EFFICIENCY AND DOSAGE OF PHYTOGENIC ANTIMICROBIAL ON BROILER PERFORMANCE

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INTRODUCTION

The use of antibiotic growth promoters (AGP) to improve animal performance and health has been practiced during the last 50 years. Nevertheless, a full ban on the feed use of AGP came into effect in the European Union in 2006, based on the potential for a reservoir in food animals of an antibiotic resistant bacteria population that could be transferred to humans. There are several kinds of antibiotics alternative developed and used currently, among which readily memorable natural substances for customers and medicinal plants with excellent physiologically activity are getting attention by researchers (Hernandez et al., 2004). In Viet Nam, plants having antimicrobial actions have been used in curing for humans but for animal are not so many. For this reason, the research and using the phytogenic antimicobial as an alternative AGP on animal feed is necessary.

The objective of this work was to evaluate, as potential alternative to AGP, the effect of two compounds *Andrographis paniculata*, *Tinospora crispa* Miers and Zingiber officinale Rose (CP1), and *Pouzolzia zeylanica* Benn, *Tinospora crispa* Miers and Zingiber officinale Rose (CP2) alone and in combination in broiler performance.

MATERIALS AND METHODS

The experiment was conducted on 1500 mixed sex broiler chicks Cobb-308 from the age 14 days to 49 days and was divided three trials. 500 chicks each trial was allocated into 5 treatments with 20 replicates, 5 birds per a replicate. Three trials in completely randomized design were conducted to determine the effects of 2 feeding powder compounds CP1, and CP2 alone and in combination in the diet on the broiler performance. The first one included I: control, feeding conventional completed diet without additive supplementation; II, III, IV: feeding with leave and stem powder of CP1 at three levels (0,71%, 1,10% and 1,42%) in their diet and V: feeding with 0,14% Berberin in their diet. The second trial: three levels (0,34%, 0,50% and 0,67%) of leave and stem powder of CP2 were used instead of the leave and stem powder CP1. The third trial included I: control, II, III: feeding with excellent level of CP1 and CP2 in first and second trail, IV: combination of excellent level of CP1 and CP2 and V: feeding with 0,14% Berberin. The experimental diet was formulated according to the standards prescribed in NRC, 1994 and were divided into two phases; grower (14-28 days of age) and finisher (29-49 days of age). Compound CP1 and CP2 were a mixture of plant powder provided by pharmaceutics branch of Medical and Pharmacy University. Feed and water were provided ad libitum.

Body weight (BW) of each broiler was measured on 14d, 35d and 49d. Feed intake was measured per pen throughout the experiment and the feed consumption was calculated from 14 to 35d, 35 to 49d

and 14 to 49d on a pen weight basis. Mortality and BW of dead chicks were recorded daily. The weight of dead and eliminated birds was taken into account for the FCR calculation. Production index (PI) was calculated at the end of experiment.

The data obtained from this study were analyzed statistically by one-way ANOVA with MINITAB 15.0 software.

RESULTS

Table 1. Effect of CP1 on broiler performance

	Diets				
	Control	0,71% CP1	1,10% CP1	1,42% CP1	0,14% Berberin
Body weight (g)					
Day 14	339	339	339	339	339
Day 35	1,603[b]	1,706[a]	1,724[a]	1,724[a]	1,733[a]
Day 49	2,142[b]	2,356[a]	2,367[a]	2,366[a]	2,372[a]
Feed consumption (kg feed/kg BW)					
14-35day	2.66[a]	2.45[b]	2.36[b]	2.32[b]	2.32[b]
35-49day	1.77	1.75	1.83	1.77	1.85
14-49day	2.26	2.22	2.17	2.18	2.16
Survival rate (%)	99	98	98	98	97
Production Index (PI)	268.1	297.1	305.4	303.9	304.3

[a,b]: Mean values on a same row with different superscripts differ significantly (p<0.05)

The overall body weight of broiler at 35d and 49d was higher (p<0,05) in birds fed three levels of CP1 and Berberin diets when compared with birds fed control diets (Table 1). During 14-35days, FCR was improved by phytobiotic supplementation compared to control. However, FCR did not differ (p>0,05) among the dietary treatments during 35-49days and 14-49days period. Survival rate was high 97-99% and the birds fed 1,10% of CP1 has PI higher than others. Conclusion, supplementation of 1,10% of CP1 to broiler diet has improved 10,5% body weight gain, 3,4% FCR and 13,9% economical effect in comparison to control group. This was also similar to the findings of Mathivanan et al (2006) who report that supplementation *Andrographis paniculata* powder in broiler feed in India was significantly improved 0,2% in FCR compared to control.

Table 2. Effect of CP2 on broiler performance

	Diets				
	Control	0,34% CP2	0,50% CP2	0,67% CP2	0,14% Berberin
Body weight (g)					
Day 14	339	339	339	339	339
Day 35	1,603[b]	1,655[b]	1,721[a]	1,722[a]	1,733[a]
Day 49	2,142[b]	2,293[ab]	2,363[a]	2,361[a]	2,372[a]
Feed consumption (kg feed/kg BW)					
14-35day	2.66[a]	2.548[ab]	2.422[b]	2.386[b]	2.32[b]
35-49day	1.77	1.870	1.789	1.867	1.85
14-49day	2.26	2.32	2.21	2.20	2.16
Survival rate (%)	99	98	99	98	97
Production Index (PI)	268.1	276.4	302.4	300.5	304.3

[a,b]*: Mean values on a same row with different superscripts differ significantly (p<0.05)*

The result of table 2 show that, Body weight of birds at 35days and 49days fed the diet containing 0,50% and 0,67% of CP2 was significantly higher (P<0,05) than those of the control treatment. FCR of 14-35 days period was significantly improved (P<0,05) when the birds fed CP2 at 0,50% and 0,67% compared with control treatment and there were no significant difference among treatment groups during 35-49 days. However, whole 14-49 days period, FCR of birds fed three levels of CP2 has no significant difference compared with control diet. Production Index of birds fed 0,50% was highest. Consequently, supplementation of 0,50% of CP2 to broiler diet has improved 10,3% in body weight gain, 2,2% in FCR and 12,8% in economical effect in comparison to control group.

Table 3. Effect of the combination of CP1 and CP2 on broiler performance

	Diets				
	Control	1,10% CP1	0,50% CP2	1,1% CP1+ 0,50% CP2	0,14% Berberin
Body weight (g)					
Day 14	339	339	339	339	339
Day 35	1,603[b]	1,724[a]	1,721[a]	1,737[a]	1,733[a]
Day 49	2,142[b]	2,367[a]	2,363[a]	2,377[a]	2,372[a]
Feed consumption (kg feed/kg BW)					
14-35day	2.66[a]	2.36[b]	2.42[b]	2.38[b]	2.32[b]
35-49day	1.77	1.83	1.78	1.90	1.85
14-49day	2.26	2.17	2.21	2.21	2.16
Survival rate (%)	99	98	99	99	97
Production Index (PI)	268.1	305.4	302.4	304.2	304.3

[a,b]: Mean values on a same row with different superscripts differ significantly (p<0.05)

Body weight of birds at 35days and 49days fed the diet containing phytogenic compound was significantly higher (P<0,05) than those of the control treatment. The feed conversion ratio of 1,10% CP1 + 0,50% CP2 fed group was improved by more than 2,2% compared to control which was in agreement with the findings of Onimisi et al (2005) who stated that feed conversion ratio was improved when broiler were with graded level of ginger waste meal from 10 to 40%. Body weight gain improved 11,0% and economical effect was higher 13,5% for the experimental period compared to control. This was also similar with Moorthy et al (2009) who observed that Ginger, Peper and Curry Leaf powder significantly increased in BW and reduced in FCR of broiler in India.

CONCLUSIONS

The results of these trials showed optimal growth performance and feed efficiency obtained when supplementation of 1,10% powder compound of *Andrographis paniculata*, *Tinospora crispa* Miers and Zingiber officinale Rose (CP1) and 0,50% *Pouzolzia zeylanica* Benn, *Tinospora crispa* Miers and Zingiber officinale Rose (CP2) alone and in combination in broiler performance.

Based on these results, CP1 and CP2 could be considered as potential alternatives to antibiotic growth promoter in broiler up to 49days.

Table 1. Ingredients composition of basal diets

Ingredients	**Diet for 1-14 days**	**Diet for 15-28 days**	**Diet for 29-42 days**
Corn	529,5	557,5	556
Ricebran	50	80	94
Soybean meal (48)	346	286	271
Soybean oil	35,3	37,3	44
L-Lysine	*1,3*	*1,8*	*0,96*
L-Threonine	*0,79*	*1*	*0,64*
Calcium carbonate	*9,9*	*10*	*10*
Dicalciumphosphate	*18,3*	*16,5*	*14,1*
Choline chloride 60	1	1	1
Salt (NaCl)	3,3	3,6	3,6
Sodiumbicarbonate	1,9	1,9	1,9
Coccidiostat	0,5	0,5	0,5
Vit-Min-Enz Premix	2,5	2,5	2,5
Methionone	*1,5*	*1,5*	*1,5*
Total	**1000**	**1000**	**1000**
Nutrient			
Dry Matter (%)	85,26	84,88	84,16
Energy, kcal ME/kg	*3047*	3100	3150
Ether extract (%)	6,6	7,2	8
Fibre (%)	3,1	3,3	3,4
Crude protein (%)	21,4	*19,2*	18,5
Dig Lysine (%)	1,15	1,05	0,95
Dig Methionine (%)	0,41	0,39	0,38
Dig Met+Cys (%)	0,56	0,52	0,51
Dig Threonine (%)	0,75	0,7	0,64
Calcium (%)	0,9	0,85	0,8
Avl. Phosphorous (%)	0,45	4,1	0,37
Salt (%)	0,31	0,34	0,34