

Preferences and physical quality of superior local chicken meat from agricultural research and development agency that given herbal medicine and probiotics feeds

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Abstract. This research was conducted to determine the effects of the used of herbs and probiotics added of superior local chicken meat from Agricultural Research and Development Agency. The study was conducted on Sato Nadi group, Jehem Village, Tembuku Subdistrict, Bangli District. This study used a Randomized Block Design Factorial pattern with 2 factors, namely the type of feed factor and type of herbal medicine. Feed type factors differentiated into to 2 levels, namely dry feed and wet feed. The type of herbal factor consists of 4 levels, which are 1) P0 = the farmers way; 2) P1 = P0 + herbs; 3) P2 = P1 + Bio L probiotics 2 ml/l through drinking water; and 4) P3 = P1 + Bio L probiotics 3 ml/l through drinking water. The parameters collected consisted of water content (%), water holding capacity (%), cooking shrinkage (%), texture (kg/cm²), pH, and sensory testing of color, texture, taste, juiciness, tenderness, acceptability and ranking test. Treatment the farmer way with herbal medicine and probiotic Bio L 2 ml/liter of drinking water is the best result to physical quality and sensory analysis. The conclusion the best result was P2 which has moisture content 74.63%, cooking shrinkage 36,17%, and texture value 3,30 kg/cm² with the farmer way with treatment herbal medicine and Bio L probiotic 2 ml/liter of drinking water. Preference panelist with score 3,56 (between rather soft to tender) there is number one ranking analysis.

1. Introduction

The development of chicken farming often faces problems especially in unstable growth, the result is low body weight and low quality of meat. The quality of meat can be used as a measure of meat that consumers preference. Efforts to improve the development and health, other than nutritional intake can also give through by additional food like herbal medicine to increased appetite and increase immunity. Herbal medicine were given in liquid form or flour mixed into the ration as feed additive or feed supplement [1].

Animal herbal medicine was supplements that can increased body weight gain and reduce feed conversion rate (FCR) and increase immunity [2]. Beside herbal medicine, probiotic use in poultry as additional feed can be used to improve animal health and increase egg productivity. Probiotics was live microbes that are given to livestock with the aim to increase microbial balance in digestion and reducing unwanted microbes, such as *E. coli*, *Salmonella*, *Clostridium* [3]. The composition of animal herbal

medicine consists of natural ingredients, such as turmeric, ginger, galangal, kencur, and betel leaf, and garlic. The content of polyphenols in ginger serves as an antioxidant that can cope with stress, while turmeric has anti-inflammatory and antioxidant effects [4].

The productivity of local chicken maintained by voluntary farmers are still low, because of the low quality of seeds and poor maintenance system. Chicken products are increasingly interesting for middle and upper class consumer, because there have good taste and increase public knowledge of balance nutrition intake. This condition make produce superior local chicken meat from Agricultural Research and Development, the advantages is high egg production and chicken can be used as a source of animal protein [5]. To increase productivity chicken of egg and meat's from Agricultural Research and Development Agency chicken must be follow by good maintenance and maintenance livestock health. This can be done by giving herbal medicine and probiotics. The purpose of this study is to know the influence of feed type, herbal medicine and Bio L probiotic on superior local chicken meat from Agricultural Research and Development Agency on panelist preferences and physical quality.

2. Material and Methods

2.1. Material

The main materials are superior local chicken meat from Agricultural Research and Development, with additional feed herbal medicine and Bio L probiotic. The equipment was stove, pan, water bath, analytic balance, centrifuges and penetrometers.

2.2. Methods

The research was conducted in Sato Nadi group, Jehem village, Tembuku subdistrict, Bangli district. The analysis of meat quality and sensory testing was conducted at the Agricultural Technology Research Institute Bali.

Processing of herbal medicine using ingredients such us turmeric (1 kg), ginger (1 kg), galangal (1 kg), garlic (1/2 kg), *Kaempferia galangga L.* (1/4 kg), betel leaf (1 ounces) and molasses (1 liter). The process of animal herbal medicine was mixed all ingredients the pounding except molasses. 5 ml water added to mixing's animal herbal medicine and filter it to get extract. Herbal medicine was given by add 5 ml to water. The provision of animal herbal medicine was carry out when the chickens are lying egg (age \pm 22 weeks) and give continuously during production observation (\pm 4 months). At the time of lying eggs Bio L probiotic was give according to the treatment.

The feed composition farmer give to chicken is 40% corn, 25% concentrate and 35% bran. The wet feed use in this study was made by mixing dry feed with water, mixing 1 kg dry fees with 1 liter of water. This mixture is precipitated \pm 10 -2 minutes, after that give to livestock.

This study use Randomized Block Design Factorial pattern. The first consist of 2 treatments, PB (wet feed) and PK (dry feed). The second factor consist of 4 treatments, 1) P0= feed the farmer's way; 2) P1= P0+5 ml/liter herbal medicine on water; 3) P2= P1+ Bio L probiotic 2 ml/liter through drinking water; 4) P3= P1+ Bio L probiotic 3 ml/liter through drinking water. There were 8 combinations of treatments. Each treatment consists of 25 heads, so total sample are 200 heads. Physical quality analysis was carried out on water content, water holding capacity, cooking shrinkage, texture and pH. Each sample was analyzed 3 times. Sensory test was carried out use hedonic test color, texture, taste, juiciness/wetness, tenderness and acceptability using 20 panelists. To find out which meat was acceptable to consumers, a ranking test was also conducted. The meat used for sensory test was boiled meat without add seasoning.

The data is analyzed use variance analysis (ANOVA) using SPSS 16. If the result was significant ($P < 0.05$) continued with Duncan's test. The first ranking test was transformed into Fischer and Yates Table (1942) which was used to determine the numerical value of the score of each sample.

3. Result and Discussion

The analysis of chicken is significant ($p < 0.05$) on moisture content, cooking losses, and texture objective but not significant ($p > 0.05$) on water holding capacity and pH. The average treatment of wet feed (PB) has higher water content compared to dry feed (PK), as present in Table 1. According to [6], the criteria for fresh meat is still wet when touched, this because there is water content in meat as the largest concentration in meat. Meat water content is influenced by feed water content, because livestock will consume more water, if the water content of feed is low [7].

Table 1. Moisture content (% bb) superior local chicken meat from Agricultural Research and Development Agency with treatment type of feed, herbal medicine and Bio L probiotic

Type feed	Herbal medicine and probiotic			
	P0	P1	P2	P3
Dry feed (PK)	45,50 ± 1,039 a	75,21 ± 0,722 c	74,63 ± 1,697 bc	74,57 ± 1,536 b
Wet feed (PB)	74,14 ± 0,992 b	75,39 ± 0,648 c	74,86 ± 0,617 bc	71,02 ± 1,696 a

- The numbers follow by the same later on the row and column show no significant in Duncan test at the 5% level.
- PK = dry feed; PB = wet feed; P0 = feed the farmer's way; P1 = P0+5 ml/l medicine on water; P2 = P1+ Bio L probiotic 2 ml/l through drinking water; P3 = P1+3 ml Bio L probiotic 3 ml/l through drinking water

The treatment of feed type, animal herbal medicine and probiotic has significant effect on cooking shrinkage of meat (Table 2). The application of dry feed (PK) with adding herbal medicine and 2 ml probiotics (P2) is the lowest value of cooking shrinkage at 36,17%. This is because the feed provided contains high nutrition, resulting in high-quality meat, where high-quality meat has a low cooking loss value [8] and [9]. Which mean meat better quality, because it loses less meat nutrition [6]. According to [10], cooking shrinkage value in influences by the amount of water run out of meat, protein degradation, the ability of meat to bind water and the amount of damage of membranes cell.

Table 2. Cooking shrinkage (%) superior local chicken meat from Agricultural Research and Development Agency with treatment type of feed, herbal medicine and Bio L probiotic

Type feed	Herbal medicine and probiotic			
	P0	P1	P2	P3
Dry feed (PK)	42,68 ± 5,688 bc	45,10 ± 2,996 c	36,17 ± 5,535 a	41,89 ± 2,377 ab
Wet feed (PB)	30,89 ± 13,399 a	47,97 ± 5,955 c	44,02 ± 2,798 b	47,24 ± 5,176 bc

- The numbers follow by the same later on the row and column show no significant in Duncan test at the 5% level.
- PK = dry feed; PB = wet feed; P0 = feed the farmer's way; P1 = P0+5 ml/l medicine on water; P2 = P1+ Bio L probiotic 2 ml/l through drinking water; P3 = P1+3 ml Bio L probiotic 3 ml/l through drinking water

Feed type and probiotic treatment has significant effect on texture/tenderness of meat. The average of meat texture is between 1.77 to 2.08 kg/cm² (Table 3). Differences in the level of tenderness of meat due to the addition of livestock herbal medicine and Bio L probiotics affect the value of cooking losses. Because the value of cooking losses is related to the tenderness of the meat [11]. Objective texture or tenderness are one indicators and main factor for consumers consideration in make choice in buy meat [6].

The result of sensory analysis shown the quality of chicken have significant effect ($p < 0.05$) on tenderness, but not significant ($p > 0.05$) on color, texture, taste, juiciness and acceptability (Table 4). Chickens with dry feed, treatment P2 is the most preferred by panelist base on ranking test with score 0.35 (Image 1). This shown the quality of chicken is influence by the feed. That accordance with statement of [11], mentioning qualities of meet influence by color, tenderness, texture, flavor, smell, and impression of juiciness. Tenderness is one factor must be maintained, improve and most important determinant of meat [12]. Because poultry have soft meat, flexible and smooth texture.

Table 3. Texture (kg/cm²) superior local chicken meat from Agricultural Research and Development Agency with treatment type of feed, herbal medicine and Bio L probiotic

Type feed	Herbal medicine and probiotic			
	P0	P1	P2	P3
Dry feed (PK)	1,77 ± 0,057 a	2,08 ± 0,250 b	3,30 ± 0,392 cd	2,95 ± 0,227 c
Wet feed (PB)	2,88 ± 0,239 bc	2,68 ± 0,104 a	2,90 ± 0,297 c	2,80 ± 0,168 ab

- The numbers follow by the same later on the row and column show no significant in Duncan test at the 5% level.
- PK = dry feed; PB = wet feed; P0 = feed the farmer's way; P1 = P0+5 ml/l medicine on water; P2 = P1+ Bio L probiotic 2 ml/l through drinking water; P3 = P1+3 ml Bio L probiotic 3 ml/l through drinking water

Table 4. Sensory test of superior local chicken meat from Agricultural Research and Development Agency with treatment type of feed, herbal medicine and Bio L probiotic

Treatment	Color	Texture	Taste	Juiciness	Tenderness	Acceptability
Dry feed (PK)						
P0	3,25 ± 0,577 a	3,25 ± 0,577 a	3,19 ± 0,655 a	2,75 ± 0,775 a	3,06 ± 0,772 ab	3,19 ± 0,981 a
P1	2,56 ± 0,813 a	2,56 ± 0,813 a	3,00 ± 0,632 a	2,75 ± 0,856 a	3,06 ± 0,929 ab	2,94 ± 0,929 a
P2	2,88 ± 0,806 a	2,88 ± 0,806 a	3,50 ± 0,894 a	3,06 ± 1,062 a	3,56 ± 0,892 b	3,19 ± 0,834 a
P3	3,19 ± 0,750 a	3,19 ± 0,750 a	3,13 ± 1,024 a	2,44 ± 0,727 a	2,50 ± 0,817 a	2,63 ± 0,719 a
Wet feed (PB)						
P0	3,13 ± 0,957 a	3,13 ± 0,957 a	3,31 ± 0,704 a	2,94 ± 0,772 a	3,00 ± 0,817 ab	2,94 ± 0,680 a
P1	2,38 ± 1,087 a	2,38 ± 1,088 a	3,00 ± 0,894 a	2,88 ± 0,958 a	2,56 ± 1,031 ab	3,06 ± 0,772 a
P2	2,63 ± 1,204 a	2,63 ± 1,204 a	3,19 ± 1,109 a	2,81 ± 1,047 a	2,94 ± 1,063 ab	3,00 ± 0,894 a
P3	3,25 ± 1,000 a	3,25 ± 1,000 a	3,38 ± 1,15 a	3,19 ± 0,911 a	3,13 ± 1,088 ab	3,13 ± 1,147 a

- The numbers follow by the same later on the row and column show no significant in Duncan test at the 5% level.
- PK = dry feed; PB = wet feed; P0 = feed the farmer's way; P1 = P0+5 ml/l medicine on water; P2 = P1+ Bio L probiotic 2 ml/l through drinking water; P3 = P1+3 ml Bio L probiotic 3 ml/l through drinking water

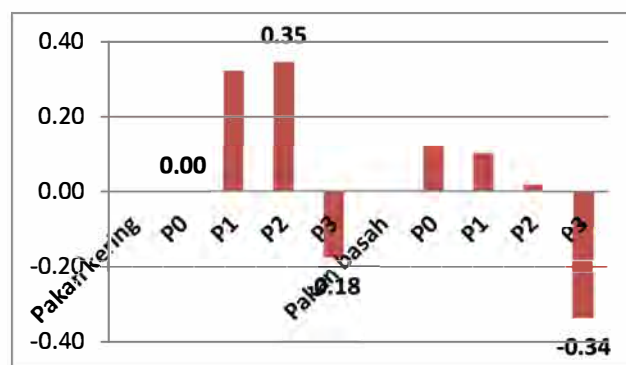


Figure 1. Ranking chicken for type of feed, herbal medicine and probiotic

- P0 = feed the farmer's way; P1 = P0+5 ml/l medicine on water; P2 = P1+ Bio L probiotic 2 ml/l through drinking water; P3 = P1+3 ml Bio L probiotic 3 ml/l through drinking water

Giving herbal medicine and Bio L probiotic can increase livestock stamina due stress cause by weather change, because the herbal medicine can reduce various type of disease in livestock [13]. This is in line with the statement of [14] in [15], mentioning that quality feed can improve meat quality base on sensory test. Another factor need attention are postharvest including slaughter, service, distribution and marketing.

The treatment of giving herbal medicine and 2 ml probiotic can increase appetite and maintain animal health from stress due to change weather and environment. This because herbal medicine contains natural ingredients such as turmeric, galangal and ginger. This natural ingredients, besides have anti-inflammatory properties, also contain antioxidant as antimicrobials and can improve digestive so can increase appetite [16] and [17]. Whereas according to [18], a decrease in cooking losses cause by increase age of livestock.

4. Conclusion

The provision 2 ml herbal medicine and Bio L probiotic through drinking water obtain score 3.56 (between rather soft to tender), and base on the ranking test was ranked first. The best meat has moisture content 74.63%, cooking shrinkage 36,17%, and texture value is 3,30 kg/cm².

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Conceived and designed experiment meat quality and sensory: Wayan Trisnawati. Data Analyzed : Wayan Trisnawati. Performed the experiment livestock of chicken: Nyoman Suyasa and Anastasia Sischa Jati U. Wrote the manuscript: Wayan Trisnawati and Anastasia Sischa Jati U. All authors read and approved the final manuscript.

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