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The Potency of Chamomile Flowers (*Matericaria chamomilla L.*) as Feed Supplements (Growth Promoters) on Productive Performance and Hematological Parameters Constituents of Broiler

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Abstract: The present study was carried out at the poultry farm, College of Veterinary Medicine-Baghdad University, to investigate the effect of adding dried milled of chamomile flowers to broiler diets on growth performance and some hematological traits. Two hundred fifty Rose broilers(day old chicks) were used in this study. Chicks were weighted and randomly distributed into (5) treatments, with (2) replicates (25 chicks of each). Chicks were fed the following diets. First group fed a basal diet without of any addition kept as a control group, while the (second 2nd, 3rd, 4th and 5th) groups were fed the same diet as in the 1st group plus addition of 0.25, 0.50, 0.75 and 1% of chamomile flowers powder. The experiment was lasted for (6) weeks age. Weight Gain (WG), Feed Intake (FI) and Feed Conversion Ratio (FCR) were measured. At the end of experiment samples were taken for blood parameter and carcasses traits. Results showed that for measurements adding of Chamomile flowers at a level of 0.75 and 1% increased significantly ($p<0.05$) Live Body Weight (LBW), (WG) and (FCR) as compared with the remaining groups, adding of chamomile flowers powder as a feed supplement with (0.75, 1%) levels were significantly ($p<0.05$) decreased (F1) as compared with control group. On the other hands all treatments revealed no significant differences on dressing percentage and giblets weight except liver weight. Adding of chamomile flowers with the above levels significantly ($p<0.05$) decrease in the (RBC, Hb, PCV) count compared with the control group but rather decreased cholesterol and glucose concentration in the blood serum especially at (0.50, 1%) as compared with the remaining groups, also adding chamomile flowers to diet showed significant decrease in H/L ratio, but showed no differences in (WBC) count.

Key words: Chamomile flowers, broiler, performance, hematological parameter

INTRODUCTION

Growth promoters (Antibiotic, probiotics, enzymes …etc) plays an important role in experimental and commercial production of the large and small animals including in birds. Supplementation of several growth promoters from different sources to the poultry diets now a days is common and widely used, in order to improve the utilization of nutrients (Boulos *et al*., 1992). Although, best results were obtained from these supplies, their use might have unfavorable effect (Public health hazards and or environmental pollution). On the other hand it may also cause a residual problems of their products in the tissues of birds and animals. However, recently many countries were banded utilization of antibiotics since of their side effects on both birds and humans.

It is indispensable to minimize these components and deals with replacers without any adverse effect on production, so it is important to use natural growth promoter (Abdel-Malak *et al*., 1995).

Recently, the use of growth promoters from herbal sources (medical plants) are very limited and there is little information about these sources and active substances (Sabra and Mehta, 1990). Applying livol as herbal growth promoter in broiler diets showed a pronounced improvements in their Body Weight Gain (BWG), mortality rate and Feed Conversion Ratio (FCR). Practically, reports showed that supplementing poultry diets with various herbs had an appropriate effects on the performance and health of reared birds (El-Gandi, 1996). Chamomile (*Matricaria chamomilla* L.) is classified under a plant family composites. It contains flavones apigenin and essential volatile oil such as bisabol oxide B, α-bisabolo, chamazulene and bisaboloxide A (Ayad, 1998).

Chamomile flowers inhibit the excessive growth of harmful intestinal Micro organisms, thus counter acting inflammation (Kolacz *et al*., 1997; Abaza *et al*., 2003) it was reported that the addition of chamomile flowers at (0.25%) level to broiler diets improved growth performance and (FCR). Others reported that addition of 0.5% of chamomile flowers to layer diets increased egg number and has significantly ($p<0.05$) decreased (FI), improved (FCR) and decreased total cholesterol, GOT values as compared with control group (Abaza *et al*., 2004).

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The aim of this study is to investigate the effect of adding chamomile flowers (*Matericaria chamomilla* L.) as a herbal natural feed supplements and could be considered as critical from biosecuritical point of view since it improves the productive performance and some blood constituents of broilers. It provides a Biological Nutritional Requirements in boiler diets as much as of this plant. It plays an important role in improving productive, physiological trait performance of broiler.

MATERIALS AND METHODS

An experiment was carried out at the poultry farm of Veterinary College, Baghdad University. The experiment lasted for 42 days from 3 - 1 - 2010 to 14 - 2 - 2010. Two hundred fifty day old chicks (Rose 308) were divided randomly into 5 treatments groups of 50 bird each with 2 replicate. The treatments were allocated to receive the following diet: Diet group (1) were fed normal basal diet free from any additions, basal diet with no adding herbal plants kept as control. Groups (2, 3, 4 and 5) were fed as in (1) with addition of 0.25, 0.50, 0.75 and 1% of Chamomile flowers powder on a basal of 250, 500, 750, 1000 gm/100 kg of feed respectively.

Chicks were reared in 1.5 m x 1.5 m floor pens with a thick wooden shaving litter system of 7 cm. The feeding program were induced a couple of diets (Starter and finisher) periods which lasted for 21 and 42) days respectively.

Diets of each period included the same ingredients and composition all diets throughout the experiments, diets were formulated to meet or exceed chicks requirements according to National Research Council (NRC, 1994) for chicks of this ages. Feed and water was provided *ad-libitum* during the experiment. The composition of the experimental basal diets is shown in Table 1.

Chicks were vaccinated against Newcastle Disease (ND) and Infectious Bronchitis (IB). Body weight was determined through the period of starter and finisher. Feed intake was recorded for the corresponding periods. At the end of the experiment, three chicks from each replicate were randomly selected and weighted to obtain live body weight. Birds were slaughtered using knife for complete bleeding and feathers were plucked. Head, viscera and shanks were removed. Carcass was left for an hour to remove excess water and allowed for over night in a refrigerator at 4±2°C then weighed. Dressing percentage was calculated without edible giblets (Heart, Gizzard, liver) that weighted separately an calculated as percentage of the carcass weight. Blood sample were taken from the brachial vein then using syringe. These samples were used for the determination of various haematological parameters including PCV, WBC and RBC counts, haemoglobin (Hb) concentrations and heterophils/lymphocytes ratio, glucose and cholesterol concentration. Data were analyzed by using the General Linear Model procedure of SAS (1996). Duncan's multiple range test was used to detect the differences ($p<0.05$) among different group means.

Table 1: The composition of the experimental basal diets

Ingredient (%)	Starter 1-21 day	Finisher 22-42 day
Yellow corn	51.00	53.30
Soybean meal (45% protein)	30.00	25.00
Wheat	13.80	15.00
Oil	1.00	2.50
Premix*	2.50	2.50
Salt	0.30	0.30
Methionine	0.10	0.10
Lysine	0.10	0.10
Di-Calcium phosphate	1.20	1.20
Calculated chemical analysis		
ME (kcal/kg)	3000.00	3086.00
Crude protein (%)	21.30	19.50
Calcium (%)	0.69	0.52
Available Phosphore	0.74	0.69
Methionine	0.33	0.31
Lysine	1.19	1.08

*Premix: (2.5%) Provided the following (per kg of complete diets) Vit. A 367500 IU, 133500IU Vit. D3, 1920 mg Vit. E, 83.42 Vit. K3, 50 mg Vit. B1, 150 mg Vit. B2, 500 mg Vit. B3, 177.5 mg Vit. B6, 0.8 mg Vit. B12, 600 mg Vit. PP, 24.5 mg folic acid, 27 mg Biotin, 5767.5 mg choline, 2667 mg Fe, 333.75 mg Cu, 3334.06 mg Mn, 203 mg Co, 2334.38 mg Zn, 100.75 mg Ca, 10 mg Se, 65446.46 mg Ph, 36667.5 mg DL-Methionine, 200.02 mg Ethoxyquin, 50 mg Flavophospholipol, 30 g Fish meal, 1800 g wheat bran

RESULTS AND DISCUSSION

Effect of chamomile on the growth performance traits (body weight gain, feed intake and feed conversion ratio) of broiler chicks is presented in Table 2. Results showed that chicks fed chamomile flowers had significantly ($p<0.05$) higher values (BWG, FI and FCR) for treatments as compared with that of the control group. Moreover, higher levels of chamomile flowers showed better results than lowers. This may be due to active compounds that are present in chamomile flowers. It could be inhibit the excessive growth of a harmful intestinal microorganism, with the result counteracting inflammation Kolacz *et al.* (1997). The chamomile flowers plays a role to enhance the activity of thyroxin hormone that accelerates the nutrients metabolites and biochemical reaction in the body which causes an increase in body weight (Al-Hamo, 2003). The improvement of body weight gain and feed conversion are due to the effect of some active compounds included in chamomile flowers, which had different effects against microorganism antimicrobial, antifungal and antioxidant and anti-inflammatory effects (Santurio *et al.*, 2007).

Table 2: Effect of different levels of Chamomile flowers powder on average body wt (gm), body wt gain (gm), feed consumption (gm/feed), feed conversion ratio ± standard error on broiler

	Items			
Treatment	Average body wt (gm)	Body wt gain (gm)	Feed consumption (gm/bird)	Feed conversion ratio (gm.feed/gm.gain)
(T1) Control	2404±56.9^{c}	2363±2.70^{c}	4324±20.2	1.83±0.02^{A}
(T2) 0.25% Chamomile flower powder	2502±54.6^{b}	2461±2.50^{b}	4324±20.2	1.76±0.03^{B}
(T3) 0.5% Chamomile flower powder	2574±46.4^{b}	2533±2.49^{b}	4349±21.6^{a}	1.72±0.02^{B}
(T4) 0.75% Chamomile flower powder	2660±47.4^{a}	2619±2.66^{a}	4345±21.8^{a}	1.66±0.02^{Bc}
(T5) 1% Chamomile flower powder	2682±53.6^{a}	2641±2.65^{a}	4304±22.6^{a}	1.63±0.01^{C}

Means with different superscripts in the same row differ significantly ($p<0.05$)

Table 3: Effect of different levels of Chamomile flowers powder on weight of the edible giblet and dressing percent ± standard error on broiler

	Organ			
Treatment	Heart (%)	Liver (%)	Gizzard (%)	Dressing percent (%)
(T1) Control	0.6±0.01^{a}	2.5±0.23^{ab}	2.8±0.06^{b}	72.7±1.20^{a}
(T2) 0.25% Chamomile flower powder	0.6±0.05^{a}	2.4±0.50^{b}	2.8±0.23^{b}	73.6±0.80^{a}
(T3) 0.5% Chamomile flower powder	0.5±0.05^{a}	2.9±0.26^{a}	3.4±0.35^{a}	72.2±1.00^{a}
(T4) 0.75% Chamomile flower powder	0.5±0.02^{a}	2.6±0.26^{ab}	3.0±0.20^{b}	73.2±1.20^{a}
(T5) 1% Chamomile flower powder	0.5±0.03^{a}	2.5±0.20^{ab}	3.0±0.30^{b}	71.7±0.60^{a}

Means with different superscripts in the same row differ significantly ($p<0.05$)

Table 4: Effect of different levels of Chamomile flowers powder on hematological parameters ± standard error on broiler

	Age (weeks)						
Treatment	Hb (gm/100 ml)	PCV (%)	RBC (10^{6}/mm^{3})	WBC (10^{3}/mm^{3})	H/L ratio	Glucose (gm/100 ml)	Cholesterol (mg/100 ml)
(T1) Control	8.2±0.1^{a}	26.3±0.4^{b}	3.40±0.04^{a}	14.65±0.38^{a}	0.42±0.06^{a}	150.9±0.31^{a}	144.4±0.82^{a}
(T2) 0.25% Chamomile flower powder	8.1±0.6^{a}	26.0±0.4^{b}	3.36±0.02^{a}	13.50±0.32^{a}	0.30±0.03^{b}	127.8±0.83^{b}	120.4±0.59^{b}
(T3) 0.5% Chamomile flower powder	7.3±0.3^{a}	22.8±0.9^{b}	3.15±0.03^{b}	15.32±0.22^{a}	0.30±0.08^{b}	109.8±0.73^{c}	95.7±1.27^{d}
(T4) 0.75% Chamomile flower powder	7.6±0.2^{ab}	24.2±0.7^{b}	3.00±0.01^{bc}	14.42±0.26^{a}	0.29±0.03^{c}	120.2±0.60^{b}	117.8±0.96^{b}
(T5) 1% Chamomile flower powder	7.4±0.1^{b}	23.2±0.4^{b}	2.86±0.01^{c}	13.25±0.33^{a}	0.28±0.05^{c}	112.3±0.63^{c}	100.2±1.11^{c}

Means with different superscripts in the same row differ significantly ($p<0.05$)

McCrea *et al.* (2005) reported that the active compounds of chamomile flowers (flavonoids, essential oils, chamazulene, α-bisabold oxides) have the same action as that in probiotic in the small intestine through their action as antimicrobial, antifungal and anti-inflammatory, their actions can support the normal microflora in the intestine and increase the validity of nutrients constituents and obtain benefit from it. These results agree with those achieved by Abaza *et al.* (2003) who found that broiler fed diets containing 0.2% of chamomile flowers has recorded a significant ($p<0.05$) improvement in Live Body Weight (LBW) and Body Weight Gain (BWG) and also agreed with those reported by Butris (2007) who found that addition of chamomile flowers powder to the broiler diets at a level of 0.6-0.9% showed highly significant increases in live body weight, body weight gain. Abd El-Latif *et al.* (2004) found that the lowest values of feed intake and the best feed conversion with the addition 0.5% chamomile flowers to the Japanese quail feed diets. Table 3 showed that different levels of chamomile flowers powder effect on dressing percentage and heart, liver and gizzard weights, showed a significant ($p<0.05$) deference among treatments, treatment (3) recorded high result in liver and gizzard as compared with other groups. This result was agree with Debersac *et al.* (2001) who reported that use of essential oil of chamomile flowers extract in a cretin levels enhanced hepatic metabolize with the result increase relative liver weight in rats. These results in contrast with Cabuk *et al.* (2006) who indicated that some intestinal organ weights such as the liver, pancreas, gizzard were not affected by addition of essential oil mixture to the diet.

Table 4 revealed that the effect of different levels of chamomile flowers powder on hematological parameters treatments. The present study showed that groups who fed chamomile flowers had significantly ($p<0.05$) lower cholesterol, glucose, H/L ratio, RBC, PCV, Hb as compared with the control group but had no significant effect in WBC among treatment. These observations are correlated with the data published by some authors (Gross and Siegel, 1983; Avallone *et al.*, 1996) referred that H/L ratio could be regarded as a good indicator to examine the stress level that birds which had suffered it. Any increase in the H/L ratio indicate a sever stress that active compounds in chamomile binding with receptors of adrenal gland in mice may affects the nervous system and decrease

ACTH secretion that causes stress which may led to increase blood glucose concentration, decreases also factor lipid. The reduction in parameters (PCV, Hb, RBC) may be due to the activity of chamomile that may act like estrogen hormone. Sturkie (1979) reported that estrogens decrease erythrocyte counts and PCV and this agree with our results. Thus, chamomile flowers could be considered as a potential growth promoter for poultry due to its digestive stimulating and antimicrobial effects.

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