Proceeding

The 2nd International Seminar

Feed Safety for Healthy Food

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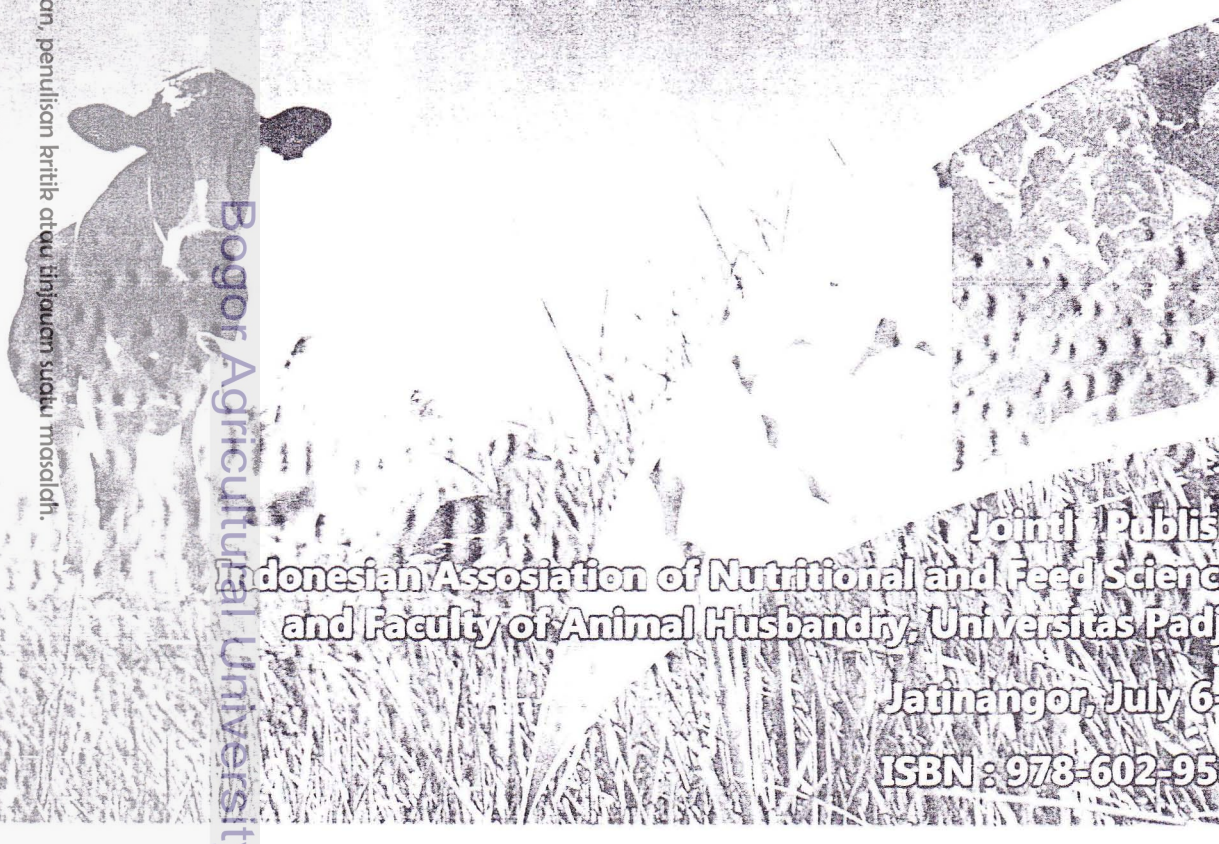

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"Feed Safety for Healty Food"

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"Feed Safety for Healty Food"

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The 2nd International Seminar
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Keynote Speaker :

Director General of Animal Husbandry and Animal Health

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Prof. Fr. Jurgen Zentek (Berlin, German)

Prof. Abdul Razak Alimon (Malaysia)

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Prof. Dr. Ali Agus

Dr. Ir. Kurnia A. Kamil, M. Agr.Sc., M. Phil.

Prof. Dr. Abdur Razak Alimon

Prof. E. R. Ørskov, Ph D., FPAS, FRSE.

Prof. Fr. Jurgen Zentek

Dr. U. Hidayat Tanuwiria, M.Si.

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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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SUPLEMENTATION *CURCUMA LONGA* OR *CURCUMA XANTHORRHIZA* ON CARCASS TRAIT AND CHOLESTEROL CONTENT OF BROILER

R. Mutia and Sumiati

Department of Animal Nutrition and Feed Technology, Faculty of Animal Science, Bogor Agricultural University, Jl.Rasamala, Darmaga Bogor, Indonesia
E-mail : rmutia.1@gmail.com

ABSTRACT

This experiment was conducted to study the effect of supplementation *Curcuma longa* or *Curcuma xanthorriza* powder on carcass trait and cholesterol content of broiler. 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. At the end of feeding trial, 8 birds each treatment were sacrificed to measure the parameters. There were no significant difference in carcass lipid, carcass yield, breast, thight, wing and back percentage of broiler among the treatment groups. However birds were fed 0.6% *Curcuma longa* (T2) or 0.4% and 0.6% *Curcuma Xanthorrhiza* (T4,T5) significantly decreased abdominal fat and cholesterol content of thight muscle as compared to other tratments. In conclusion, *Curcuma longa* or *Curcuma xanthorrhiza* at level 0.6% is effective to decreased carcass cholesterol and abdominal fat.

Key words : *Curcuma longa*, *Curcuma xanthorrhiza*, carcass, cholesterol, broiler

INTRODUCTION

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 compound from turmeric is curcumin. Turmeric contains three different analogues of curcumin e.i.,

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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 recently (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). Base on their bioactive substance, we conducted this experiment to compare the effectivity of *C. longa* and *C. xanthorrhiza* on carcass trait, abdominal fat, carcass lipid and cholesterol of broiler.

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 were 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*.

Chemical analysis

Proximate analysis of basal diet were conducted according to AOAC (1984). Carcass lipid from thigh musle were determined by the method of AOAC (1984). Carcass cholesterol from thigh muscle were determined according to Liebermen Burchard method (Kleiner and Dotti, 1962).

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Data collection

At 6 week of age, eight bird each treatment randomly selected and sacrificed for measure carcass trait, abdominal fat, carcass lipid and cholesterol. Carcass yield, breast, wing, thigh, and back were calculated as percentage from live weight.

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 carcass trait, abdominal fat, carcass lipid and cholesterol of broiler are presented in Table 2. There were no significant effect on carcass yield, carcass lipid, breast, thigh, wing and back percentage of broiler due to supplementation *C.longa* or *C.xanthorrhiza*. However birds fed 0.6% *C.longa* (T2) or 0.4% and 0.6% *C.xanthorrhiza* (T4, T5) significantly ($p<0.01$) decreased abdominal fat and carcass cholesterol as compared to control or other treatment diets. These results clearly indicated that bioactive compound (mainly curcumin and xanthorrizol) from *C.longa* and *C.xanthorrhiza* had hypolipid and hypocholesteremic effect on broler. These results in aggrement with Samarasinghe *et.al.*, (2003) and Emadi *et.al.*, (2006) who reported supplementation turmeric significantly reduce abdominal fat. Decreasing of abdominal fat and carcass cholesterol due to physiological effect of curcumin. As reported by Chattopadhyay *et.al.*, (2004), curcumin increased the activity of pacreatic lipase and bile production that stimulate lipid metabolism. Emadi *et.al.*, (2007) reported that feeding turmeric at level 0.25-0.75% in the diet significantly increased blood total cholesterol, HDL-cholesterol and decreased LDL and VLDL cholesterol of broiler at 6 weeks of age. As reviewed by Chattopadhyay *et.al.*, (2004), curcumin reduces LDL and VLDL lipoprotein significantly in plasma and total cholesterol level in liver. They also reported that there were interaction between curcumin and α-tocopherol that increased the bioavailability of vitamin E and cholesterol levels. In contrary with our results, Mehala and Moorthy (2008) reported that feeding 0.1 -0.2% turmeric in broiler diet had no significant effect on abdominal fat and thigh muscle cholesterol. The differences might be due to different *C.longa* that we used, so the concentration of bioactive compound will be different too. If we compared the effectivity of both herbs, our results showed that *C.xanthorrhiza* had better in hypolipid and hypocholestoremic activity than *C.longa*. In conclusion, *C.longa* at level 0.6% or *C.xanthorrhiza* at level 0.4-0.6% in the diet were effective to reduce abdominal fat and carcass cholesterol 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. Effects supplementation *C. longa* or *C. xanthorrhiza* on carcass trait, abdominal fat, carcass lipid and cholesterol of broiler (6 weeks of age)

Parameters	T1	T2	T3	T4	T5
Carcass yield (%)	53.90 ±1.27	54.39 ± 2.41	51.34 ± 2.03	53.79 ± 2.62	52.86 ± 2.35
Breast (%)	25.23 ± 1.87	25.06 ± 2.56	24.86 ± 0.71	26.54 ± 1.42	24.69 ± 0.67
Wing (%)	5.00 ± 0.45	5.66 ± 0.78	5.38 ± 0.48	5.17 ± 0.65	5.62 ± 0.41
Thigh (%)	14.54 ± 2.06	14.84 ± 1.38	15.68 ± 1.25	16.22 ± 0.44	15.48 ± 1.41
Back (%)	22.35 ± 1.17	23.14 ± 2.12	22.68 ± 2.58	21.63 ± 0.82	21.64 ± 2.02
Abdominal fat (%)	1.25^{B} ± 0.25	0.68^{A} ± 0.30	1.05^{B} ± 0.22	0.77^{A} ± 0.20	0.81^{A} ± 0.25
Carcass lipid (%)	7.77 ± 2.37	7.55 ± 2.08	8.28 ± 2.90	6.14 ±1.25	7.97 ± 3.36
Carcass cholesterol (mg%)	1.12^{A} ± 0.09	0.90^{B} ± 0.02	1.10^{A} ± 0.14	0.99^{B} ± 0.04	0.89^{B} ± 0.03

*T1 = control , T2 = basal diet + 0.6% *Curcuma longa*, T3 = basal diet + 0.2 % *C. xanthorrhiza*
T4 = basal diet + 0.4% *C. xanthorrhiza* , T5 = basal diet + 0.6% *C. xanthorrhiza*
^{A,B} Means in the same row with different superscript are significantly different ($p<0.01$)