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STABILITAS KORNET DAGING KAMBING DENGAN TEPUNG DAUN SALAM (*SYZYGIUM POLYANTHUM*) SELAMA PENYIMPANAN

STABILITY OF CORNED GOAT MEAT SUPPLEMENTED WITH BAY LEAF (SYZYGIUM POLYANTHUM) POWDER DURING STORAGE

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Abstract. *The quality of corned goat meat may deteriorate during storage due to changes in physichochemical, microbiological, and sensory properties. Bay leaf (Syzygium polyanthum) powder contains phenolic and flavonoid compounds that have been reported to exhibit antioxidant activity. This study aimed to evaluate the physicochemical, microbiological, and sensory stability of corned goat meat supplemented with 0.6% bay leaf powder during refrigerated storage for 0, 7, 14, and 21 days at 4±2˚C. The experiment used a Completely Randomized Design with four storage periods and five replications. Data were analyzed using one-way ANOVA followed by Duncan's Multiple Range Test at P<0.01. The results showed that storage duration significantly affected product quality. During 21 days of storage, pH increased from 6.28 to 6.60, moisture content from 46.96% to 58.98%, peroxide value from 3.13 to 3.77 meq/kg, and Total Plate Count (TPC) from 1.88 to 1.99 log CFU/g. In contrast, lightness (L*) decreased from 43.34 to 42.41, texture from 11.99 to 10.14 N, and overall sensory acceptance from 4.52 to 2.52. Despite deterioration in quality during storage, TPC values remained below the maximum limit set by SNI 3775:2024 throughout the storage period. These findings indicate that corned goat meat supplemented with 0.6% bay leaf powder remained microbiologically acceptable for up to 21 days during refrigerated storage. However, the protective effect of bay leaf powder was not directly compared because no control treatment without bay leaf powder was included.*

Keywords : *Antioxidant, Bay leaf powder, Corned goat meat, Peroxide value, Storage stability*

Sitasi :

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INTRODUCTION

Processed meat products such as corned meat are widely consumed because of their practicality, nutritional value, and relatively extended shelf life. However, processed meat products remain susceptible to quality deterioration during storage, including physicochemical, microbiological, and sensory changes. One of the major factors contributing to quality degradation is lipid oxidation, particularly in products containing unsaturated fatty acids and subjected to grinding and heating processes. These conditions increase the exposure of lipids to oxygen and promote free radical formation, leading to rancidity, discoloration, and nutritional losses (Nikmaram et al., 2018). In addition, microbial growth during storage may contribute to protein degradation, pH changes, and sensory deterioration of meat products (Rodriguez - Caturla et al., 2023).

The quality and stability of processed meat products during storage are influenced by several factors, including storage temperature, packaging conditions, moisture content, and the stability of the protein-lipid matrix. Refrigerated storage and vacuum packaging are commonly applied to reduce microbial growth and oxidative reactions; however, quality deterioration may still occur gradually over time. Fellendorf et al. (2018) reported that formulation changes and salt reduction affected the physicochemical and sensory properties of corned beef during storage. Abdul Aali & Alobaidi (2018) also observed sensory deterioration and increased bacterial counts in corned beef stored at 4°C. These findings indicate that storage duration remains an important factor affecting the shelf life and quality characteristics of processed meat products. Another study by Rashid & Khidhir (2021) also stated that the physical and chemical characteristics of canned meat products undergo significant changes due to storage temperature and duration. These findings indicate that storage remains a critical factor in determining the shelf life and final quality of processed meat products.

Natural plant-derived ingredients containing antioxidant compounds have attracted increasing attention as potential alternatives to synthetic antioxidants in meat products. Bay leaf (*Syzygium polyanthum*) contains phenolic compounds, flavonoids, and other bioactive constituents that have been associated with antioxidant and antimicrobial activities (Hartanti et al. 2019). Previous studies reported that bay leaf extracts may contribute to oxidative stability and microbial inhibition in meat products (Pirimoy et al., 2019). Nevertheless, the effectiveness of bay leaf powder in maintaining the stability of corned goat meat during storage has not been extensively studied.

Therefore, this study aimed to evaluate the physicochemical, microbiological, and sensory changes of corned goat meat supplemented with 0.6% bay leaf powder during refrigerated storage at different storage periods.

MATERIALS AND METHODS

1. Research Materials

The materials in this study were divided into corned goat meat production materials and chemical analysis materials. The ingredients for making corned goat meat are hind leg goat meat (70% of the total mixture), bay leaf powder (0.6% of the meat weight), skim milk powder (3% of the total mixture), soy protein isolate (2% of the total mixture), egg yolk (3% of the total mixture), tapioca flour (5% of the total mixture), shallots (3% of the total mixture), salt (2% of the total mixture), sugar (1% of the total mixture), canola oil (10% of the total mixture), and ground pepper and nutmeg (0.5% each of the total mixture). The chemical analysis materials consisted of samples, distilled water, pH 4 and 7 buffer solutions, TBA reagent, trichloroacetic acid (TCA), PCA (Plate Count Agar) medium, diluent solution (0.85% physiological NaCl), and organoleptic test forms.

2. Research Equipment

The equipment used in this study included a digital pH meter (Mettler Toledo SevenCompact™, accuracy ±0.01 pH), a drying oven (Memmert UN55, Germany, temperature range up to 250˚C), an analytical balance (Ohaus Pioneer™, capacity 220 g with accuracy 0.0001 g), 90 mm diameter glass petri dishes, glass desiccators with silica gel, UV-Vis spectrophotometer-Vis (Shimadzu UV-1800, wavelength 190–1100 nm), 15 mL glass reaction tubes, volumetric pipettes and micropipettes (Eppendorf Research®, range 0.1–1000 µL), digital water bath (Memmert WNB 7, temperature range 10–100˚C), glass Erlenmeyer flasks (50–250 mL), and autoclave (Hirayama HVE-50, sterilization temperature 121˚C at 15 psi pressure).

3. Production of Bay Leaf Powder

Bay leaves were sorted, washed, and wilted for 48 hours at room temperature. Next, the bay leaves were dried using an oven at a temperature of 50±2℃ for 20 hours until they reached a final moisture content of ±10-12%. The dried bay leaves are ground using a dry mill until they have a smooth and uniform texture. The bay leaf powder is then sifted using a 100 mesh sieve. The finely ground powder is stored in a tightly sealed container to prevent moisture absorption.

4. Procedure for Making Corned Goat Meat

The goat meat is cut into small pieces (±2×2×2 cm) and then ground together with additional ingredients using a chopper at a speed of ±1500 rpm for ±20 seconds until a homogeneous mixture is formed. The mixture is then molded and cooled in a refrigerator for 30 minutes. The corned goat meat is steamed at 85±2℃ for 10 minutes. The cooked corned goat meat is packaged using vacuum plastic and stored in a refrigerator at a temperature of 4±2℃ to be used as test samples according to storage conditions (0 days, 7 days, 14 days, and 21 days).

5. Analysis Methods

The parameters analyzed in this study included pH, color (L*, a*, b*), texture, moisture content, peroxide value, TPC (Total Plate Count), and organoleptic quality. pH measurements were performed using a Mettler Toledo SevenCompact™ pH meter (AOAC, 2005). Color analysis was performed using a Konica Minolta CR-400 Chromameter (AOAC, 2005). Texture was analyzed using a TA.XT Plus Texture Analyzer (AOAC, 2005). Moisture content was determined using the oven method with a Memmert UN55 (AOAC, 2005). Peroxide value was analyzed by iodometric titration (AOAC, 2005). TPC analysis was tested using the pour plate method with PCA media in accordance with ISO 4833-1 (2013). Organoleptic testing was conducted using the hedonic method by 30 panelists consisting of 15 men and 15 women, aged 20-30 years. The assessment was conducted using a 5-point hedonic scale, ranging from 1 (dislike) to 5 (very like). The parameters assessed included aroma, color, texture, and overall acceptance.

6. Research Design and Data Analysis

This study was an experimental laboratory approach using a completely randomized design (CRD). This design included 4 storage treatments: 0 days of storage (KS0), 7 days of storage (KS1), 14 days of storage (KS2), and 21 days of storage (KS3). Each treatment was repeated 5 times, resulting in 20 experimental units.

Data on physicochemical parameters (pH, L*a*b* color, texture, moisture content, and peroxide value) and Total Plate Count (TPC) were statistically analyzed using one-way analysis of variance (ANOVA). If there were significant differences ($P<0.01$), the analysis was continued with Duncan's Multiple Range Test (DMRT). Sensory evaluation data obtained from the hedonic test were treated as interval data and analyzed using one-way ANOVA. Significant differences among treatments were further evaluated using Duncan's Multiple Range Test (DMRT) at $P<0.01$. All statistical analyses were performed using R software.

RESULTS AND DISCUSSION

1. Physicochemical Quality

1.1 pH Value

The results showed that storage time significantly increased the pH value of corned goat meat ($P<0.01$). The pH value of corned goat meat products presented in Table 1 increased from 6.28 (KS0) to 6.60 (KS3), indicating that the pH value of corned goat meat increased with longer storage time.

The increase in pH in meat products is related to microbial activity and to residual enzymes that degrade nitrogen components (proteins/peptides) into basic compounds such as volatile amines. This mechanism occurs because even though low storage temperatures slow down microbial activity, autolysis and facultative anaerobic microbial metabolism can still occur under vacuum conditions. Factors causing pH changes other than

protein degradation can also be influenced by microbiological dyna-mics in the vacuum system. Vacuum packaging suppresses the growth of aerobic bacteria but does not completely inhibit facultative anaerobic bacteria. During cold storage, certain microorganisms can survive and metabolize meat components, producing byproducts that affect the acid-base balance of the product (Rodriguez-Caturla et al., 2023). With increased storage time, the accumulation of these basic metabolites gradually raises the pH.

The increase in pH observed during storage indicates that physicochemical and microbiological changes continued to occur in the product despite the presence of 0.6% bay leaf powder. Bay leaves are known to be rich in phenolic compounds and flavonoids which capture free radicals and inhibit lipid oxidation (Julizan et al., 2023). Research on natural antioxidants in meat products shows that the dominant effect of plant extracts is to reduce oxidative indicators such as TBARS, rather than to significantly control pH changes (Manessis et al., 2020). Previous studies have reported that bay leaves contain phenolic compounds and flavonoids associated with antioxidant activity. However, the present study did not directly compare formulations with and without bay leaf powder; therefore, the specific contribution of bay leaf powder to product stability could not be conclusively determined. The increase in pH in this corned goat meat product more reflects the autolysis process and microbiological activity during storage, while the role of bay leaves is more evident in oxidative stability than in the acid-base stability of the product.

Table 1. Average Effect of Storage Duration on the Physicochemical Properties of Corned Goat Meat

Parameter	Storage Treatment			
	KS0	KS1	KS2	KS3
pH Value	6.28±0.05^{a}	6.37±0.06^{a}	6.47±0.02^{b}	6.60±0.06^{c}
Lightness (L)	43.34±0.06^{a}	42.85±0.07^{b}	42.68±0.05^{c}	42.41±0.06^{d}
Redness (a*)	15.34±0.02^{a}	15.10±0.01^{b}	14.85±0.04^{c}	14.56±0.06^{d}
Yellowness (b*)	18.60±0.04^{a}	18.46±0.08^{b}	18.17±0.05^{c}	17.85±0.04^{d}
Texture (N)	11.99±0.05^{a}	11.43±0.06^{b}	10.79±0.02^{c}	10.14±0.05^{d}
Moisture content (%)	46.96±0.11^{a}	50.76±0.15^{b}	55.04±0.14^{c}	58.98±0.12^{d}
Peroxide value (meq/kg)	3.13±0.11^{a}	3.34±0.10^{b}	3.54±0.10^{b}	3.77±0.10^{c}

Note: ^{a,b,c,d} Different superscripts in the column indicate significant differences (P<0,01)

1.2 Color L*a*b*

The color values of corned goat meat with added bay leaf powder showed a downward trend during 21 days of storage at 4°C in vacuum packaging. The color decrease values in Table 1 indicate that the product became slightly darker as the storage time increased. Color changes in meat products during storage are generally closely related to the dynamics of myoglobin pigments and the oxidative conditions of the corned goat meat.

The low oxygen availability in vacuum plastic leads to the predominance of deoxyhemoglobin, which is darker in color, thereby reducing the L* value (Jewell et al., 2025). Residual oxygen in the packaging allows for slow oxidation of pigments. The oxidation of myoglobin to metmyoglobin plays a major role in the decrease in redness (a*) in processed meat products during storage, especially when the cornet undergoes increased lipid oxidation. Lipid oxidation and myoglobin oxidation trigger each other because the release of heme and iron from myoglobin can act as pro-oxidants that accelerate chain reactions (Rohaman & Siregar, 2020).

The decrease in a* value in Table 1 is consistent with the increase in peroxide value during storage, indicating that lipid oxidation reactions continue even when corned goat meat is stored at low temperatures. Primary and secondary lipid oxidation products can affect pigment stability and shift color perception to dull or brownish (Manessis et al., 2020). This mechanism explains why color changes occur gradually even though the corned goat meat has been vacuum-packed and stored at low temperatures.

The slight decrease in the b* value in Table 1 is also related to changes in the chemical structure of the meat matrix during storage. The interaction between lipid oxidation and protein changes can affect pigment distribution and light reflectance on the product surface. Research by Soares et al. (2021) on *beef patties* showed that a plant-based treatment using *edible onion film* was able to maintain more stable color parameters compared to the control treatment during storage at low temperatures. This reinforces the assumption that color stability is greatly influenced by the oxidative conditions of the product.

The decrease in color parameters during storage may be associated with pigment oxidation and lipid oxidation processes occurring in the product matrix. Previous studies have reported that phenolic compounds present in plant materials such as bay leaves, may contribute to the oxidative stability in meat products (Kaczmarek et al., 2021). However, the specific effect of bay leaf powder on color stability was not directly evaluated in the present study because no control treatment without bay leaf powder was included. In addition to antioxidant compounds, bay leaves also contain natural pigments such as chlorophyll and phenolic derivatives that can affect the color characteristics of the product. These compounds work by capturing free radicals and inhi-

biting lipid oxidation reactions, thereby indirectly helping to maintain the stability of myoglobin pigments. The addition of beetroot powder to chicken patties had a significant effect on color parameters (L*a*b*), indicating that bioactive components and natural pigments can help maintain the visual stability of products (Evanuarini et al., 2023). Research on the application of plant extracts in meat products also shows that natural antioxidants effectively suppress the formation of oxidation products that contribute to discoloration (Kaczmarek et al., 2021). Although there was a decrease in L*, a*, and b* values during storage, the addition of bay leaves is thought to slow down the rate of color change, thereby maintaining the visual quality of the corned beef relatively well until day 21.

1.3 Texture

The texture values of corned goat meat with the addition of bay leaf powder in Table 1 decreased during storage. This decrease indicates a weakening of the protein matrix structure over time. Mechanistically, changes in the texture of meat products during storage are related to the degradation of structural proteins due to endogenous enzyme activity and the metabolism of psychrotrophic microorganisms, which can still occur at refrigeration temperatures. This degradation causes the tissue to become softer and weakens internal cohesion (Rashid & Khidhir, 2021).

Texture changes are also influenced by lipid oxidation through secondary interactions with proteins. Lipid oxidation products can react with protein functional groups, thereby affecting tissue stability and water-holding capacity (Al-Dalali et al., 2022). Texture changes during storage are also related to protein matrix stability. Research by Evanuarini et al. (2023) shows that the addition of functional ingredients such as eggshell nano powder can improve the gel structure of beef patties and produce a more compact matrix. The relationship between lipid oxidation and protein structure changes has been studied in ground beef patties during storage, where a decline in physical quality accompanies increased oxidative reactions (Jewell et al., 2025). The decline in texture of corned goat meat products is consistent with the increase in peroxide value observed during storage.

The addition of bay leaf powder to corned goat meat has the potential to slow down texture deterioration through its antioxidant activity. By suppressing lipid oxidation, the stability of protein-lipid interactions in the corned goat meat matrix can be better maintained, thereby slowing down texture deterioration. Although texture values continued to decline until day 21, the presence of natural antioxidants from bay leaves is thought to help maintain product structural integrity during storage.

1.4 Moisture content

Moisture content data (Table 1) for corned goat meat increased from 46.96% on day 0 to 58.98% on day 21 during storage. This increase is more

accurately understood as a change in water distribution and binding capacity due to protein structure dynamics during storage, rather than as an addition of external water. The stability of moisture content in processed meat products such as corned goat meat is greatly influenced by protein-salt-water interactions and initial processing conditions. Reformulation or changes in the composition of salt and additives are known to affect physico-chemical properties, including *cooking loss* and water retention (Fellendorf et al., 2018). This indicates that the protein matrix-system in corned goat meat is dynamic and can change during storage.

Chemical changes such as lipid oxidation and protein modification during storage can affect the ability of tissues to bind water. Slow oxidation can alter protein structure through secondary reactions, thereby affecting emulsion stability and product moisture distribution (Flores & Toldrá, 2021). The addition of bay leaves plays a role in slowing down these changes through a lipid oxidation inhibition mechanism.

1.5 Peroxide value

The analysis results of corned goat meat in Table 1 show an increase in the peroxide value during storage. This increase indicates the occurrence of primary lipid oxidation, which produces hydroperoxide compounds as the initial products of the oxidative reaction. Lipid oxidation in meat products is one of the main factors in quality deterioration because unsaturated fatty acids are highly susceptible to free radical attack (Al-Dalali et al., 2022). Although low temperatures and vacuum packaging can slow the reaction, the oxidation process still occurs gradually during storage.

The mechanism of lipid oxidation in meat involves the formation of peroxyl radicals, which then produce hydroperoxides as primary products. Hydroperoxides are unstable and easily decompose into secondary compounds such as aldehydes, ketones, and alcohols, which contribute to rancid odors and sensory quality deterioration. The close relationship between lipid oxidation and color change has also been studied, where myoglobin and lipid oxidation act as catalysts for each other (Jewell et al., 2025). An increase in the peroxide value in corned goat meat not only indicates fat degradation but also has the potential to affect the color and aroma stability of corned goat meat during storage.

The addition of bay leaf powder is highly relevant in controlling the oxidation process in corned goat meat products. Plant extracts with high antioxidant capacity can slow the formation of hydroperoxides and suppress the development of further oxidation during storage (Amalia et al., 2025). The use of plant-based active ingredients in meat products has been shown to help maintain oxidative stability and sensory quality compared to meat products without additives (Soares et al., 2021). Although the peroxide value in corned goat meat continued to increase until

day 21, the presence of bay leaves is thought to inhibit the propagation rate of radicals and slow down the conversion of hydroperoxides into secondary products that cause rancidity, thereby reducing the impact of quality deterioration during the storage period.

2. Total Plate Count (TPC)

Total Plate Count (TPC) is a method of enumerating the total number of mesophilic aerobic microorganisms in a food product, used as a general indicator of the microbiological quality and safety of the product. Data on changes in TPC in corned goat meat with the addition of bay leaf powder is presented in Figure 1, which shows an increase in the number of microbes over time from day 0 to day 21. The increase in TPC indicates that during storage, microorganisms remain viable and continue to grow even though the product is vacuum-packed. Vacuum conditions can reduce oxygen, but they are not synonymous with sterilization. This is in line with the principle that microbiological evaluation remains crucial in processed meat products because microbial indicators are directly related to product safety and shelf life (Abed et al., 2020).

Microbial growth during storage not only increases the TPC count but also triggers quality changes that are usually detected through a decline in sensory quality. *Shelf-life* studies on vacuum-packed refrigerated meat confirm that the end of consumer shelf life is largely determined by sensory changes that arise mainly due to microbial growth and metabolic activity, and are influenced by temperature, pH, and packaging atmosphere (Rodriguez-Caturla et al., 2023). According to SNI 3775:2024, the maximum total plate count of microbial contamination in corned beef products is 10^6 CFU/gram. The increase in TPC in corned goat meat over 21 days is still below the SNI standard and can be explained as a natural process in low-temperature storage, where the growth rate is slower but cumulative.

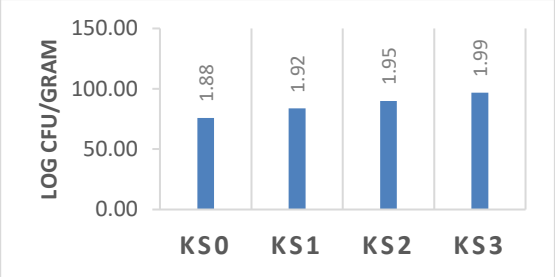

Figure 1. Diagram of the Effect of Storage Duration on the Average TPC of Corned Goat Meat

The increase in TPC during storage is also influenced by changes in the physicochemical characteristics of the product matrix. Increased storage time allows for the degradation of protein components, which produces soluble nitrogen compounds, thereby providing a substrate that can be utilized by microorganisms. The increase in moisture content observed in this study also contributes to conditions that are more conducive to microbial growth, as high humidity is associated with increased water activity, which is essential for bacterial proliferation (Abdul Aali et al., 2018). Previous studies have repor-

ted antimicrobial properties of bay leaf extracts in meat systems (Candra et al., 2022). Nevertheless, the present study only evaluated microbiological changes in corned goat meat supplemented with 0.6% bay leaf powder during storage and did not include a comparison treatment without bay leaf powder.

3. Sensory Quality

3.1 Flavor

The results of the sensory quality analysis presented in Table 1 and Figure 2. show that the aroma score decreased from 4.68 on day 0 to 3.32 on day 21. This decline is closely related to lipid oxidation, which produces volatile compounds such as aldehydes and ketones that contribute to the appearance of rancid odors. Primary lipid oxidation, as indicated by the increase in peroxide value, has the potential to develop into secondary oxidation products that directly affect aroma perception (Manessis et al., 2020). As storage time increased, the accumulation of these volatile compounds became more apparent, causing lower aroma scores.

The addition of bay leaf powder can contribute to slowing down the formation of volatile compounds that cause rancidity through the mechanism of inhibiting oxidative reactions. The use of natural antioxidants such as banana hearts in corned beef can maintain sensory quality, including aroma, by suppressing the formation of lipid oxidation during storage (Fauziyah et al., 2017). However, oxidation still occurs gradually, and the decline in aroma scores observed in the present study suggests that bay leaf powder may retard, rather than completely prevent, quality deterioration during refrigerated storage.

Table 2. Average Effect of Storage Duration on the Sensory Quality of Corned Goat Meat

Parameter	Storage Treatment			
	KS0	KS1	KS2	KS3
Flavor	4.68±0.11^{a}	4.32±0.18^{ab}	3.72±0.18^{bc}	3.32±0.17^{c}
Color	4.48±0.11^{a}	3.84±0.17^{a}	3.32±0.18^{b}	2.64±0.16^{b}
Texture	4.40±0.14^{a}	3.88±0.18^{ab}	2.88±0.18^{bc}	2.44±0.16^{c}
Overall acceptability	4.52±0.11^{a}	3.80±0.14^{ab}	3.36±0.17^{bc}	2.52±0.10^{c}

Figure 2. Diagram of the Effect of Storage Duration on the Sensory Quality of Corned Goat Meat

3.2 Color

Sensory color score analysis data showed a decrease with increasing storage time (Figure 2). This decrease was consistent with the results of instrumental color measurements (L*, a*, b*) , which showed a decrease in brightness and redness. Changes in panelists' color perception are related to myoglobin oxidation and the formation of metmyoglobin, which results in a duller, brownish color (Soares et al., 2021). The interaction between lipid oxidation and meat pigments also accelerates color degradation, making the visual appearance of the product less appealing.

Vacuum packaging can indeed reduce oxygen availability, but it does not completely prevent pigment changes during storage. Bioactive compounds in bay leaves have the potential to indirectly slow pigment oxidation by controlling lipid oxidation (Julizan et al., 2023). Although the color score still decreased, the presence of bay leaves likely helped maintain the visual stability of the product longer than meat products without antioxidants.

3.3 Texture

The results of the texture score analysis of corned goat meat showed a decrease from day 0 to day 21 (Figure 2), reflecting the panelists' perception of changes in the product's chewiness and density. This change was consistent with the instrumental texture test results, which showed a decrease in hardness during storage. Biologically, protein degradation due to enzyme and microorganism activity can weaken the matrix structure, resulting in a softer texture (Rashid & Khidhir, 2021).

Lipid oxidation can also interact with proteins, affecting the integrity of the product's tissue. When the protein structure undergoes modification, sensory characteristics such as elasticity and cohesiveness can change. The antioxidant activity of bay leaves is expected to help maintain structural stability by controlling oxidative reactions (Fellendorf et al., 2018), although it does not completely prevent a decline

in texture quality during long-term storage.

3.4 Overall Acceptability

The overall acceptance score in Figure 2. decreased from 4.52 to 2.52 during storage, indicating that the combination of changes in aroma, color, and texture cumulatively affected the panelists' level of liking. The literature states that the sensory quality of meat products during storage is greatly influenced by the interaction between lipid oxidation and microbial growth, which directly affects aroma and appearance characteristics (Abdul Aali et al., 2018). With the increase in TPC and oxidation indicators in this study, the decline in the overall score was a logical consequence of the quality changes.

The addition of bay leaves to corned goat meat may have a protective effect on sensory stability through oxidation control and potential antimicrobial activity. However, because storage time remains the dominant factor, the decline in overall scores up to day 21 indicates that natural antioxidant interventions can slow down, but not completely stop, quality deterioration during refrigerated storage.

Conclusion

This study demonstrated that storage duration significantly affected the physicochemical, microbiological, and sensory characteristics of corned goat meat supplemented with 0.6% bay leaf (*Syzygium polyanthum*) powder during refrigerated storage at 4±2˚C. During 21 days of storage, pH, moisture content, peroxide value, and Total Plate Count (TPC) increased, while color values (L*, a*, b*), texture, and sensory acceptance scores decreased. Nevertheless, TPC values remained below the maximum limit established by SNI 3775:2024 throughout the storage period, indicating that the product remained microbiologically acceptable up to 21 days of storage.

The results indicate that quality deterioration continued to occur during refrigerated storage despite the presence of 0.6% bay leaf powder in the formulation. However, the specific protective effect of bay leaf powder against physicochemical and microbiological deterioration could not be directly confirmed because no control treatment without bay leaf powder was included in this study.

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