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The effect of marinade concentrations of different local herbs and spices on the hedonic test of super native chicken breast

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Abstract. This study was conducted the effect of marinade concentrations of different local herbs and spices on the hedonic test of super native chicken breast. The research material consisted of super native chicken breast, chili powder, sugar, salt, pepper, garlic, cinnamon, palm oil, lime juice, monosodium glutamate, and ginger. The treatment levels of marinade concentration were 10, 20, and 30% of the weight of meat. The hedonic test of the super native chicken marinade was carried out by 40 untrained panelists. The hedonic test data of super native chicken breast marinated were analyzed by non-parametric analysis through the Hedonic Kruskal-Wallis test and if there was a significant difference ($P < 0.05$) then further tested with Duncan's New Multiple Range Test. The results showed that the marinade concentration level of different local herbs and spices had a significant effect on acceptability, but did not affect on color, aroma, taste, texture, juiciness, and tenderness of super native chicken breast marinated. The marinade concentration of local herbs and spices at the level of 20% was the best treatment with highest score hedonic of 4.38 so that it was preferred by the panelists when compared to other treatments.

1. Introduction

Super native chicken is a cross between a native rooster and a layer chicken. Super native chicken is very popular for consumption by the people of Indonesia because it is known that it tastes better, is lower in fat, cholesterol, and takes a shorter time of about 45 to 60 days to be ready to be harvested. Native chicken takes a longer time than super native chicken, about 75 to 80 days to be harvested. Super native chicken meat as a source of Indonesian animal germplasm continues to be developed into ready-to-cook products. Ready to cook (RTC) products that are currently trending are marinated chicken meat products. Ready-to-cook products are becoming popular in the community because there are restrictions on the Covid-19 pandemic, making it easier for the cooking process. Marinating technology is the process of soaking meat in a marinade. The marinade is a seasoned solution that functions as a meat marinade, usually used to improve the taste, impression of juiciness, and tenderness of meat after cooking [1,2]. Marinade ingredients that can be used are local herbs and spices which are widely available in Indonesia as a source of local potential.



Local herbs and spices such as chili powder, ⁵sugar, salt, pepper, garlic, cinnamon, palm oil, lime juice, and ginger have been extensively studied separately for use as marinades and flavorings in meat processing. Meat marinade technology can also improve food safety and added value to the product [3]. The principle of meat marinade technology is soaking meat in a marinade containing certain ingredients so that slowly passive transport of the marinade material into the meat by osmosis occurs [1]. The increase in the taste and tenderness of the meat due to the marinating process is caused by the increase in the water holding capacity of the meat [4]. The application of marinade technology on broiler meat can improve the taste, tenderness, and acceptability of the panelists [5]. Local herbs and spices have the potential to be used together to be used as marinade ingredients for super native chicken. Breast meat is one of the most preferred parts of meat by some consumers [6]. So far, no one has evaluated the application of local herbs and spices marinade technology for super native chicken breast. The hedonic test is generally carried out to evaluate the panelists' preference for processed meat products [7]. Therefore, this study was conducted to know the effect of marinating local herbs and spices with different concentrations on the hedonic test of super native chicken breast.

2. Materials and Methods

2.1. Materials

The material used in this study consisted of native chicken breast, chili powder, ⁵sugar, salt, pepper, garlic, cinnamon, palm oil, lime juice, ginger, and monosodium glutamate (MSG).

2.2. Methods

This research consists of several processes. This research was started from marinade preparation, meat preparation, marinating process, cooking, and hedonic test.

2.2.1. Preparation of meat. The breast super native chicken used in this study came from super native chickens (unisex) obtained from local farms in Jember.

2.2.2. Preparation of marinade. The marinade formulation used in this study used local herbs and spices which included: 12% chili powder, 12.25% sugar, 8% salt, 1% pepper, 0.25% cinnamon, 17% garlic, 25% palm oil, 10% lime juice, 12% MSG, and 2.5% ginger.

2.2.3. Marination process. The chicken breast mixed with marinade with treatment concentration levels, namely: 10, 20, and 30% of the meat total weight. The chicken breast marination until it is evenly distributed. The chicken breast was then vacuum-packed with time marination for 60 minutes.

2.2.4. Cooking process. The chicken breast of marinated was cooked by steaming for 45 minutes and after the cooked meat it is then cooled and then hedonic tested by untrained panelists.

2.3. Hedonic Test

The super native chicken breast which has been marinated with different levels of marinade concentration was tested hedonic by 40 untrained panelists [8]. The parameters observed were: color, flavor, taste, texture, tenderness, juiciness, and acceptability [7]. The hedonic scale used is 1 (dislike extremely), 2 (dislike), 3 (rather like), 4 (like), and 5 (like extremely).

2.4. Statistic Analysis

The data of hedonic test were analyzed by analysis non-parametric test of Hedonic Kruskal-Wallis and if there was a significant difference ($P < 0.05$) then further tested with Duncan's New Multiple Range Test [9].

3. Results and Discussion

The hedonic test is one of the sensory characteristics of meat products that is widely tested to determine the level of preference of the panelists for the meat products being tested [10]. The results of the hedonic test that have been carried out by the panelists on super native chicken breast cooked with local herbs and spices with different concentration levels were presented in Table 1.

Table 1. Hedonic test results of super native chicken breast marinated with herbs and spices with different levels of marinade concentration

Variable	Marinade concentration level		
	10%	20%	30%
Color ^{ns}	3.40	3.60	3.73
Flavor ^{ns}	3.93	3.70	3.83
Taste ^{ns}	3.95	3.88	3.73
Texture ^{ns}	3.80	4.05	3.88
Tenderness ^{ns}	3.93	3.98	3.85
Juiciness ^{ns}	3.73	3.95	3.95
Acceptability	3.93 ^a	4.38 ^b	4.15 ^{ab}

^{ab}Different superscripts at the same row indicate significant differences (P<0.05)

3.1. Color

The results showed that the concentration level of marinade of different local spices and herbs had no significant effect (P>0.05) on the color of the marinated breast meat. The color score of the marinated breast meat ranged from 3.40 to 3.73, i.e. from rather like to like. The level of preference of the panelists on the color of breast meat that has been marinated with the marinade of local herbs and spices at different concentration levels did not change. This could be because the panelists had difficulty distinguishing the color of the marinated breast meat with local herbs and spices at different concentration levels visually by eye. Perception of meat color can influence panelists' decisions in choosing meat and its processed products [11]. Visually, the panelists are thought to have the same perception of all colors of super chicken breast that have been marinated with different levels of marinade concentration of local herbs and spices so that the assessment of the color score of the marinated meat does not differ much for each treatment.

3.2. Flavor

The results showed that the concentration level of marinade of different local spices and herbs had no significant effect (P>0.05) on the flavor of the marinated breast meat. The aroma score of the marinated breast meat ranged from 3.70 to 3.93, i.e. from rather like to like. The level of panelists' preference for the aroma of breast meat that has been marinated with the marinade of local herbs and spices at different concentration levels did not change. This could be because the panelists had difficulty distinguishing the flavor of the marinated breast meat from the marinade of local herbs and spices at different concentration levels by smelling it. The flavor of the meat was produced from a combination of various components that stimulate the olfactory receptors in the nasal passages [11], while the flavor-forming compounds derived from local herbs and spices as a marinade for super native chicken breast with its concentration level are thought to have almost the same flavor after being smelled by panelists so that based on these perceptions, the panelists' assessment of the flavor score of the marinated meat did not differ much for each treatment.

3.3. Taste

The taste is a sensory quality of meat-related to the sense of taste [7]. The results showed that the concentration level of marinade of different local herbs and spices had no significant effect (P>0.05) on the taste of the marinated breast meat. The taste score of the marinated breast meat ranged from 3.73 to 3.95, which was from rather like to like. The level of preference of the panelists on the taste of

breast meat that has been marinated with the marinade of local herbs and spices at different concentration levels did not change. This could be because the panelists had difficulty distinguishing the taste of the marinated breast meat from the marinade of local herbs and spices at different levels of concentration by the way they were tasted. The taste of the meat was produced from a combination of various components that stimulate the taste receptors on the tongue [11], while the specific flavoring compounds derived from local herbs and spices as a marinade for super native chicken breast with the level of concentration are thought to have almost the same taste after being tasted by the panelists taste buds so that based on these perceptions, the panelists' assessment of the taste score of the marinated meat did not differ much for each treatment.

3.4. ²Texture

The texture is a sensory property of meat that is related to the level of smoothness of the meat³. The results showed that the concentration level of marinade of different local herbs and spices had no significant effect ($P>0.05$) on the texture of the marinated breast meat. ⁴The texture score of the marinated breast meat ranged from 3.80 to 4.05, i.e. from rather like to like. The level of preference of panelists on the texture of breast meat that has been marinated with the marinade of local herbs and spices at different concentration levels did not change. This could be because the panelists had difficulty distinguishing the texture of the marinated breast meat from the marinade of local herbs and spices at different concentration levels when chewing the meat. Panelists are suspected of having almost the same perception of the texture of the meat ⁴ed, namely the breast which is known to have a smooth texture [6] so that based on this perception, the panelist's assessment of the texture score of the marinated super native chicken breast is not much different for each treatment.

3.5. ²Tenderness

The tenderness is the main parameter in determining the quality of meat that is sensory tested ³. The results showed that the concentration level of marinade of different local spices and herbs had no significant effect ($P>0.05$) on the tenderness of the marinated breast meat. The tenderness score of the marinated breast meat ranged from 3.85 to 3.98, ie from rather like to like. The panelists' preference for tenderness of breast meat that had been marinated with the marinade of local herbs and spices at different concentration levels did not change. This could be because the panelists had difficulty distinguishing the tenderness of the marinated breast meat from the marinade of local herbs and spices at different concentration levels when biting the meat. Panelists are thought to have almost the same perception of the tenderness of the meat used, namely the breast which is known to be tender [6] so that based on this perception, the panelist's assessment of the tenderness score of marinated super native chicken breast is not much different for each treatment.

3.6. ²Juiciness

The juiciness is a sensory property related to the level of wetness of the me³ [7]. The results showed that the concentration level of marinade of different local spices and herbs had no effect ($P>0.05$) on the juiciness of the marinated breast meat. The juiciness score of the marinated breast meat ranged from 3.73 to 3.95, ie from rather like to like. The level of panelists' preference for the juiciness of breast meat that had been marinated with the marinade of local herbs and spices at different concentration levels did not change. This could be because the panelists had difficulty distinguishing the juiciness level of the marinated breast meat from the marinade of local herbs and spices at different concentration levels when chewing the meat. Panelists are thought to have almost the same perception of the level of wetness of the meat, so based on this perception, the panelist's assessment of the juiciness score of marinated super native chicken breast is not much different for each treatment.

3.7. Acceptability

The acceptability is part of the ²sensory properties of the meat to ⁴the level of acceptance of the panelists to all the sensory properties of the meat tested [7]. The results showed that the concentration level of

marinade of different local spices and herbs had a significant effect ($P < 0.05$) on the acceptability of marinated breast meat. The color score of the marinated breast meat ranged from 3.93 to 4.38, from like to like extremely. The level of preference of panelists on the acceptability of breast meat that has been marinated with the marinade of local herbs and spices at the concentration level has changed. The acceptability scores starting from the highest were obtained from breast meat that had been marinated with marinade concentration levels of 20%, 30%, and 10%, namely 4.38; 4.15; and 3.93 respectively. This could be due to the panelists as a whole that the marinade concentration level of 20% was the right concentration for marinating super native chicken breast.

2 Conclusion

The results showed that the marinade concentration level of different local herbs and spices had a significant effect on acceptability, but did not affect on color, flavor, taste, texture, juiciness, and tenderness of super native chicken breast marinated. The marinade concentration of local herbs and spices at the level of 20% was the best treatment with highest score hedonic of 4.38 so that it was preferred by the panelists when compared to other treatments.

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