The Effect of Green Tea (Camellia Sinensis) and Turmeric (Curcuma Longa) as Feed Additives on Performance of Local Sheep

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Abstract. Studies on green tea and turmeric utilizations as natural additives in ruminant diets are still limited. In this experiment, randomized completely design was used to compare the effects of 4 experimental diets: T0 = control diet without green tea and turmeric powders; T1 = diet with 1% turmeric powder; T2 = diet with 2% green tea powder; and T3 = diet with 1% turmeric acid and 2% green tea powders on performance of local lambs. Based on the results, adding 2% green tea or 1% turmeric powders or their combination had no a significant effect (P>0.05) on feed intake (g DM/head/day) of local lambs confirming that their uses did not reduce diet’s palatability. The two herbal inclusions had also no significant effect (P>0.05) on average daily gain (ADG, g/head/day) and carcass percentage (%).

1. Introduction

Tea drink is popular among people as a healthy consumption. Tea leaves is rich in antioxidants to inactivate free radical oxygen in the human body, reducing the risk of obesity, and preventing cardiovascular diseases [1,2,3,4]. On the other hand, turmeric is well-known for its uses as herbs and herbal medicine for human. However, study on green tea, turmeric, and their mixed utilizations as feed additives for ruminants have not been done intensively. Ramdani et al. [5] reported that green tea leaves contain considerable amounts of protein, fiber, minerals, and bioactive compounds especially tannins and saponins. Meanwhile, turmeric is rich in phenolic curcumin that has antioxidant and antibacterial properties. In broiler chicken, adding turmeric powder into a diet increased erythrocyte and leucocyte of blood cells of broiler chickens leading to improve their performances [6]. Therefore, this research aimed to test the effect of green tea (Camellia Sinensis) and turmeric (Curcuma Longa) powders as additives in a sheep diet on feed intake, ADG, and carcass percentage of local sheep.

2. Material and methods

2.1. Animals

About 24 heads of West Java local lambs were used in this experiment aged 8-10 months at average live weight of 20.2 ± 1.85 kg. Each lamb was caged in an individual pen. Before experiment, lambs were adapted to experimental situation for about 2 weeks and fed ad libitum field grass with about 200 g concentrate. During experiment, each lamb was fed experimental diets for 3 months.

2.2. Experimental diets

All diets consisted of 60% concentrate and 40% field grass that were given as feed while green tea and turmeric powders were added into concentrate. There were 4 experimental diets: T0 = control diet without green tea and turmeric powders; T1 = diet with 1% turmeric powder; T2 = diet with 2% green tea powder; and T3 = diet with 1% turmeric acid and 2% green tea powders. Diets were formulated to
meet lambs nutrient requirement to reach ADG of about 100 g/head/day at crude protein 9.5%, TDN 55%, and dry matter intake minimum 3% live weight [7].

2.3. Measured Parameters
ADG was measured by calculating the difference between initial and final weights divided by the number of days of experiment and expressed as g/head/day. Meanwhile, feed intake was measured by calculating the difference between the amounts of given and remaining feeds on feed bunk and expressed in gram DM/head/day. Carcass percentage was measured by calculating the percentage of carcass from the live weight before slaughtering.

2.4. Statistical Analysis
Randomized experimental design was used to compare 4 different experimental diets as explained previously whilst One-way Analysis of Variance in MINITAB 16 was used to see the different among 4 experimental diets at P<0.05.

3. Results and discussion
Table 1. shows the effect of diets containing green tea and turmeric powders on grass, concentrate, and total feed intakes (g DM/head/day) of local lambs. It can be seen that grass intakes of local lambs ranging from 290.50 ± 23.40 to 294.40 ± 13.89 g DM/head/day while concentrate intake ranging from 566.20 ± 3.59 to 569.50± 2.09 g DM/head/day. In combination, lambs consumed about 858.70 ± 25.77 to 863.90 ± 12.88 g DM/head/day.

Table 1. Means (± SD) grass, concentrate, and total feed intakes (g DM/head/day) of local lambs fed diets containing green tea and turmeric powders.

| Treatments | Grass (g DM/head/day) | Concentrate (g DM/head/day) | Total (g DM/head/day) |
|------------|-----------------------|----------------------------|-----------------------|
| T0         | 294.40± 13.89         | 569.50± 2.09               | 863.90± 12.88         |
| T1         | 294.10± 8.67          | 566.20± 3.59               | 860.10± 11.28         |
| T2         | 291.90± 17.40         | 568.80± 2.70               | 860.80± 18.06         |
| T3         | 290.50± 23.40         | 568.20± 2.72               | 858.70± 25.77         |
| Significant| P = 0.780             | P = 0.242                  | P = 0.741             |

T0 = control diet without green tea and turmeric powders; T1 = diet with 1% turmeric powder; T2 = diet with 2% green tea powder; and T3 = diet with 1% turmeric acid and 2% green tea powders.

Table 2. Means of initial weight (kg/head), final weight (kg/head), ADG (g/head/day) and carcass percentage (%) of local lambs fed diets containing green tea and turmeric powders.

| Treatments | Initial weight (kg/head) | Final weight (kg/head) | ADG (g/head/day) | Carcass percentage (%) |
|------------|--------------------------|------------------------|------------------|------------------------|
| T0         | 20.10 ± 1.79             | 27.30 ± 1.95           | 86.60± 24.4      | 46.60± 1.71            |
| T1         | 19.90± 2.34              | 27.50 ± 3.25           | 92.40± 19.8      | 44.80± 1.95            |
| T2         | 20.30± 1.62              | 27.60± 2.59            | 88.20± 21.1      | 45.50± 1.41            |
| T3         | 20.40± 1.66              | 28.40± 1.39            | 96.00± 12.3      | 45.30± 1.93            |
| Significant| P = 0.965                | P = 0.925              | P = 0.253        | P = 0.394              |

T0 = control diet without green tea and turmeric powders; T1 = diet with 1% turmeric powder; T2 = diet with 2% green tea powder; and T3 = diet with 1% turmeric acid and 2% green tea powders.

Statistically, adding 2% green tea or 1% turmeric powders or their combination had no a significant effect (P>0.05) on grass, concentrate, and total feed intakes. Mueller-Harvey [8] and Po et al. [9] reported that adding herbals containing high amounts of plant secondary metabolites such as tannins into ruminant’s diets could reduce the palatability of the diets because of bitter taste of tannins. However,
adding green tea and turmeric into sheep diets in the current study did not reduce feed intake or the palatability of the diets. This might be due to the green tea and turmeric powders were mixed with high palatable concentrate before feeding so that it did not affect the palatability significantly.

Table 2 describes the effects of adding green tea and turmeric powders into a sheep diet on ADG (g/head/day) and carcass percentage (%) of local lambs. As can be seen that ADG of local lambs fed experimental diets in the current study ranging from 86.60 ± 24.4 to 96.00 ± 12.3 g/head/day. However, adding green tea and turmeric powders into a sheep diet in the current experiment had no significant effect (P>0.05) on performance of local lambs.

4. Conclusion
Plant secondary metabolites such as tannins have widely reported to taste bitter leading to have poor palatability. However, adding green tea and turmeric into sheep diets in the current study did not reduce feed intake or the palatability of the diets. Adding 2% green tea, 1% turmeric, and their combination into a sheep diet has no significant effect on lamb’s performances.

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