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THE POTENCY OF FEED SUPPLEMENTED MIXTURE OF HOT RED PEPPER AND BLACK PEPPER ON THE PERFORMANCE AND SOME HEMATOLOGICAL BLOOD TRAITS IN BROILER DIET

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ABSTRACT
This study was conducted to investigate the efficiency of utilization of fed supplemented mixture of Black pepper(BP) *Piper nigrum* and Hot red pepper (Hrp) *Capsicum Annum* to broiler on its productive performance and some hematological traits. A total of 300 (Arbor-Acres) day old unsexed chicks were divided into five groups of 60 birds each and were allocated to five feeding treatments. Group 1 is considered as a control group free from any additions, Group 2, 3, 4 and 5 involved the addition of 0.25, 0.5, 0.75 and 1 % of a mixture of Bp and Hrp respectively. The results showed that group 4 and 5 performed a highly significant ($P \leq 0.05$) average in (live weight gain , feed consumption , feed conversion ratio and dressing percent) there were no significant difference in the edible giblet. At the same time the above mixture of group 4 and 5 depressed the cholesterol, RBC, WBC and H/L ratio concentration. It was concluded that using a mixture as feed additive at levels 0.75 and 1 % enhanced the overall performance of broiler chicks, and improved hematological traits .

KEY WORDS: Black pepper, hot red pepper, Performance, Hematological traits, Broiler, Feed additives.

INTRODUCTION

Herbs, spices have received an increasing attention as possible growth promoters (GP) additives references. There is an evidence suggests that some of these components have different active substances (Al-Kassie and witwit, 2010). In spite of the birds do not sense the effect of hot spice, because of lack the receptors specific to capsaicin binding (Mason and Maruniak, 1983; Geisthovel *et al.,* 1986), or it have receptors that are insensitive to capsaicin (Szolcsangi, 1976), but it increasing the appetite that the addition of hot red pepper (Hrp) and black pepper (BP) to the diet affect on the feed consumption of the broiler (Yoshioka *et al*., 1999). Specific effects of the mixture on chicken performance have not received much attention because poultry may not actually respond to flavor as compared with pigs (Moran, 1982), although there is an evidence (Deyoe *et al*., 1962) that flavors could affects feed intake negligibly in chicken. A recent study involved the birds performance showed that blends of active compounds for both of Hrp and Bp that causes chemopreventive and chemotherapeutic effects. As for Hrp the capsaicin (CAP) is the main active compound responsible that are the pungent effects of various species of hot pepper (Mitsuhiro *et al*., 1994; Jancso *et al*., 1997) and the main component of Hrp including hot taste, CAP has been shown to have a protective function in the gastric mucosa as a stimulant of afferent nerve endings by CAP protect against aspirin or alcohol-induced gastric injury (Gonzalez, *et al*., 1998).

Hrp play an important role in increasing the ability analyzer and deposition of cholesterol and fat in the body and contributes to decrease levels of triglycerides and work to support the vascular system in the body. Hencken, (1991) explained that Hrp is rich in vitamin C which have a considerable impact in improving production through contributes the reduction of heat stress on a fact that birds consumption of Hrp induce a considerable change in energy balance when individuals are given free access of food (Yoshioka *et al*., 2001). All additives improved the apparent feed digestibility of dry matter and crude protein of the finisher diet. No differences were observed for provintriculus, gizzard, liver, pancreas and small intestine weights.

Although it is well known that plant extracts improved the digestibility of the feeds in broilers, Hernandez *et al*., (2004) revealed that the effect of different additives on digestibility had slightly improved performance and the differences were not significants. Capsinoids is a family of compouds that are analogues of caspsaicin, which is the pungent component in hot chilli peppers. Capsinoids are widely present at low levels in chilli pepper fruit, it includes capsiate, dihydrocapsiate and it has a very favorable safety profile (Kobata *et al*., 1999). Hrp is known as the herb crises in order to stimulate the healing effects of the disregarded the body such as kidney, lungs, stomach and heart. The effect of Hrp appetizer on subsequent

energy and micronutrient intakes were examined and it showed that Hrp in addition to appetizer significantly reduced the cumulative *ad lib* energy and carbohydrate intake during the rest of the lunch and in the snaks served several hairs later (Yoshioka *et al*., 1999).

Black pepper (*Piper nigrum*) is a flowering vine in the family *Piperaceae*, genus *Piper* and species *P. nigrum*. It was a common medicinal herb used in human diet. This herb is known spices, which improves digestibility (Moorthy *et al*., 2009).

Black pepper (*P. nigrum linn*) was richest in glutathione peroxidase and glucose-6-phosphate dehydrogenase. It has been shown that piperine can dramatically increase absorption of selenium, vit B, beta carotene and curcumin as well as other nutrients (Khalaf, 2008). Piperine present in black pepper acts as thermogenic compound. Piperine enhances the thermogenesis of lipids and accelerates (Malini *et al*., 1999), energy metabolism in the body and also increases the serotonin and beta-endorphin production in the brain. On the other hand, Bp can be used for stomach disturbances, bronchitis and cancer by impact germs (microbs) and cause the stomach to increase the flow of digestive juice. There is conflicting evidence about its role in cancer (Turner and Jack, 2004). The present study was designed to investigate effect of a mixture of Hrp and Bp as a medical plant herbs used in the diets as a possible feed and feed additive to improve the performance when its added to the the broiler diets at different levels.

MATERIALS AND METHODS

Experiments were carried out at the poultry farm of Veterinary College, Baghdad University. Three hundred, day old broiler (Rose 308) chicks were divided into 5 treatment groups, 60 birds each treatments was further subdivided into 3 replicates, 20 birds each . The treatments were divided as follows: Diet (1) using basal diet free from herbal plants kept as control. Diets (2,3,4 and 5) using basal diet plus(0.25,0.50,0.75 and 1 %)a mixture of Hrp and Bp. (250,500,750 and 1000) gm/100 kg of feed respectively. Chicks were reared in floor pens (1.5m×1.5m) with a thick litter system of wood shavings about 7 cm. The feeding program consisted of starter diet that have been used until 21 days of age and a finisher diet until 42 days of age .All diets of each period were prepared with the same composition .Diets were formulated to meet or excess requirements according to the National Research Council (NRC), (1994) for broilers at this age. The feed and water provided *ad libitum* during the experiment. Two phases of feeding program involved in supplying: starter (1-21 days of age) and finisher (22-42days of age). The chemical composition of the experimental basal diets are shown in table (1)

TABLE 1: Composition of the experimental basal diets

Ingredient (%)	Starter 1-21 day	Finisher 22-42 day
Yellow Corn	51	53.3
Soybean meal (45% protein)	30	25
Wheat	13.8	15
Oil	1	2.5
Premix*	2.5	2.5
Salt	0.3	0.3
Methionine	0.1	0.1
Lysine	0.1	0.1
Di- Calcium phosphate	1.2	1.2
Calculated chemical analysis		
ME(Kcal/kg)	3000	3086
Crude protein %	21.3	19.5
Calcium %	0.69	0.52
Avialable 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) 367500 IU, 133500IU Vit.D3,1920 mg Vit.E,83.42 Vit.K3,50mg Vit.B1,150 Vit B2, 500 mg Vit.B3,177,5 mg Vit.B6,0.8mg Vit B12,600mg Vit.PP,24.5 mg folic acid,27 mg Biotin,5767.5 mg choline,2667mg 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,50mg Flavophospholipol, 30 g fish meal,1800 g wheat bran.

Chicks were vaccinated against the most common diseases such as Newcastle Disease (ND) and Infectious Bronchitis (IB), body weight was determined throughout the feeding periods, feed intake was recorded for the above periods. At the end of the experiment, three chicks from each replicate were randomly selected and weighted to obtain live body weight.(LBW). Chicks were slaughtered using a sharp knife for complete bleeding and feathers were plucked. Head, interal viscera and shanks were removed. Carcass was left for one hour to remove excess water and allowed for over night cooling at 4 ±2 ^{o}C then weighted. Dressing percentage carcasses was calculated free from giblets and the included

organs were weighted separately as percentage of the carcass weight. Blood samples were taken from the brachial vein using a syringe. Samples were used for the measurement of various hematological parameters including PCV, WBC and RBC count, hemoglobin (Hb) concentrations and hetrophile to lymphocytes ratio,(H/L) glucose and cholesterol concentration. Data were analyzed using the General Linear Model Procedure of SAS, (1996). Duncan's multiple range tests was used to detect the differences ($P < 0.05$) among different group means.

RESULTS AND DISCUSSION

Table(2) reveals the effect of adding (Hrp & Bp mixture of) to the Broiler diet on the productive traits (body weight , feed consumption, Feed conversion ratio , edile giblets and dressing percent) among treatments. With regards to (T1) Control. (T5, T4) showed a highly significant ($P \leq 0.05$) increase in body weight and feed consumption traits in comparison with (T2, T3). (T1)control were as appeared lowest value with regards to feed conversion ratio trait, these may be due to digestibility characteristics of BP included in the diet or it might be to the active compound (capisicine) riched in Vit.C that improves feed consumption which is reflected on body weight improvement . Similar results of Ghazalah *et al*(2007)& Tollba *et al* (2007) were indicted that using amoderate level of BP which reflect the high activity of piperazine citrate that affects on the flow of digestive juices across stomach. On the other hand feed conversion ratio showed a lowest value of T4 , T5 as compared with (T2,T3) and(T1)control ,that may explains the growth improvement of these groups as a result of increase in feed intake of chicks fed on above mixture and superiored body weight gain for these groups. These results in comparable with Al-Harthi ,(2006) who found that feeding chicks hot pepper supplemented diet showed an improved feed conversion ratio, its attributed to its stimulant , carminative , digestion and antimicrobial properties. Mean while the above table showed generally a high value of (T4) dressing percent in comparison with the rest treatments .Were as all treatments revealed no significant difference among them in accordance with edible giblets (Heart % , Gizzard %, liver %) traits , these result assures that the mixture supplemented diet had no significance effects on these traits. Table (3) illustrates the effect of different levels of (Hrp &BP mixture) in broiler diet on hematological parameters treatments and cholesterol. Table (20 generally indicated a pronounced dominance of treatments (1)control on the above mentioned hematological traits as compared with the rest experimental treatments which recorded the lowest averaged values mainly (T3,T4, T5) respectively with exptional of (T2) H/L ratio trait that dominated on T1). It seems that Hrp in the mixture had no effect on the above mentioned traits except with (H/L) ratio that (T3,T4,T5) recorded a lowest values respectively and this reflects the role of (Hrp) specially its active compound (capisicine) involved in stress hormones (such as CS, ACTH,E NE ,T4) and that supports the immune system of birds and enhances its resistance against disease through decreasing (H/L) ratio , and that what the above table really showed ,these result is correlated with data published by (Gross & Siegal,1983;Avallore *et al*.,1996)Who referred that (H/L) ratio could be considered as good indicator to examine heat stress level that birds suffer from , on the other hand reduction in (PCV,Hb and RBC) in treatments may be due to the activity of (BP) which may acts as an estrogen hormone ,Sturkie(1976)reported that estrogen decrease RBC formation with the result decrease (PCV, Hb) and this agree with our results .The above table also showed a dominance of(T1,T2,T3) respectively in comparison with (T4,T5) in cholesterol traits , and this gives an indication that mixture supplemented diet had no effect on above trait.

TABLE 2: Effect of mixture on productive traits of broiler in different treatments ± Standard error

	Treatments				
Traits	T1	T2	T3	T4	T5
BWG	2575±41.62^{c}	2635 ±38.16^{b}	2713±39.18^{b}	2781±35.14^{a}	2794±41.32^{a}
FC	4865±6.34^{a}	4777±13.23^{b}	4850±19.32^{a}	4893±20.01^{a}	4932±17.82^{a}
FCR	1.89±0.05^{a}	1.81±0.09^{b}	1.79±0.07^{b}	1.76±0.07^{c}	1.77±0.21^{c}
DP%	72.5±1.43^{b}	73.6±1.67^{b}	74.5±1.82^{a}	75.8±1.28^{a}	74.6±0.96^{a}
Heart %	0.67±0.03^{a}	0.70±0.02^{a}	0.64±0.03^{a}	0.69±0.04^{a}	0.66±0.05^{a}
Gizzard%	3.45±0.21^{a}	3.18±0.18^{a}	2.98±0.28^{a}	3.34±0.19^{a}	2.88±0.23^{a}
Liver%	2.72±0.19^{a}	2.93±0.24^{a}	2.58±0.33^{a}	2.88±0.22^{a}	2.87±0.16^{a}

Means with different superscripts in the same raw differ significantly ($P \leq 0.05$).

BWG= Body weight gain(gm)

FC= Feed consumption(gm)

FCR= Feed Conversion Ratio (g feed/g body wt. gain)

DP= Dressing percent%

TABLE 3: Effect of mixture on hematology parameters ± standard error on broiler

Traits \ Treatments	T1	T2	T3	T4	T5
PCV %	28.2± 0.31 [a]	27.9±0.41 [a]	26.50±0.51 [c]	24.2±0.30 [c]	23.9±0.40 [c]
Hb gm /100 ml	8.7±0.20 [a]	8.6±0.41 [a]	7.9±0.30 [b]	7.4±0.40 [c]	7.4±0.50 [c]
RBC 10^6 /mm^3	3.5±0.02 [a]	3.3±0.03 [a]	3.0±0.02 [b]	2.8±0.02 [c]	2.8±0.03 [c]
WBC 10^3 /mm^3	13.8±0.28 [a]	13.8±0.31 [a]	13.2±0.32 [b]	12.9±0.27 [b]	12.7±0.32 [b]
H/L ratio	0.40±0.04 [a]	0.41±0.03 [a]	0.36±0.05 [b]	0.33±0.03 [b]	0.32±0.03 [b]
Cholesterol mg/100ml	136.5±0.92 [a]	135.2±0.91 [a]	134.3±0.89 [a]	122.2±-0.78 [b]	118.5±0.66 [b]

Means with different superscripts in the same raw differ significantly (P≤0.05).

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