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INFLUENCE OF ARENA (*Arenga pinnata*) SUGAR ADDITION WITH DIFFERENT PERCENTES ON THE QUALITY OF CHICKEN MEAT FRIED FRUITS

PENGARUH PEMBERIAN GULA AREN *(Arenga pinnata)* DENGAN PERSENTASE YANG BERBEDA TERHADAP KUALITAS DENDENG SAYAT DAGING AYAM

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Abstract

Jerky is a traditionally processed meat preservative product. Jerky is a slab-shaped food made from slices or grinds of fresh meat seasoned in dry-cured meat with the characteristics of food with low humidity and high protein content. The method used in the research was a completely randomized design (CRD) method in the same directions with 4 treatment levels (A = 0%, B = 10%, C = 20%, D = 30%) and 5 replications. The results showed that different percentages of addition of palm sugar (0%, 10%, 20%, and 30%) had a very significant effect on water content and organoleptic values of color, taste, aroma, and texture and significantly affected the microbial test. The highest water content analysis was found in the handling without adding the percentation of palm sugar 0% (13.77%) and the smallest in handling 30% (10.48%). The highest total microbial analysis was found in the handling without the addition of 0% palm sugar percentation (94.50 cfu / mL) and the smallest at the supplementary of 10% (25.96 cfu / mL) percentages of palm sugar. Jerky in chicken meat with the highest organoleptic quality was acquired in the handling with the supplementary of 30% palm sugar with color characteristics 2.85; flavor 2,94; smell 2.69; and texture 2.91; at the level of reception rather like.

***Keywords**: Chicken meat, jerky meat, palm sugar*

Abstrak

Dendeng merupakan produk pangan yang diolah secara tradisional. Berbentuk lembaran yang dibuat dari daging segar yang diiris maupun digiling, dengan penambahan bumbu dan dikeringkan. Dendeng merupakan *"dry cured meat"* dengan kekhasan kadar protein tinggi dan kelembaban rendah. Riset ini mengadopsi model rancangan acak lengkap atau RAL pola searah menggunakan 4 kombinasi yaitu A=0%, B=10%, C=20%, D=30% dan 5 kali ulangan sehingga didapat 20 unit percobaan. Hasil riset memperlihatkan bahwa treatment pemberian gula aren (0%, 10%, 20% dan 30%) berbeda sangat nyata terhadap kadar air dan organoleptik (aroma, warna, rasa dan tekstur) serta berbeda nyata terhadap total mikroba. Analisis kadar air paling tinggi pada treatment dengan persentase gula aren 0% (13.77%) dan terendah pada 30% (10,48%). Analisis total mikroba yang paling tinggi pada treatment tanpa penambahan gula aren (48,50 cfu/mL) dan terendah pada persentase gula aren 10% (20,80 cfu/mL). Dendeng dengan mutu organoleptik paling baik yaitu pada treatment dengan persentase gula aren 30% dengan karakteristik warna 2,85; rasa 2,94, aroma 2,69; dan tekstur 2913 dengan tingkat penerimaan agak suka.

Kata kunci : Dendeng, daging ayam, gula aren

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INTRODUCTION

Chicken meat is a food ingredient that has a high nutritional content. In addition to its delicious taste, the price is also affordable so it is popular with the public. Although it has a high nutritional content, unfortunately, chicken meat is easily damaged. Damage to meat is caused by biological, physical, or chemical contamination. However, the main cause of damage to meat is microbes. The way to extend the shelf life of fresh meat is by preservation. Thus damage to meat can be prevented. Damage to meat can reduce the selling value of the meat (Harlia *et al*., 2010).

To extend the shelf life of meat to improve the taste to suit consumer tastes and maintain its nutritional value, a meat preservation process is carried out (Soeparno, 2005). Meat preservation can be done by processing meat into jerky (Lukman, 2010). The taste of jerky is very unique, namely sweet and slightly sour. The color also tends to be dark due to the rather high sugar content. The presentation of jerky is generally fried and to enhance the taste of the jerky, other seasonings can be added (Nursiam, 2010). Because of the addition of sugar and salt. The function of sugar and salt is to provide flavor and preservation. In addition, it makes it easier to pack and transport, because the volume of the product becomes compact (Suradi, 2009).

Chicken jerky production using palm sugar is not limited to providing sweetness, but also to improving the taste, aroma, color, texture, and also the quality of the product. Based on the above, a study was conducted on the impact of giving palm sugar at different percentages to processed chicken jerky with the hope of having good quality in terms of physical health so that it can be consumed by various groups.

The purpose of this research is to determine the impact of giving palm sugar with various percentages on the quality of chicken jerky. The formulation of the problem in this research is to determine the impact of giving palm sugar with various percentages on organoleptic quality, water content, and total microbes. Which treatment is most preferred by consumers and gives the best results.

RESEARCH METHODS

Materials and Research Methods

Place and Time of Research

This research was conducted at the Animal Product Processing Technology Laboratory of the Indonesian Polytechnic of Venezuela; the Plant Disease Laboratory of the Faculty of Agriculture, Universitas Syiah Kuala (USK); and the Food and Agricultural Product Analysis Laboratory of the Faculty of Agriculture, USK.

Materials and Equipment

The main material used in this research was 100 g of fresh chicken meat per sample. Supporting materials were palm sugar, garlic, coriander, salt and sugar. The main and supporting materials were obtained from Lambaro market, Aceh Besar. The materials used

for the research were 1 g of sample, 9 mL of distilled water, 1 mL of suspension, and 10 mL of NA (nutrient agar). The equipment used in this research was a meat-slicing machine, blender, cooler, basin, scales, frying pan, pot, tampah, knife and stove. The equipment used for water content analysis consisted of analytical scales, porcelain cups, desiccators, and ovens; while for total microbial analysis used petri dishes, sterile pipettes, incubators, and colony counters.

Experimental Design

This research adopted a completely randomized design or RAL with a factor of palm sugar administration levels consisting of 4 combinations, namely A = 0%, B = 10%, C = 20%, and D = 30%. Each combination was repeated 5 times and 20 experimental units were obtained. The data obtained were then tested using Analysis of Variance or ANOVA. If there is a significant impact on the treatment, the study is continued using the Least Significant Difference (LSD) test.

RESULTS AND DISCUSSION

4.1. Water Content Analysis

Water content affects the quality and shelf life of food ingredients. Products with high water content are usually more easily damaged than dry products. These foods will experience changes, both biologically, physically, and chemically, if they do not meet the requirements. This is indicated by the appearance of microorganisms in the food, which makes it unfit to eat (Saputra, 2015).

Water is the largest part of fresh meat. Water can also affect texture, flavor, and appearance. The quality of jerky is determined by water content. One of the keys to the success of the food processing process is water content.

The high water content of jerky is a good medium for microbial growth. The purpose of determining water content is to determine the strength of a material in its storage. To avoid the influence of microbial activity, a good handling method is needed for food ingredients. Malangi (2015), stated that food ingredients last longer if the water content is low.

Several parameters of jerky quality such as taste, texture, appearance, and product acceptance are greatly influenced by the water content in it. The data from the research on the analysis of the water content of jerky with the addition of palm sugar showed that the resulting value ranged from 9.51% - to 29.33% with an average value of 11.72%. The ANOVA results showed that the addition of palm sugar with different percentages (0%, 10%, 20%, 30%) was very significantly different ($P < 0.01$) from the water content value of the chicken jerky produced.

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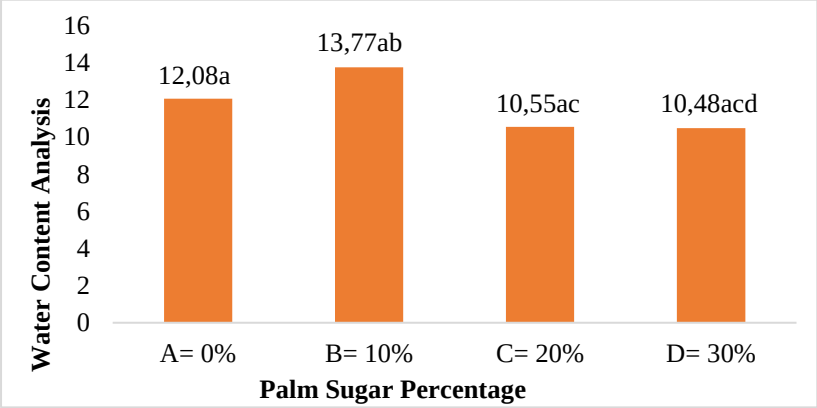

Figure 1. Results of Analysis of Water Content of Chicken Meat Jerky with the Provision of Palm Sugar

Figure 1 explains that the provision of 10% palm sugar has the highest value, which is 13.77% which is not significantly different from the combination of 0%, 20%, and 30%. The lowest water content value is found in the 30% palm sugar treatment, which is 10.48% which is not significantly different from the combination of 0%, 10%, and 20%.

The higher the administration of palm sugar, the lower the water content in the jerky because palm sugar can attract the water content in the chicken meat used in the jerky-making process. Buckle *et al*. (2009), stated that the provision of sugar can affect the decrease in water content in the processed raw materials.

According to Kasmadiharja (2008), the amount of free water formed as a product of microbial activity affects the increasing water content. The low water content in the treatment of adding 0% palm sugar compared to the treatment of adding 10% palm sugar is thought to be due to uneven drying of the sliced chicken jerky and sudden changes in weather during drying causing the inside of the jerky to still be wet, thus affecting the amount of water content in the jerky.

4.2. Total Microbial Analysis

Consuming chicken meat is good because it contains macro and micro nutritional values needed by the body. However, the presence of these nutrients is a good place for microbial growth. Alufiandra (2017), stated that if food ingredients have been contaminated by microbes, it can change the composition of the food ingredients, causing infection, food poisoning and even rotting.

Monitoring data from the results of the total microbial analysis of jerky with the provision of palm sugar with different percentages showed that the total microbial analysis value of chicken jerky obtained ranged from 1.5-6-168.8-6 cfu/mL. The average total microbial analysis value was 50.41-6 cfu/mL. The results of the analysis of variance showed that the provision of brown sugar with different percentages (0%, 10%, 20%, 30%) had a very significant disparity ($P<0.01$) in the total microbial value of jerky.

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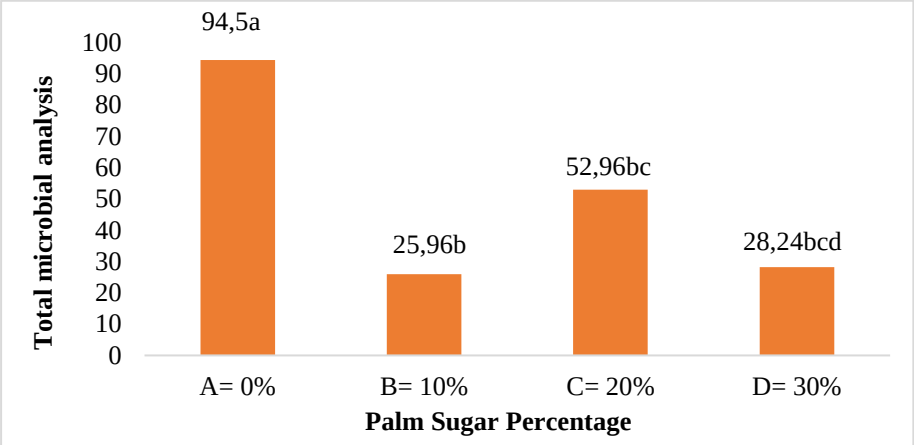

Figure 2. Results of Total Microbial Analysis of Chicken Meat Jerky with the Provision of palm sugar

The highest total microbial value of jerky was obtained from the combination of 0% palm sugar, namely 94.50 cfu/mL, and had a very significant difference from the treatments of 10%, 20%, and 30%. The lowest value was obtained at a percentage of 10% palm sugar, namely 25.96 cfu/mL which did not have a significant difference with the treatments of 20% and 30% but was significantly different from the combination of 0%.

The role of palm sugar is to attract the amount of water content in chicken meat so that by reducing the water content, it will inhibit microbial growth. So palm sugar functions as a preservative and extends the shelf life. Situmorang (2008), stated that chicken meat is a commodity that is easily damaged. Microbial growth in meat is influenced by temperature, environment, and water content factors. Water contained in free form in food ingredients can help the process of food damage.

Sugar with a high percentage inhibits the growth of bacteria, yeast, and mold. This occurs as a result of the dehydration effect on the microorganisms, which is caused by the high osmotic pressure of sugar. The high osmotic pressure of the solution can cause plasmolysis of microbial cells so that water comes out of the microbial cells. With reduced water, the microbial cells will dry out and eventually die. The low microbes in the 10% combination compared to the 20% combination are thought to be due to the influence of analytical tools that are difficult to stabilize. Another possibility is that the materials used have been contaminated with other materials during storage.

Organoleptic Color

The color factor determines the quality of a product before other factors. From the color of an ingredient, the level of freshness and maturity of the ingredient can be known (Falcon, 2009). According to Pratama (2013), in determining consumer acceptance, the color factor also plays a very important role. The bright color of a food ingredient gives an attractive impression so that it is more popular with consumers (Ulfah *et al*., 2023).

Monitoring data from the results of the analysis of the organoleptic value of the color of jerky with the addition of palm sugar showed that the panelists' preference for the color of the jerky ranged from 1.51 - 3.11 (very dislike to slightly like) with an average score of 2.24

(dislike). The results of the analysis of the variety of colors in jerky showed that the addition of palm sugar with different percentages (0%, 10%, 20%, and 30%) was very significantly different (P <0.01) on the organoleptic value of the color of the jerky produced.

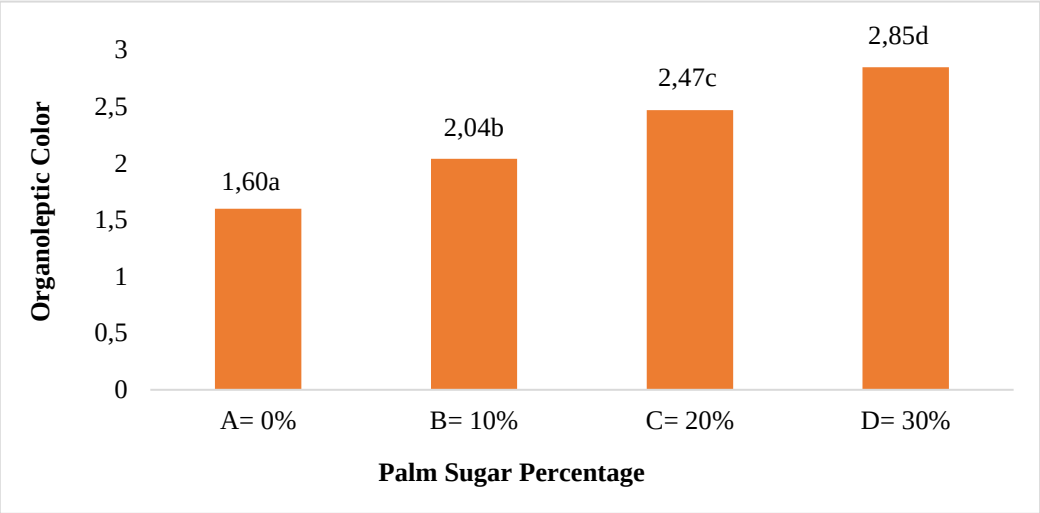

Figure 3. Organoleptic Quality Results of Chicken Sliced Jerky Color with Palm Sugar Added

Figure 3 explains the highest panelist acceptance of the color of jerky with palm sugar added in the 30% combination, namely 2.85 (quite like), and the lowest in the 0% combination, namely 1.60 (dislike). This is thought to be because the percentage of palm sugar used affects the color of the sliced chicken jerky to be more brownish so that it is preferred by the panelists. The bright brownish color gives an attractive impression so it is preferred.

To Winarno's opinion (2008), attractive food colors will arouse the appetite, because the color of food ingredients is closely related to flavor The factors that cause a food ingredient to be colored are pigments, caramelization reactions, Maillard reactions, reactions of organic compounds with air and the addition of coloring agents (Cahyadi, 2009). Maillard reaction is a chemical reaction that occurs between reducing sugars and amino acids with heating. When jerky is fried, the Maillard reaction causes a brown color, savory taste, and fragrant aroma in jerky.

Organoleptic Taste

The taste of food ingredients reflects a combination of taste, smell, and trigeminal responses, not just one response. This effect is also combined with sight, touch, and hearing responses. If consumers taste a food, it is a realization of the combination of the five human senses (Mauliza, 2016). Monitoring data from the results of the analysis of the organoleptic value of taste in jerky with the addition of palm sugar showed that the panelists' preference values for the taste of jerky ranged from 1.33–3.00 (very dislike to slightly like) with an average score of 2.14 (dislike).

The results of the analysis of the variety of flavors in jerky showed that the addition of palm sugar with different percentages (0%, 10%, 20%, and 30%) had a very significant effect (P <0.01) on the organoleptic value of jerky taste.

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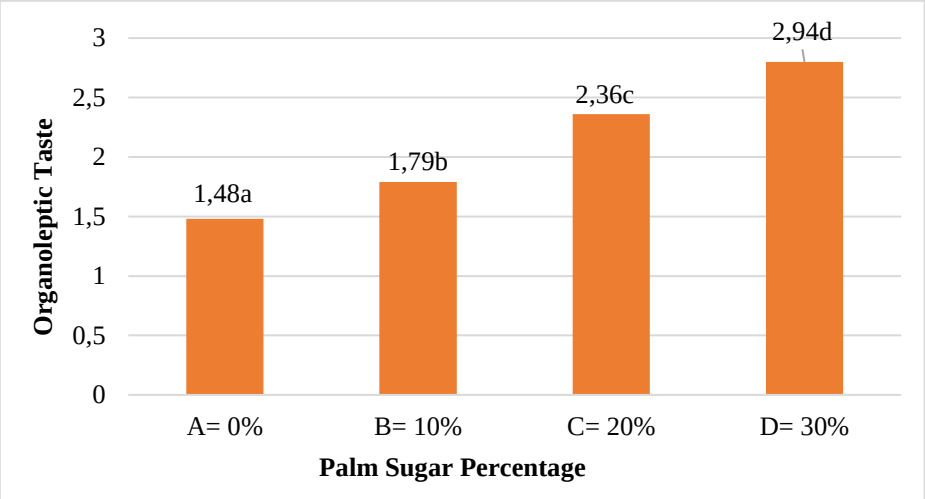

Figure 4. Organoleptic Quality Results of Chicken Sliced Jerky Flavor with Palm Sugar

Figure 4 shows the highest panelist acceptance of the taste of jerky with palm sugar in the 30% combination, namely 2.94 (rather like) which has a very significant effect with the 0%, 10%, and 20% combinations. The lowest panelist acceptance is in the 0% combination, namely 1.48 (dislike) which has a very significant effect on the other three treatments. This is thought to be because the administration of palm sugar with different percentages affects the taste of the jerky produced. The higher the administration of palm sugar, the sweeter the jerky, and the higher the panelist acceptance. The sweet taste of palm sugar consists of sucrose, fructose, glucose, and maltose content. By the opinion of Ulan *et al.* (2010), stated that the sweetness value is caused by the presence of fructose.

According to Setyaningsih *et al*. (2010), the higher the additional sugar concentration will affect the taste of the product. The added palm sugar has a distinctive aroma and taste that consumers like, which is the opinion of Ferial (2010), which states that palm sugar has a distinctive aroma and taste that consumers like.

Organoleptic Aroma

One of the attractions that can arouse the sense of smell is aroma (Sinaga, 2007). Thus, the aroma spread by food can invite consumer appetite. Odor examination can be an indicator of the acceptance of a product (Kartika & Supartono, 2008). Monitoring data from the results of the analysis of the organoleptic value of aroma in jerky with the addition of palm sugar showed that the panelists' preference value for the aroma of jerky ranged from 1.47 - 2.97 (very dislike to slightly like) with an overall average value of 2.11 (dislike). The results of the aroma variance test on jerky showed that the combination of giving palm sugar with different percentages (0%, 10%, 20%, and 30%) was very significantly different ($P < 0.01$) on the organoleptic quality of the resulting jerky aroma.

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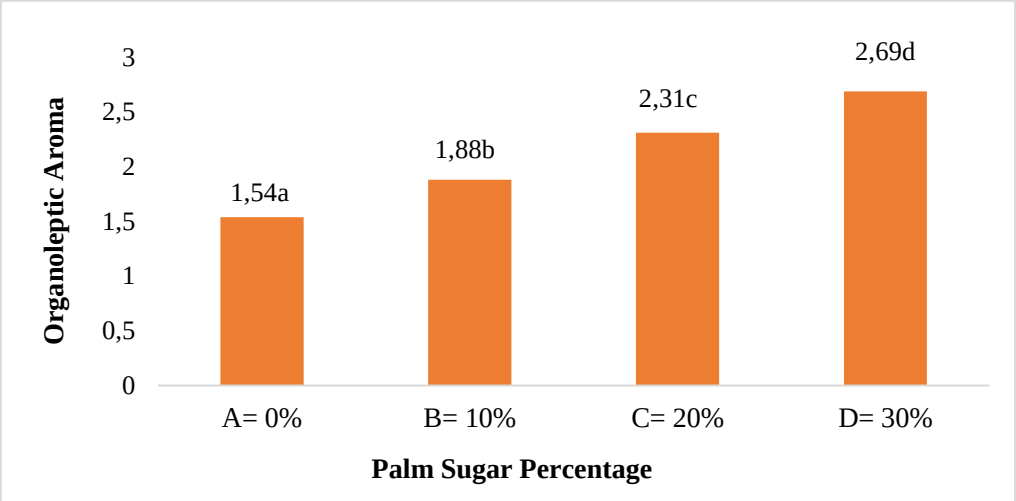

Figure 5. Organoleptic Quality Results of Chicken Beef Jerky Aroma with Palm Sugar

Figure 5 explains the highest panelist acceptance of the aroma of jerky with palm sugar is in the 30% combination, namely 2.69 (rather like) which has a very significant effect with the 0%, 10%, and 20% combinations. The lowest panelist acceptance is in the 0% combination, namely 1.54 (very dislike) which has a very significant effect with the other three combinations.

The higher the percentage of palm sugar given, the better the aroma produced, so that it is more preferred by the panelists. The appearance of aroma or smell in food is caused by the formation of volatile compounds as a reaction to enzyme work, but can also be formed without the help of enzyme reactions. Palm sugar has several macronutrient and micronutrient elements. Micronutrient elements in palm sugar include: thiamine, riboflavin, nicotinic acid, pyrodixin, cyanocobalamin, ascorbic acid, and salt (Nurlela, 2002).

Palm sugar has a distinctive aroma, smelling of caramel and slightly sour. The caramel smell is caused by the caramelization reaction due to heating during frying. While the sour taste is due to the presence of organic acids. Soeparno (2005), added that with heating, volatile compounds will appear which can create a specific flavor and aroma from cooked meat. In addition to the heating process, the caramelization reaction also results in the formation of aroma (Lay *et al*., 2005). In addition to providing a distinctive aroma, the addition of brown sugar can also reduce rancid odors. This is supported by the opinion of Ferial (2010), that palm sugar has a distinctive flavor and aroma that is very much liked by users, so it is often used as a seasoning.

Organoleptic Texture

Texture plays an important role in food acceptability. Texture is a sensation of pressure that can be seen with the mouth (when chewed or swallowed) or felt with the fingers. To assess a food texture, hardness is the reference used mechanically, although texture has more complex properties such as geometric (sandy) and mouthfeel (watery and oily). The texture of a product when viewed physically can affect the taste of food (Setyaningsih *et al*., 2010). Food has a very wide disparity in physical properties that are

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raised by the components of the form of food ingredients to achieve a form, as an effort to provide a certain texture on the surface.

Texture assessment aims to understand the panelist's response to the level of elasticity or flexibility of a product using the sense of touch, namely through tactile stimulation (Kusnadi, 2011). Monitoring data from the analysis of the organoleptic value of the texture of jerky with the addition of palm sugar showed that the panelists' preference for the texture of jerky ranged from 1.33 - 3.00 (very dislike to slightly like) with an average total score of 2.11 (dislike). The results of the analysis of the variety of jerky textures showed that the combination of giving palm sugar with different percentages (0%, 10%, 20%, and 30%) had a very significant effect ($P < 0.01$) on the organoleptic quality of the jerky texture.

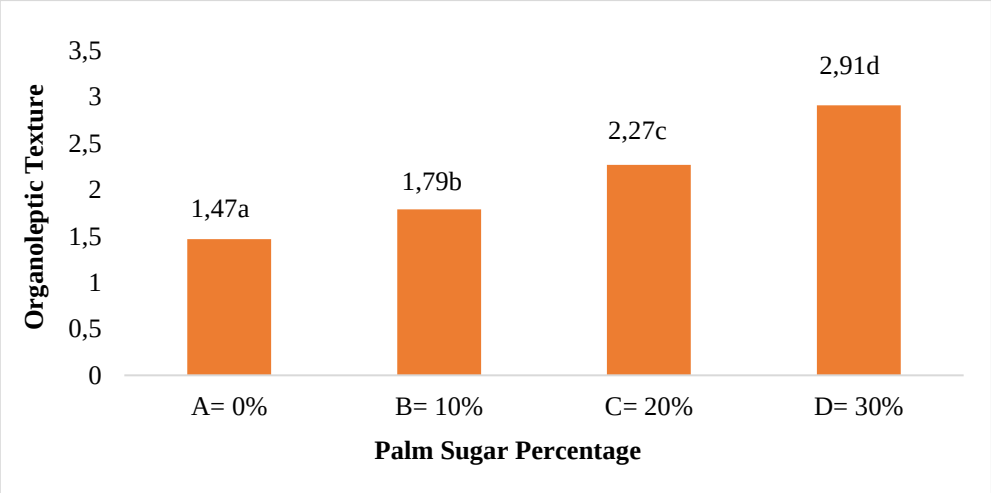

Figure 6. Organoleptic Quality Results of Chicken Sliced Jerky Texture with Palm Sugar Added

Figure 6 explains the highest panelist acceptance of the jerky texture with palm sugar added in the 30% combination, namely 2.91 (rather like) which is very significantly different from the 0%, 10%, and 20% combinations. The lowest panelist acceptance is in the 0% combination, namely 1.47 (very dislike) which is very significantly different from the other three combinations.

Assessment of texture in this case by assessing the elasticity of the jerky product using touch and feel. The addition of palm sugar with different percentages affects the texture of the jerky. The higher the percentage of palm sugar given, the softer the texture of the resulting jerky, so that it is more preferred by the panelists. In contrast, the lower the percentage of palm sugar given, the tougher the texture of the resulting jerky.

CONCLUSION

The addition of palm sugar with different percentages (0%, 10%, 20%, and 30%) has a very significant effect ($P<0.01$) on water content, total microbes, and organoleptic quality of color, aroma, taste, and texture. Analysis of the highest water content of jerky with the addition of palm sugar is in the 10% combination, namely 13.77%, and the lowest in the 30% combination, namely 10.48%. Analysis of the highest total microbes is in the combination without the addition of palm sugar, namely 94.50 cfu/mL, and the lowest in the 10%

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combination, namely 25.96 cfu/mL. Based on the organoleptic test, jerky with the best treatment was obtained in the 30% combination with an organoleptic value of color 2.85 (quite like), taste 2.94 (quite like), aroma 2.69 (quite like) and texture 2.91 (quite like). Further research should be conducted on chicken jerky products with a higher percentage, as well as other proximate analyses, to obtain better jerky quality.

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