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The 2nd International Seminar

Feed Safety for Healthy Food

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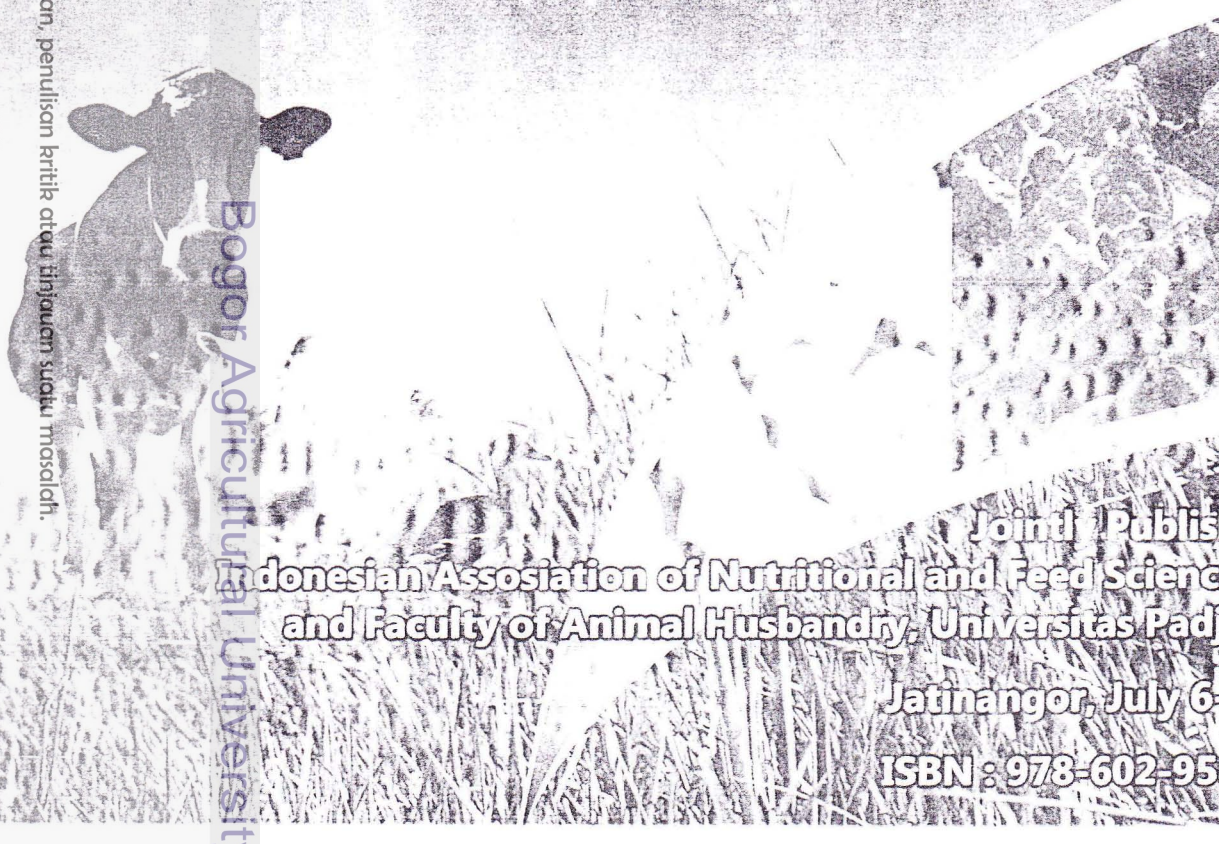

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The 2nd International Seminar
"Feed Safety for Healty Food"

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Secretariat of The International Seminar
"Feed Safety for Healty Food"

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The 2nd International Seminar
"Feed Safety for Healty Food"

Keynote Speaker :

Director General of Animal Husbandry and Animal Health

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Prof. Abdul Razak Alimon (Malaysia)

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Proceeding

The 2nd International Seminar
"Feed Safety for Healty Food"

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FOREWORD

We thank the Almighty Allah, the Most Gracious and the Most Merciful that the proceedings of the 2nd International Seminar, the 8th Biannual Meeting and 3rd Congress and Workshop of AINI with the theme "Feed Safety for Healthy Food" organized by Indonesian Association of Nutrition and Feed Science, Faculty of Animal Husbandry, Universitas Padjadjaran on 6 - 7 July 2011 have been completed.

These activities were to collect variety of scientific information with the purpose to collect scientific information about feed for a healthy food, to produce a draft policy on a national feed system and to make a scientific forum for Academics, Researchers, Practitioners of animal husbandry, Health and Policy makers. Scientific papers that were presented either in oral or poster stated in the proceedings.

Thanks go to all those who have provided both moral support or material so that this seminar can be carried out and the proceeding can be issued.

Jatinangor, 5 March 2012

Committee

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SUPPLEMENTATION *CURCUMA LONGA* OR *CURCUMA XANTHORRHIZA* ON BROILER PERFORMANCE

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ABSTRACT

An experiment was conducted to study the effect of supplementation *Curcuma longa* or *Curcuma xanthorrhiza* powder on broiler performance. Two hudred day-old *Hubbard* broiler chick (unsexed) were randomly assigned to five dietary treatments with four replication (10 birds/replication). Birds were fed basal diet as control (T1) or basal diet supplemented with 0.6% *Curuma longa* (T2), 0.2, 0.4, 0.6% *Curcuma xanthorrhiza* (T3, T4, T5). Water and feed were provided *ad libitum* during 6 weeks experimental period. There was no significant difference in feed consumption and feed conversion between the treatment groups. Supplementation *Curcuma longa* or *Curcuma zanthorrhiza* significantly ($p < 0.05$) increased body weight gain and decreased mortality as compared to control group. Among the treatment groups, T3 (0.2% *Curcuma xanthorrhiza*) have the best results with the highest body weight gain and lowest feed conversion and mortality.

Key words : *Curcuma longa*, *Curcuma zanthorrhiza*, broiler, performance

INTRODUCTION

Feed additives have become essential components of feeds especially for monogastric animals. Until late 1980's various antibiotics were heavily used world wide as growth promoting feed additive (Samarasinghe et.al., 2003). Antibiotics have played an important role in animal production as growth promoters. The use antibiotics as growth promoters has been banned in many countries due to public concern about their residues in animal products and the development of antibiotics resistance bacteria (Lee *et al.*, 2004). This condition force the nutritionist for searching an anternative to antibiotics. The use of natural products as alternative to conventional antibiotics has been rise in recent years. Herbs and spices can be use as alternatives to AGPs in poultry nutrition due to their anti microbial properties, antioxidant activity and digestion aid including stimulation of endogenous enzym activity. Among the herbs, *Curcuma longa* and *Curcuma zanthorrhiza* has been use for centuries as medicinal plant in Indonesia. The rhizome of *Curcma longa* (turmeric) has been widely use as a spice, food preservative and colouring material in India, China and South East Asia (Chattopadhyay *et al.*, 2004). The main bioactive compoud from turmeric is curcumin. Turmeric

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contains three different analogues of curcumin e.i., diferuloylmethane, demethoxycurcumin, and bisdemothycurcumin (Balaji and Chempakam, 2010). Curcumin have wide spectrum of biological actions including anti inflammatory, antioxidant, anticarcinogenic, antimutagenic, anticoagulant, antifertilty, antidiabetes, antibacterial, antifungal, antiprotozoa, antiviral, antivibrotic, antiulcer, hypotensive and hypocholesteremic activity as reviewed recenty (Chattopadhyay *et al.*, 2004). *Curcuma zanthorrhiza* is well known as temulawak or Javanese turmeric. This plant is origin from Indonesia. The mayor component of the essential oil of this plant is zanthorrhizol. This compound have some biological action including antibacteria, antifungal (Rukayadi, 2011), antioxidant, antiplatelet effect, immnomodulatory and cardiovascular protective properties (Jantan, 2011). *Curcuma xanthorrhiza* also contain bioactive curcuminoid (62% curcumin and 38% desmethoxycurcumin). There were some reports on utilization *C.longa* in broiler diet (Emadi, *et.al.*, 2006, 2007; Samarasinghe *et.al.*, 2003) but reports on *C.xanthorrhiza* were still limited. Base on their bioactive substance, we conducted this experiment to compare the effectivity of *C. longa* and *C. xanthorrhiza* on broiler performance.

MATERIALS AND METHODS

Bird and Housing

This experiment was conducted at Laboratory of Poultry Nutrition, Faculty of Animal Science, Bogor Agricultural University. Two hudred day-old *Hubbard* broiler chick (unsexed) were randomly assigned to five dietary treatments with four replication (10 birds/replication). The chicks were reared on deep litter system in open side house with standard management conditions throughout the experiment period of 6 weeks. Feed and water were provided *ad libitum*. The chicks were vaccinated against New Caste and Gumboro diseases according to their age.

Experimental diet

Basal diet as control were formulated to met broiler requirement according to NRC (1994) recommendation. The ingredient and nutrient composition are presented in table 1. *Curcuma longa* and *Curcuma zanthorrhiza* were purchased from local market. These rhizomes are made powder after drying process (by oven 60°C, 24 h). The experimental diets are T1 = control, T2 = basal diet + 0.6% *C.longa*, T3 = basal diet + 0.2% *C. xanthorrhiza*, T4 = basal diet + 0.4% *C. xanthorrhiza*, T5 = basal diet + 0.6% *C. xanthorrhiza*. Proximate analysis of basal diet were conducted according to AOAC (1984).

Data collection

Feed intake and body weight were recorded on a weekly basis, whereas mortality was recorded daily throughout the experimental period. From above data, body weight gain, feed conversion and livability were calculated.

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Statistical analysis

All data were analyzed using the GLM proedure of SAS sofware (SAS, 2001) for analysis of variance. Significant treatment means were separate by Duncan's multiple range test (1955).

RESULTS AND DISCUSSION

The effects of supplementation *C.longa* or *C.xanthorrhiza* on broiler performance, are presented in Table 2. In starter period (0-3 weeks of age), birds fed 0.4% and 0.6% *C.xanthorrhiza* (T4, T5) significantly ($p<0.05$) consumed more feed as compared to other treatment diets. These results indicated that *C.xanthorrhiza* stimulated feed intake of broiler in early period. Body weight gain and feed conversion of birds fed supplemented with *C.longa* or *C.xanthorrhiza* significantly ($p<0.05$) incresed as compared to control diets group. In finisher period (4-6 weeks of age), there were no significant effects on feed intake among the treatment diets. However, body weight gain of birds fed 0.2% and 0.4% *C.xanthorrhiza* signifiantly ($p<0.05$) increased as compared to other treatment diets. The same pattern also seen in feed conversion ratio. The lowest feed conversion was in birds fed 0.2% *C.xanthorrhiza* (T3). In overall data (0-6 weeks of age), there were no significant effects on feed intake and feed conversion due to suplementation *C.longa* and *C.xanthorrhiza* . However, body weight gain of birds fed both herbs significantly ($p<0.05$) increased as compared to control diet group. Our results were in aggrement with Al-Sultan (2003) and Samarasinghe *et.al.*, (2003) who reported supplementation turmeric significantly increased body weight gain and improved feed conversion. The increased body weight gain due to bioactive compound from *C.longa* and *C.xanthorrhiza*. As reported by Chattopadhyay et. Al., (2004) curcumin has beneficial effect on the stomact. It increased mucin secretion thus act as gastroprotectant agains irritants. Curcumin also enhances intestinal lipase, sucrase and maltase activity. Curcumin also increased the activity of pancreatic lipase, amylase, trypsin and chymotrypsin. Increasing enzyme production due to curcumin may increased feed digestion and nutrient utilization. Moreover, curumin also has antioxidant and antimicrobial activity, these effects will improved gastro intestinal condition. Samarasinghe *et.al.*, (2003) reported that addition turmeric significantly improve the energy metabolizability and net protein utilization. All of action from curcumin will improved body weight gain and feed conversion of broiler. Mortality data from our experiment showed that birds fed supplemented with *C.longa* or *C.xanthorrhiza* had lower mortality as compared to control. The lowest mortality was in birds fed 0.2% *C.xanthorrhiza*. These results clearly indicated that both herbs has antimirobial activity so the birds healthier than control group. Mehala and Moorthy (2008) reported that feeding turmeric significantly increased titre value of haemagglutination inhibition against Newcasle disease. In conclusion, supplementation *C.longa* or *C.xanthorrhiza* in broiler diet improved body weight gain. Supplementation 0.2% *C.xanthorriza* was the best to improved performance of broiler.

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Table 1. Composition of basal diet (%)

Ingredient	Starter (0-3 weeks)	Finisher (3-6 weeks)
Corn	50.00	50.00
Rice bran	2.50	14.00
Soybean meal	29.11	21.40
Fish meal	10.00	8.00
Vegetable oil	5.47	5.30
$CaC0_3$	0.89	1.20
Vitamin-mineral premix	0.25	1.10
Nutrient analysis :		
Gross Energy (kkal/kg)	3909.00	4011.00
Dry Matter (%)	87.39	86.26
Crude Protein (%)	22.53	19.21
Ether extract (%)	11.44	7.63
Crude Fiber (%)	5.42	5.01
Ash (%)	5.58	5.91
Ca (%)	1.22	1.49
P (%)	0.85	0.91

Table 2. Effect of supplementation *Curcuma longa* or *Curcuma xanthorrhiza* on broiler performance (6 weeks of age)

Parameters	T1	T2	T3	T4	T5	SEM
Starter (0-3 week)						
Feed intake (g)	517.0[a]	612.5[a]	626.3[a]	684.1[b]	675.8[b]	46.8
BWG (g)	224.1	268.5	268.5	278.5	290.5	38.0
Feed conversion	2.53[c]	2.20[a]	2.31[a]	2.35[b]	2.33[b]	0.09
Finisher (4-5 week)						
Feed intake (g)	1536.6	1606.2	1627.1	1630.0	1704.5	119.1
BWG (g)	687.4[a]	663.7[a]	750.8[b]	725.8[b]	674.6[a]	43.3
Feed conversion	2.28[a]	2.41[c]	2.19[b]	2.26[b]	2.51[d]	0.05
Overall (0-6 week)						
Feed intake (g)	2107.6	2218.7	2253.4	2314.2	2380.4	138.0
BWG (g)	911.2[a]	942.2[b]	1018.9[d]	1004.3[d]	965.2[c]	66.1
Feed conversion	2.25	2.33	2.18	2.28	2.40	0.17
Mortality (%)	4.0	2.0	1.5	2.5	3.0	-

*T1 = control (basal diet), T2 = basal diet + 0.6% *Curcuma longa*, T3, T4, T5 = basal diet + 0.2%, 0.4%. 0.6% *Curcuma zanthorriza*

[a-d] Means in the same row with different superscript are significantly different ($p<0.05$)