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Addition of Chlortetracycline to Improve the Performance of Broilers Fed Local Diets

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ABSTRACT

A research was carried out to study the effect of chlortetracycline addition in drinking water on the performance of broilers fed corn-mungbean base diet. The diet was composed of corn and mungbean as the major ingredients. One hundred of day-old chicks CP 707 were randomly assigned into two treatments i.e. 1) no addition of chlortetracycline in the drinking water (D1), (2) addition of chlortetracycline in the drinking water (D1+). Diet and water were offered *ad libitum*. Feed consumption, body weight, and feed conversion were recorded up to day 21. Chlortetracycline addition via drinking water affected significantly feed consumption and feed conversion ($P < 0.05$). Broilers with chlortetracycline administration showed lower feed consumption and feed conversion. The results indicated that chlortetracycline additive can improve the performance of broilers fed corn-mungbean base diet.

Key words : Chlortetracycline, mungbeans, corn, sorghum, feed conversion

INTRODUCTION

Subtherapeutic level in-feed antibiotics are commonly used in broiler commercial feeds (Murwani and Bayuardhi, 2007). In feed-antibiotic exerts its effect by decreasing the number of pathogenic bacteria and hence promoting a better microbial balance in the gut and improving nutrient utilization (Dibner and Richards, 2005). They are therefore useful in preventing bacterial infection and protect broilers from heat stress in hot and humid climate like Indonesia. It is also a common practice to administer antibiotics via drinking water in the management of

broiler production (Murwani and Bayuardhi, 2007). Such practice is helpful in maintaining broilers health, suppressing mortality, supporting maximal growth and sustaining profitable bussiness.

In-feed antibiotic is commonly used in commercial broiler diet based on corn, soybean meal, and meat bone meal. As these feed ingredients rely heavily on imports, high price of feed can not be avoided. In attempt to substitute imported feed ingredients, the use of locally available grains were studied. Soybean meal as source of vegetable protein can be replaced by mungbean which has high protein content among various local beans. Sorghum can also be used together with corn as source of energy. Although sorghum has been known to contain an anti nutritive-tannin, its use in appropriate amount in the diet composition can be beneficial to broilers (Nyachoti *et al.*, 1996; Murwani, 2008; Murwani, 2009). Meat bone meal which has been banned for use in ruminants feed remains an important feed ingredients for broilers as it supplies high animal protein. However it can be substituted by various local animal protein such as fish meal,

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rejected milk, or by products of bakery industries. The following research therefore was carried out to study the effect of antibiotic additive i.e. chlortetracycline in drinking water in broilers fed local feed ingredients based diet.

MATERIALS AND METHODS

Birds and diets

All feed ingredients were obtained from local feed producers. Corn, sorghum and mungbean were obtained in grain form with moisture content around 11%. These feed ingredients were ground separately and stored in clean water-tight plastic drum until mixed. They were also checked for the presence of mycotoxin, but no mycotoxin was detected.

Corn, sorghum, mungbean, protein mix, inactivated bakery yeast (fermipan), vitamin mixture and mineral mixture were used to compose the basal diet (Table 1). Protein mix consisted of locally produced milk powder and albumin powder. Albumin powder was prepared by steaming albumin obtained from side product of local bakery producers, dried and then ground.

A total of 100 Ross CP 707 day old unsexed broilers with initial body of weight 37 ± 5 g were chick used in this experiment. They were offered free access to sugar and vitamin mix solution on the arrival. The experimental chicks were randomly assigned into 2 groups (in a warm brooder) and given the following treatments: 1) without chlortetracycline (D1), (2) with chlortetracycline via drinking water (D1+) (Table 1). On day 7, the birds from each large groups were further allocated randomly into 5 replicates with 10 chickens in each replicate.

The dose of antibiotic used was 500 ppm (500 mg/L water). The diet was formulated to meet nutrient requirement of broilers with protein level on 22.7%. The calculated ME of 3200 Kcal/kg. ME was calculated from ME value of each feed ingredient (NRC, 2004 and Hartadi *et al.*, 1986). Chicks were offered *ad libitum* access to the diet and drinking water.

Antibiotic-free vitamin was given through drinking water and mineral mixture was mixed with the diet. Birds were vaccinated with commercial ND La Sota (PT. Medion Indonesia) on day-4 via eye drop and subcutaneous simultaneously. The dose and vehicle of vaccine was used according to instruction sheet. Subcutaneous route was given with automatic injector. The treatments were performed for 25 days of starter period, in an open broiler-house with similar condition as that found in most small to medium scale

Table 1. Composition and nutrient contents of experimental diets.

Ingredients (%)	D1	D1+
Treatment of antibiotic in drinking water	-	500 ppm
Corn	36.71	36.71
Mungbeans	29.95	29.95
Sorghum	2.90	2.90
Protein Mix	21.26	21.26
Coconut Oil	2.9	2.9
Mineral	3.38	3.38
Baker yeast	2.90	2.90
Total	100	100
Nutrient Contents		
Metabolisable Energy (Kkal/kg) ²	3230.28	3230.28
Crude protein ²	22.7	22.7
Crude fat ²	1.09	1.09
Crude fiber ²	2.32	2.32

¹ The contents of mineral mix per kg i.e. 32.5% Ca, 10% P, 6 g Fe, 4 g Mn, 0.075 g Cu, 3.75 g Zn, 0.5 g vitamin B12, 50000 IU vitamin D3

² Based on calculated values

³ Based on proximate analysis.

broiler chicken producers (Murwani and Bayuardhi, 2007).

Feed consumption, body weight and feed conversion

Feed consumption was determined from the amount of feed given *ad libitum* minus feed that was not consumed. Body weight was measured each week with an electronic scale. Feed conversion was determined from the ratio of feed consumption to body weight.

A completely randomized design with 2 treatments and 5 replicates was employed. All data were analyzed using ANOVA, and Duncan's multiple range test.

RESULTS AND DISCUSSION

Feed consumption of broilers in D1 was significantly higher than broilers in D1+ ($P < 0.05$) (Figure 1). Antibiotic supplementation in drinking water reduced feed consumption.

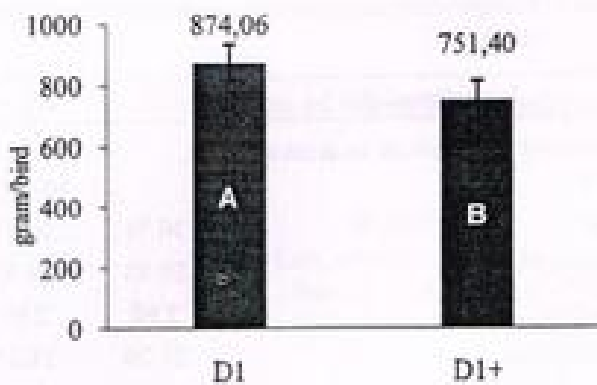


Figure 1. Means of feed consumption of broilers as affected by antibiotic addition in drinking water (g/bird)

There is no significant effect of treatments on body weight of broilers at 21 d ($p > 0.05$). Antibiotic administration did not affect body weight of broilers (Figure 2).

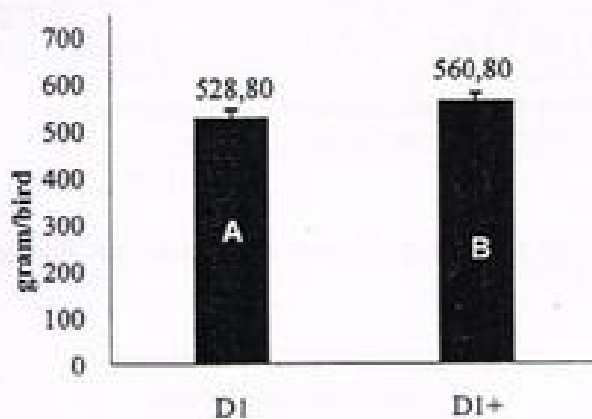


Figure 2. Means of broilers body weight of as affected by antibiotic addition in drinking water

There is a significant effect of treatments on feed conversion of broilers at 1 – 21 day ($p < 0.05$). Antibiotic administration improved feed conversion (Figure 3).

Feed consumption of broilers is affected by palatability. It is generally accepted that predominant senses of birds including broilers are sight and touch. Birds have taste buds and receptors, as well as touch receptors in the beak. Therefore, birds can taste and perceived physical form of the diets including colour, although with less acuity than mammals (Klasing, 2000). The use of corn and mungbean as major ingredients in the diet give certain colour and taste which are due to yellow colour of corn and the green skin colour of mungbean. Therefore, the palability of diet in birds with and without antibiotic should be the same. However, administration of antibiotic resulted in a decrease of feed consumption (D1+). Decreasing feed

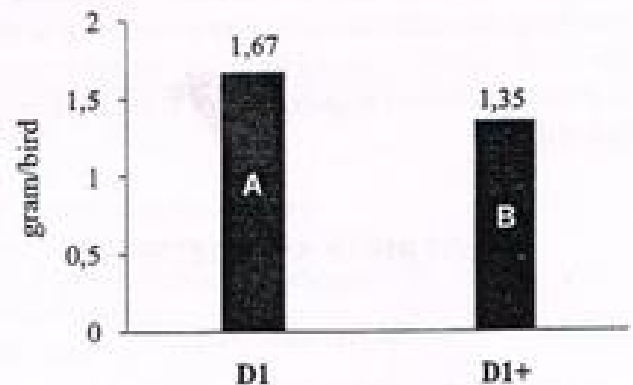


Figure 3. Means of feed conversion of broilers as affected by antibiotic addition in drinking water.

consumption might indicate that antibiotic improved the effectiveness of feed utilization which could fulfill the energy and nutrient needs of broilers. Antibiotic might induce satiety system in birds and therefore had less consumption. Antibiotics might also exert its effect by improving gut morphology, especially on small intestine, suppressing pathogenic microbes, and consequently improving nutrient absorption (Parks *et al.*, 2000; Perez *et al.*, 2005; Murwani, 2008). Such effect was manifested by accretion into lean which is reflected in body weight of broilers. Consequently that in feed conversion of broilers fed in D1+ was lower than D1. The results of the present study showed that administration of chlortetracycline via drinking water to broiler starter fed corn-mungbean base diet improved feed conversion.

CONCLUSION

Administration of chlortetracycline via drinking water is beneficial to broilers starter fed corn-mungbean base diet.

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