigments during combustion and their interactions with meat, so that can affect smoked meat colour. Analysis of the image and

texture shows no significant change in meat shell liquid smoke during storage, except that colour becomes dark and the texture of the meat declines (Xin *et al.*, 2021).

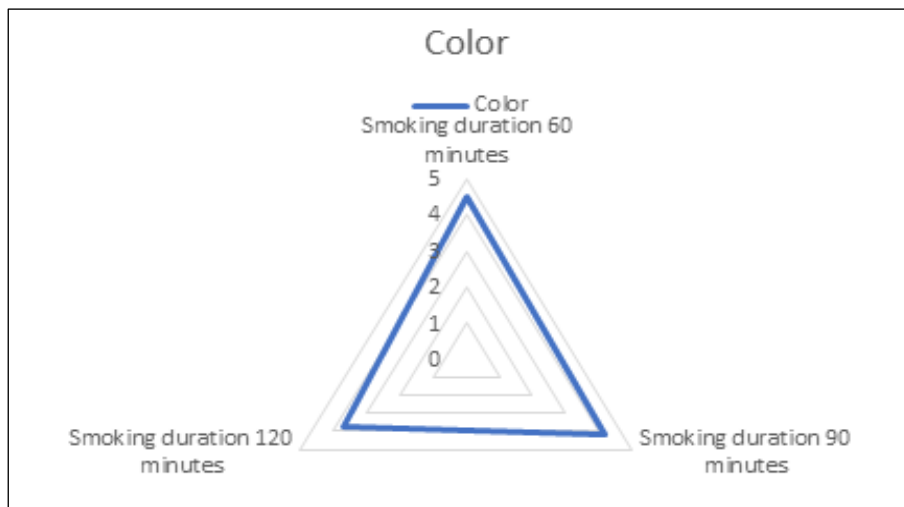


Figure 2: Evaluation radar chart of organoleptic colour parameters

The cooking process changes the characteristic myoglobin, which causes the characteristic colour of chocolate to dull on the cooked meat. However, temperature denaturation of various forms of redox myoglobin is not constant because the colour is young relative to the part in the cooked product. Of course, indicator level possible maturity is dependable. Temperature denaturation of myoglobin depends on the redox status of the protein. Meat with a normal pH containing carboxy myoglobin will be more stable to heat, so increase point end maturity as much as halfway up to two-thirds degree maturity (King *et al.*, 2023). Red-coloured persistent youth can also be caused by several sources of oxide nitrate, including several small NO₃- or NO₂-deep source foods, spices, or water added to meat (King *et al.*, 2023). Product burning No perfect from the oven gas fuel to cause surface coloured red young. Colour type: red young This can be minimized or removed with the removal of agents that cause and/or increase temperature points (King *et al.*, 2023).

Causing the pigment colour red or red guava on meat ripe are 1) myoglobin and oxymyoglobin, which are not denatured, namely red pigment in fresh meat, 2) nitrosyl hemochrome, red pigment in young on preserved meat, and 3) heme reduced. Chromoglobin from cooked meat is well known (Cornforth *et al.*, 2001). Sometimes, exposure to carbon monoxide in cooked meat can cause the formation of hemochrome carbon monoxide. A red colour or red guava that isn't wanted can appear quickly after cooking or develop gradually during distribution or appearance at retail. The initial pH of meat, the temperature of cooking, the way of cooking, the procedure of processing, packaging, and the growth of microbes have all been proven to affect the colour red guava or red in cooked meat (Cornforth *et al.*, 2001).

Texture

Texture test results are organoleptically presented in Table 6.2. The Kruskal-Wallis test for texture parameters shows a significant difference (P 0.05), rejecting hypothesis zero (H₀) because there is a significant influence of treatment (60 minutes of smoking and roasting, 90 minutes of smoking and roasting, and smoking and roasting for 120 minutes) on texture of meat from a cow with different smoking durations. Testing is further analyzed using the Mann-Whitney test to determine the difference between treatments.

Kruskal-Wallis for texture parameters shows a significant difference (P 0.05) and rejects hypothesis zero (H₀) because there are significant differences in treatment (60 minutes of smoking and roasting, 90 minutes of smoking and roasting, and smoking and roasting for 120 minutes) on the texture of meat and beef with different curing times. Testing is further analyzed using the Mann-Whitney test to determine the difference between treatments.

In Figure 3 Mann-Whitney test results for texture parameters show that treatment smoking and baking for 60 minutes show significant differences (P 0.05) when compared to treatment smoking and roasting for 90 minutes and treatment smoking and roasting for 120 minutes. Treatment smoking and roasting for 90 minutes showed a significant difference (P 0.05) compared to treatment smoking and roasting for 120 minutes. Texture parameter scores are highest obtained in treatment smoking and roasting for 60 minutes (4.57), whereas they are lowest obtained in treatment smoking and roasting for 120 minutes (3.33).

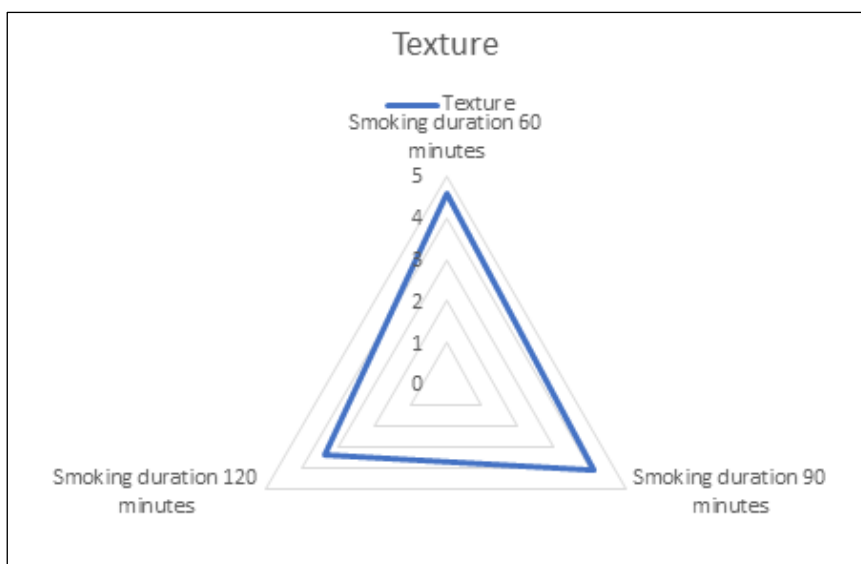


Figure 3: Evaluation of the radar graph organoleptic texture parameters

Organoleptic test differences: texture of smoked sirloin beef with curing times of 60 minutes, 90 minutes, and 120 minutes use torrefied Biobriquettes leaf kesambi can be seen from degrees of maturity, temperature smoking, moisture content, tenderness, and composition material burn. Duration: Different smoking can affect the level of maturity of the meat. Duration longer smoking can result in the meat becoming more ripe which can affect the texture of meat to become more soft and tender. Temperature smoking can also affect the texture of smoked sirloin. More temperature can accelerate the process of cooking and influence the softness of meat. Duration of smoking can affect the water content of the meat. Duration longer smoking can lower the water content in the meat and produce more texture dry or solid. Tenderness factor: meat-like composition Collagen and fat can also affect the texture of smoked beef. Longer smoking can help soften collagen and fat in meat so that it has more texture. The composition chemistry of torrefied biobriquette leaf kesambi can affect combustion and displacement heat during smoking. Differences in combustion and displacement heat can affect the cooking process of meat and, in the end, the texture of smoked beef. During the cooking process, the protein contracts in the meat, making it not tender enough, and the main connective tissue protein (collagen) becomes more soft. because that, For pieces with lower content of connective tissue, such as steaks and cuts of bone ribs and loin, the method recommended for cooking covers hot and dry, including frying, grilling, and smoking (Epley, 1992). Flesh decline can happen. Because fat oxidation and bacteria, can affect the quality of meat, and salting Roselle with 3% or 3% lime has the best effect on the taste and softness of sei (Angels *et al.*, 2017).

Applying hot moist for a long time at a low temperature (275°–325°F) will produce a conversion of collagen hard into gelatin soft, making a piece of meat more soft compared to cooking with hot dry For piece-

less meat that is tender (Epley, 1992). Degrees of maturity influential real to tenderness. When meat is non-heated fat, contractile proteins become more hard and lose humidity, resulting in lower tenderness. In most cases, meat cows with A little marble need more time to cook more A little compared to neat cow quality. However, consumers often fail to adapt to the matter. This resulted in the meat cow becoming too mature and lacking softness.

CONCLUSION

Based on the results of the study, it can be concluded that long-curing treatment is influential in shrink cooking as well as the evaluation of organoleptic colour and texture. Treatment was best observed at 60 minutes of smoking time, which produced a shrinkage of 8.6430% as well as love the colour and texture.

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