Chemical Quality of *Longissimus* Muscles of Kacang Goat After Supplemented With A Combination of Palm Kernel Meal and Powdered Katuk Leaf

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Abstract. The purpose of this study was to analyze the effect of supplementation of palm kernel meal (BIS), Katuk leaf powder (KAT), and their combination on the chemical quality of *Longissimus dorsi* muscle in Kacang goats. Twenty male Kacang goats aged ±1.5 years old with the average live body weight of 15.42±1.28 kg were used in this research. A complete randomized design was used in this research; with 4 treatments and 5 replications. All goats were acclimatized for 2 weeks. Group P0 as control was given distilled water. Group P1 was given BIS at a dose of 100 gr/day/head. Group P2 was administered with BIS 100 gr/day/head and Katuk leaf powder 15 gr/day/head, and group P3 was given KAT 15 gr/day/head. The treatments were given twice per day for 35 consecutive days and goats were fed with leaves and grasses, and had access to water ad libitum. At the day 25 and 50 after treatment, goats were slaughtered according to standard commercial halal procedures. *L. dorsi* muscles were taken and subjected to measurement of moisture content, crude protein, fat, ash content, and cholesterol. The results showed that KAT statistically (P≤0,05) reduces cholesterol and fat contents of *L. dorsi* muscles. In conclusion, the administration of KAT may reduce cholesterol and fat.

Keywords: palm kernel meal, Katuk leaf powder, *Longissimus dorsi*, Kacang goats.

1 Introduction

Physical and chemical quality are important aspects of meat quality assessment. Meat quality plays an important role in consumers and meat processing. Normally meat is not only assessed from muscle, fat, and bone aspects, but also other constituents such as water, fat, crude fiber, ash, and cholesterol contents [1]. Several researchers have been conducted to assess the physical quality and chemical composition of goat or sheep fed by certain grass or herbal feeds [2,3,4,5].

The use of herbs or herbal products to improve production or quality of meat chemical components has been practiced by several researchers. Herbal products from certain plants are believed to increase production. Several consumers and farmers are aware and implementing concepts and patterns under a clean, green, and ethical basis [6]. This practice is implemented to provide comfort for costumers especially in the field of food hygiene.

The use of the herbal product is more preferred by consumers not only from the animal welfare point of view but also human health. It has been known that goat meat has a low level of intramuscular fat and high in water content [2,7] if compared with similar culling age and body weight.

Although there are a lot of documentations on goat meat chemical composition [8,4], there is still limited information about the chemical composition of goat meat after being fed field grass with a combination of palm kernel meal. Thus, further information about the parameter in Kacang goat after being giving BIS and Katuk leaf power (KAT) is required.

2 Materials and Methods

2.1 Location

The research was conducted in Sei Putih District, North Sumatera Province. It was located in 3o25'04.4"N 98 o53'04.0"E with 43,7 m elevation above sea level. The area has a warm climate with the temperature hovering between 290 C to 300C and rainfall from moderate to heavy.

2.2 Animal Treatment

Twenty local Kacang goats obtained from the market and breeding around the research area Sei Putih District. Goats were then separated according to body weight from 14 kg to 19 kg (average live body weight 15,42±1.28 kg)

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and according to age from 1,5 to 2 years old. Goat age was calculated through the eruption pattern of incision teeth, where goats selected as samples must have a pair of first permanent incision teeth.

All animals were acclimatized for 14 days with field grass feed. Every day the goats were given fed natural grass and water ad libitum. After the acclimatization period passed, with complete random sampling design (CRD) the goats were randomly placed in individual cages and divided into 4 groups consisting of 5 animals each. The first group is the control group (P0) given only distilled water. The first, second, and third groups were treatment groups. P1 group was given BIS 100g/day per animal, the P2 group was given BIS and KAT 100g/day and 15 g/day per animal each. P3 group was only given KAT 15g/day per animal. All treatments were given orally two times a day; in the morning at 07:30 and in the afternoon at 16:30.

2.3 Culling Procedure

On day 25 and 50 of treatment, two to three animals from every treatment were culled with halal practice. After 24 hours of carcass storage, the muscle portion of *Longissimus* muscle was sampled as much as 100 g for further chemical analysis examination. Chemical composition analysis was conducted based on proximate analysis to determine water, fat, crude protein, ash, and cholesterol content [9] utilizing facilities in the Production and Nutrition Science Department, Bogor Agricultural Institute.

All goats were slaughtered with halal practice on day 25 after treatment for the first wave and 50 days after treatment for the second wave. Before slaughtering, goats have fasted for 10 hours. After slaughtered, carcasses were placed in 200C storage with 70% humidity. Carcasses were separated into symmetrical left and right portions. Samples were taken from the right half portion of carcass by *L. dorsi* muscle [10]. Samples for analysis were weighted 100 g. Samples were placed in plastic containers, labeled, and taken to the laboratory. The parameter measured were water, fat, crude protein, ash, and cholesterol content. The method used for chemical analysis is the Gravimetric method for water content, Kjeldahl method for protein analysis, Soxhlet method for fat content analysis, and Lieberman-Burchards for cholesterol analysis [9]. Data obtained was analyzed by Anova, variance analysis to compare calculated F with F table with 5% significance. If a significant difference was found, the result will be followed by Duncan's multiple distance test [12].

3 Results and Discussion

Research results showed that water, ash, and crude protein content of Kacang goat from all treatment groups did not significantly differ with each other (P>0.05), but fat and cholesterol content showed significant differences. The full result is presented in the following table.

Table 1. The average value of chemical composition (% sample weight) of Kacang goat *L. dorsi* muscle (n=20)

Variable	25th day				50th day		
	Control	BIS	BIS+KAT	KAT	BIS	BIS+KAT	KAT
Moisture (%)	77,89±0.21	78,66±0.37	79,84±0.83	79,18±0.64	78,20±0.37	79,84±0.83	$79,38±0.24^{ns}$
Fat (%)	$0,53±0.20^{b}$	0,64±0.10	0,51±0.16	$0,18±0.62^{a}$	0,44±0.10	0,51±0.46	$0,12±0.62^{a}$
Crude Protein (%)	16,67±0.93	16,61±0.92	18,63±1.97	18,35±0.68	17,61±0.92	18,33±1.97	$18,05±0.68^{ns}$
Ash (%)	1,22±0.02	1,12±0.02	1,02±0.0	1,05±0.05	1,12±0.02	1,02±0.06	$1,05±0.05^{ns}$
Cholesterol (mg/100g)	$76,1±0,8^{b}$	75,07±0,7	68,3±0,5	$59,9±0,7^{a}$	79,3±0,5	66,1±0,8	$55,07±0,7^{a}$

[ab]The means with different letters in the same row indicated significantly different (p≤0.05), ns: not significant

Meat water content obtained in this research after day 25 of treatment did not differ significantly (P>0.05) with the result obtained after 50 days of treatment. Factors influencing water content are livestock species, age, gender, feed, location and part of muscle [11]. According to Anggorodi [13], water and fat content are influenced by age and feed composition. Fat content measurement results in this research were significantly lower (P<0.05) compared to control. Fat content in *L. dorsi* muscle on day 25 and 50 after KAT treatment were 0,18±0.62% and 0,12±0.62%.

Based on research done by Aqsa *et al*. [14] it is reported that Kacang goat water content is 77,2%, higher than the result obtained in this research. It could be assumed that meat water content in this research is still within normal for it hovers between 65 - 80% [10].

The fat content obtained in this research was significantly different (P≤ 0.05) compared to the result obtained from control. Average fat content in the control group, BIS group, BIS-KAT group, and KAT group after 25 and 50 days of treatments were 0.53%, 0.44%, 0.51%, and 0.18%. The same result was also obtained in day 50 of treatment. Fat content obtained in this research also significantly different, similar to cholesterol content. Based on the result obtained in this research, it can be said that Kacang goat cannot store excess energy consumption and feed protein will be changed into fat or marbling. Fat content in Kacang goat used in this research is slightly higher compared to the research done by Soeparno *et al.* [15] and Aqsa *et al*. [14] which were 1.79% and 2.09% respectively, and lower compared to the result done by Agnihotri et al. [16] where Barbari goat showed to have fat content of 4.8%.

Meat cholesterol level obtained in this research is significantly different (P≤ (0.05) if the control group is to be compared with the group given BIS or BIS-KAT combination. The average cholesterol level in this research after KAT administration was 59.9 mg/100g after 25 days and 55.07 mg/100g after 50 days. This is in accordance with Pratiwi *et al*. [17] who stated that meat cholesterol level is closely related to Fat content and is influenced by fatty acid composition. Meat cholesterol level obtained in this research is lower compared to the results obtained by Aqsa *et. al*. [14] which is 76.50 mg/100g meat.

4 Conclusion

It can be concluded that Katuk leaf powder can lower fat and cholesterol content but cannot influence water, crude protein, and ash contents.

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