Effect of Thai Herb (Asiatic pennywort) in Broiler Ration on Productive Performance and Carcass Quality

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Abstract : The objective of this study was to investigate the productive performance and carcass quality of broilers fed with multi-levels of Thai herb (dried Asiatic pennywort; 0, 2, 4, 6 and 8% of basal feed). Asiatic pennyworh was found to increase immune level in blood plasma so that the feed was mixed without antibiotic supplementation. One-day 680 chicks were divided into 5 groups with 4 replications (34 chicks per rep.) assigning in a Completely Randomized Design (CRD). The feeding practice was *ad libitum* on a period according to the NRC (1995) at 21 and 19% protein; metabolism energy at 3,150 Kcal/Kg. Drinking water was provided at all time. Animals were fed 40 days and 40 broilers per group were slaughtered to study the carcass quality.

The results indicated that 2% dried Asiatic pennywort group had a better productive performance ($p<0.01$) in terms of average daily gain (29.67, 31.37, 29.28, 26.30 and 22.95; respectively) and feed conversion ratio (2.90, 2.63, 2.60, 3.36 and 2.77; respectively) compared to those with other levels of dried Asiatic pennywort. But the mortality rate was not significantly different in all groups. Carcass quality in terms of slaughtered weight of 2% dried Asiatic pennywort was highly significant than those in other levels (1.27, 1.30, 1.19, 1.22 and 1.09 kg; respectively), dressing percentage of the control group was better than those of other groups (72.5, 69.8, 69.7, 68.0 and 65.3%; $p<0.05$; respectively). The external and internal organ percentage of all groups was found to be similar. The percentage of retail cuts of broilers in terms of *Pectoralis major, Pectoralis minor* and wing of broiler fed 2% dried Asiatic pennywort was higher than those of the others significantly different.

Key words : Asiatic pennywort, broiler, performance, carcass

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Introduction

Poultry meat is the most important export in Thailand. It can make about $ 600 million earning per year (Public Veterinary Section, 2000). Poultry meat is also flavorable to consumer because of reasonable price (Jaturasitha, 1991). For intensive production, producer tries to increase the growth rate of poultry by mixing antibiotic in feed. By this way, it was prohibited by EU. This problem should be solved by using herb in feed as an alternative. Some Thai herbs have demonstrate the ability to inhibit and/or destroy microorganism and when used are harmless to human and animal. In Thailand, the potential of herb is tremendous and one of them, *Cantella asiatica* (L.) Urban. (Umbelliferae), is quite interesting. The chemical component is triterpene saponin that consists of asiaticocide A and B. This consists of active substance such as 6ß-Hydroxy asiatic acid and terminolic acid (Pramongkit, 1995). There were many researches in human but non in use as animal feed (Kim *et al*., 1997; Kosalwatna *et al*., 1988; Sappakun and Ungwitayatorm, 1982). In human researches, it can be confirmed that Cantella asiatica can heal wound and inhibit bacteria and microorganism. The aim of this experiment is to study the effect of dried Asiatic pennywort in broiler ration on performance and carcass quality.

Materials and Methods

Asiatic pennywort was dried in oven at 45 ºC for 48 hr. Dried Asiatic pennywort was ground and analyze about the chemical composition according to AOAC (1995) (Table 1). Feed (Table 2) was divided into 5 groups according to the mixing of dried Asiatic pennywort in feed (0, 2, 4, 6 and 8%; respectively). One-day 680 chicks were divided into 5 groups with 4 replications (34 chicks per rep.) assigning in a Completely Randomized Design (CRD). The feeding regimes were *ad libitum* on a period according to the NRC (1995) at 21 and 19% protein; metabolizable energy at 3,150 Kcal/Kg. Drinking water was provided at all time. Body weight and feed intake were recorded every week. Animal were fed 40 days and 40 broilers per group were slaughtered to study for the carcass quality according to Jaturasitha (1991). Data were subjected to the analysis of variance and the comparison among means was carried out by Duncan's New Multiple Range Test with SAS Version 6.12 for Window (SAS, 1996).

Results and discussion

Performance

The average temperature during experiment was 23 ºC (Max 33, min 15 °C). The performance trait was shown in table 3.

The performance traits in terms of feed intake (FI) and feed conversion ratio (FCR) of broilers fed 6 % of dried Asiatic pennywort was highly significantly different ($p<0.01$) than other groups and 8 % of dried Asiatic pennywort was inferior compared to other groups because dried Asiatic pennywort has 18.4% fiber that will limit of feed intake (Pongpiachan, 1996). The results were supported by the findings of Kumpraeu *et al* (1994) in *Andrographis paniculata*. The average daily gain (ADG) was also highly significant different ($p<0.01$). The 2 % of dried Asiatic pennywort was the highest and 8% was the lowest. The mortality rate of all groups was similar,

and probably due to the similarity of chicks' health and the controlled condition of housing and feed management.

Carcass trait

The results of carcass quality study were shown in Table 4. The live weight of broiler fed 2 % of dried Asiatic pennywort was higher than those in 4, 6 and 8% dried Asiatic pennywort groups ($p<0.01$) but the dressing percentage of the control was highly significantly different from those of other groups.
The external and internal organs were quite similar in terms of head, neck gizzard and spleen percentages. For retail cuts, the *P. major* percentage of groups using dried Asiatic pennywort was higher than the control ($p<0.05$). *P. minor* percentage of 4% dried Asiatic pennywort was the lowest ($p<0.05$) which the wing percentage of the control was the lowest ($p<0.05$). There was no significant difference in the thigh and drumstick percentage.

Conclusion

The 2 % dried Asiatic pennywort in broiler ration gave the flavourable result in terms of performance and carcass traits.

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Table 1: Chemical analysis of dried ground Asiatic pennywort.

Composition (Dry Matter Basis)	Dried Ground Asiatic pennywort
Dry Matter (%)	94.65
Crude Protein (%)	9.56
Fat (%)	2.30
Fiber (%)	18.36
Ash (%)	15.45
Gross energy (Kcal/Kg)	3,899

Table 2: Ingredient and chemical composition of experimental diets both periods

Feed Ingredients	First period					Second period				
	T1	T2	T3	T4	T5	T1	T2	T3	T4	T5
Corn	46.99	45.02	42.16	39.26	36.39	55.78	52.9	50.03	47.18	44.31
Rice Bran	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Soybean Meal	28.47	28.35	28.37	28.44	28.46	22.88	22.92	22.96	22.99	23.05
Fish Meal	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Limestone	0.95	0.55	0.55	0.54	0.51	0.60	0.62	0.58	0.54	0.52
Dical	0.86	0.89	0.89	0.91	0.95	0.55	.054	0.58	0.62	0.64
Salt	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
L-Lysine	0.05	0.05	0.06	0.06	0.07	0.00	0.00	0.00	0.00	0.00
DL-Methionine	0.25	0.26	0.27	0.27	0.28	0.08	0.09	0.10	0.11	0.11
Rice Bran Oil	5.93	6.38	7.20	8.02	8.84	3.61	4.43	5.25	6.06	6.87
Premix	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Total	100.0	100.00	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Chemical composition, %										
Protein	21.25	20.73	20.52	20.10	21.19	19.60	18.28	18.98	18.63	18.20
Fat	8.63	8.72	11.12	13.24	13.63	9.44	11.75	9.78	10.36	12.42
Moisture	8.12	8.18	8.51	7.61	7.54	8.57	9.55	9.71	9.00	8.81
Ash	7.83	6.33	7.17	8.05	7.02	5.53	5.48	7.04	6.03	6.70

Note: T1 = Basal feed
T2 = 2% of Asiatic pennywort in basal
T3 = 4% of Asiatic pennywort in basal
T4 = 6% of Asiatic pennywort in basal
T5 = 8% of Asiatic pennywort in basal

Table 3: Productive performance of broiler fed with different levels of Asiatic pennywort

Productive Performance	Diet Formulas				
	T1	T2	T3	T4	T5
Feed intake / head / day (g)					
0-7 Day *	15.09^{ab}	16.01^{a}	15.97^{a}	14.23^{b}	14.97^{ab}
8-14 Day	35.49	33.64	33.68	33.48	33.91
15-21 Day	69.59	72.74	61.03	65.69	63.92
22-28 Day	100.72	100.93	89.6	104.07	90.24
29-35 Day	112.92	110.89	113.85	124.28	112.05
36-40 Day**	138.16^{a}	135.25^{a}	97.21^{b}	103.64^{b}	93.19^{b}
Average feed intake (g)**	83.55^{ab}	81.88^{b}	75.24^{c}	85.15^{a}	61.17^{d}
Daily gain (g)					
0-7 Day *	6.83^{ab}	6.91^{a}	6.28^{abc}	5.51^{c}	5.80^{bc}
8-14 Day	17.60	19.10	17.89	17.8	17.14
15-21 Day**	37.80^{b}	43.45^{a}	35.23^{b}	34.27^{b}	27.42^{c}
22-28 Day**	50.95^{a}	45.70^{ab}	41.64^{b}	39.09^{bc}	34.27^{c}
29-35 Day*	46.92^{ab}	60.37^{a}	48.19^{ab}	48.25^{ab}	39.35^{b}
36-40 Day	32.29^{b}	33.74^{ab}	36.06^{ab}	35.02^{ab}	40.73^{a}
Average daily gain (g)**	29.67^{ab}	31.37^{a}	29.28^{ab}	26.30^{bc}	22.95^{c}
Feed conversion ratio (FCR)					
0-7 Day**	2.14^{b}	2.28^{b}	2.57^{a}	2.64^{a}	2.65^{a}
8-14 Day	2.10	1.84	1.98	1.95	1.95
15-21 Day**	2.12^{bc}	1.66^{d}	2.06^{c}	2.25^{ab}	2.39^{a}
22-28 Day*	2.08^{b}	2.42^{ab}	2.23^{b}	2.74^{a}	2.75^{a}
29-35 Day**	2.40^{a}	1.79^{b}	2.37^{a}	2.45^{a}	2.23^{a}
36-40 Day	4.18^{a}	3.56^{ab}	3.11^{b}	3.50^{b}	3.15^{b}
Average feed conversion ratio**	2.90^{b}	2.63^{b}	2.60^{b}	3.36^{a}	2.77^{b}
Mortality rate					
0-7 Day	1.00	0.00	2.00	1.00	0.00
8-14 Day	1.00	1.50	0.00	1.00	1.00
15-21 Day	0.00	1.00	0.00	1.50	1.00
22-28 Day	0.00	0.00	0.00	0.00	0.00
29-36 Day	0.00	0.00	0.00	1.00	0.00
36-40 Day	0.00	1.00	1.00	1.00	0.00
Total Mortality rate, %	1.00	2.00	1.67	2.00	1.00

*Different superscripts indicate means with in the rows that are significantly different ($p<0.05$) but ** are highly significantly different ($p<0.01$)

Note: T1 = Basal feed
T2 = 2% of Asiatic pennywort in basal
T3 = 4% of Asiatic pennywort in basal
T4 = 6% of Asiatic pennywort in basal
T5 = 8% of Asiatic pennywort in basal

Table 4: The carcass quality of broiler fed with different levels of Asiatic pennywort and commercial diet

Trait	T1	T2	T3	T4	T5
Live weight, g**	1271.50^{ab}	1306.50^{a}	1188.00^{c}	1222.25^{bc}	1094.50^{d}
Dressing percentage**,** %**	64.36^{a}	61.00^{bc}	61.72^{b}	60.20^{c}	57.12^{d}
External organ					
Head, %	3.16	2.89	3.20	3.00	2.99
Neck, %	5.00	4.62	4.76	4.85	4.83
Blood, %	4.18^{b}	5.01^{ab}	5.33^{a}	4.74^{a}	5.48^{ab}
Shank, %**	4.55^{a}	4.21^{b}	4.51^{a}	4.18^{b}	4.24^{b}
Feather, %**	3.66^{d}	6.99^{c}	6.75^{c}	8.96^{b}	10.48^{a}
Internal organ					
Liver, %*	2.35^{a}	2.36^{a}	2.28^{ab}	2.21^{b}	2.19^{b}
Gizzard, %	3.49	3.29	3.39	3.31	3.28
Heart, %*	0.53^{b}	0.54^{b}	0.63^{a}	0.56^{b}	0.57^{ab}
Spleen, %	0.10	0.09	0.10	0.10	0.10
Retail cuts					
Pectoralis major, %*	15.50^{b}	17.12^{a}	16.40^{ab}	16.24^{ab}	16.13^{ab}
Pectoralis minor, %	3.68^{a}	3.64^{ab}	3.42^{b}	3.50^{ab}	3.57^{ab}
Thigh, %	17.07	16.98	17.27	16.62	17.26
Wing, %*	11.16^{c}	11.57^{ab}	11.45^{abc}	11.34^{bc}	11.73^{a}
upper wing,%	5.47	5.76	5.63	5.45	5.75
lower wing,%	5.69^{b}	5.81^{ab}	5.82^{ab}	5.75^{b}	5.99^{a}
Drumstick, %	13.26	13.35	13.89	13.49	13.50

*Different superscripts indicate means with in the rows that are significantly different ($p<0.05$) but ** are highly significantly different ($p<0.01$)

Note: T1 = Basal feed
T2 = 2% of Asiatic pennywort in basal
T3 = 4% of Asiatic pennywort in basal
T4 = 6% of Asiatic pennywort in basal
T5 = 8% of Asiatic pennywort in basal