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EFFECT OF USING NIGELLA SEEDS, CHAMOMILE FLOWERS, THYME FLOWERS AND HARMALA SEEDS AS FEED ADDITIVES ON PERFORMANCE OF BROILER

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Abstract

The present study was carried out in Poultry Department, Faculty of Agriculture, Alexandria University to evaluate the effect of adding some dried medicinal plants (M.P) as Nigella seeds (N.S), Chamomile flowers (CH.F), Thyme flowers (TH.F) and Harmala seeds (HS) at levels of 0.25, 0.25, 0.50, 0.25%, respectively, individually or in combination versus using Zinc Bacitraction (Zn B) or virginimicyin (VIR) at levels (20 mg/kg of diet) to broiler chicks diet on growth performance,nutrient digestibility values, blood serum constituents and economical efficiency. Two hundred and forty hubbard broiler chicks at three weeks of age were used in this study. Chicks were weighed and randomly distributed into sixteen treatments, with three replicates (5 chicks of each). The experiment was terminated when birds were 7 weeks old. Weight gain, feed intake, feed conversion and some blood serum constituents were measured. At the end of the experiment, digestibility values and carcass characteristics were measured. Results showed that :

The Using of N.S., TH.F, HS and CH.F at 0.25, 0.5, 0.25, 0.25%, dietary levels, respectively, individually or in combination, improved the performance compared to control and antibiotics (Zn B or VIR) supplemented groups.

The use of 0.25% CH.F plus 0.25% N.S. improved body weight, body weight gain, feed conversion, carcass traits and proved to be more economical than the other treatments or control.

INTRODUCTION

Growth promoters (chemical products, antibiotics, probiotics, enzymes. etc) play an active role in the experimental and commercial production of large and small animals as well as poultry. Supplementation of several growth promoters from different sources to poultry feed is nowadays common and widely used, in order to improve the utilization of nutrients (Boulos *et al.*, 1992). Although, good results were obtained with

these substances, their use might had unfavourable effect (Public health hazards and or environmental pollution). In other side, it may also result in production of residual problems in the tissues of birds and animals. However, recently many countries tended to prevent application of antibiotics because of their side effects on both bird and man kind. It is indispensable to minimize these components, and deal with replacers without any adverse effect on production. So it is important to use natural growth promoter (Abdel-Malak *et al.*, 1995). Recently, growth promoters from herbal sources (medicinal plants) are used very limited, because, there is little information about these sources and their active ingredints. Sabra and Mehta (1990) applying livol, as herbal growth promoter in the diet of broilers observed pronounced improvements in their body weight gain, mortality rate and feed conversion.

The present study was conducted to determine the effect of some dried medical plants as Nigella seeds (N.S.) (*Nigella Sativa* L.), German Chamomile flower heads (CH.F) (*Matricaria Chomomila* L.), Thyme flowers (TH.F) (*Thymus Vulgaris*) and Harmala seeds (H.S.) (*Peganum Harmala*) as feed supplements versus, some antibiotics as Zinc Bacitracin (ZnB) and Virginiamycin (VIR) as growth promoters on the performance of broiler chicks.

MATERIALS AND METHODS

The present study was carried out at the Poultry Research Center, Faculty of Agriculture, Alexandria University. The study involved one experiment designed to study the effect of adding (N.S. CH.F, TH.F, H.S) at levels (0.25,0.25,0.5,0.25%) purchased from Alex. local markets, individually or in combination as shown in Table 2 versus using either ZnB or VIR at level 20 mg/kg of diet for each as a growth promoter in broiler diets. Two hundred and forty hubbard broiler chicks at three weeks of age were wing-banded, weighed and randomly distributed into sixteen treatments with three replicates (5 chicks of each).

The composition of the basal diet used in the pre- experimental period (1-21 days of age) and as a control diet through the experiments (3-7 weeks of age) is shown in Table 1. The basal diet contained 10 kg of sand/ ton (1%) to be replaced with the test materials in the experimental diets shown in Table 2. All chicks had full access to feed and water. The environmental temperature was about 32 ^{o}C during the first week using gas heater, and gradually decreased to about 24$^{\pm}$ 2 ^{o}C at the fourth week of age. Artificial lighting was maintained continuasly during night without interruption. The experiment extended for seven weeks. Live body weight and feed intake were

recorded, while, body whight gain and feed conversion were calculated from 3-7 weeks of age. The proximate analysis of the tested materials are shown in Table 7. The digestibility values of nutrients of the experimental dites were determined at 7 weeks of age using three birds from each treatment. Samples of diets and excreta were analyzed for their content of nitrogen, ash, fiber, fat and nitrogen free extract (calculated by difference) according to A.O.A.C., 1990. Digestibility values of nutrients of the experimental diets were estimated on dry matter by the following formula:

$$\text{Digestibility of nutrient of diet} = \frac{(\text{Dry weight of diet intake}) \times (\% \text{ nutrient in diet}) - (\text{dry weight of feces voided}) \times (\% \text{ nutrient in feces}) \times 100}{\text{Dry weight of diet intake} \times \% \text{ nutreint in diet.}}$$

At the end of the experimental period, three birds from each dietary treatment were randomly chosen, weighed then slaughtered. Carcasses were eviscerated and their liver, heart, pancreas, gizzard, Bursa of Fabricius. and abdominal fat were weighed separately. Intestinal and cecum lengths were also estimated. All slaughter traits studied were proportionated to one kg. live body weight. Blood samples were collected from slaughtered birds in glass tubes and left at room temperature for one hour, then, kept over night in refrigerator at + 8 °C to separate serum. Serum total protein were measured by the Biuret method as described by Armstrong and Carr (1964). Albumin concentration was determined according to Doumas *et al.* (1977). Globulin concentration was calculated as the difference between total protein and albumin. Serum total cholesterol was determined according to the method of Watson (1960).

Economic evaluation for all the experimental diets was made. Economical efficiency is defined as the net revenue per unit feed cost calculated from input output analysis as described by Hassan *et al.* (1996). The statistical analysis of the experimental data was computed using analysis of variance procedure described in the SAS (1988), one fixed mathematical. The significant differences among treatments were determined by Duncan multiple rang test (Duncan, 1955).

RESULTS AND DISCUSSION

This experiment was designed to study the effect of adding the four medicinal plants (MP) at the corresponding best levels obtained from the study carried out by Abaza (2001), individually or in combination, for their synergetic effect, versus either Zinc Bacitracin or Virginiamycin as a growth promoter in broiler dites.

Growth performance

The data of broiler body weight and gain through the experemental period (3-7) weeks presented in Table 3 indicated highly significant ($p < 0.01$) differences between treatments. The synergetic effect of combination between 2.5 kg CH.F and 2.5 kg N.S. per ton (treat. 10) in broiler diet was superior in body weight and gain than control and other treatments. Also, there were insignificant differences in body weight and gain among treatments (10,11,9,5,6,4,7,12,15). The broiler chicks fed 2.5 kg CH.F + 5 kg TH.f + 2.5 kg H.S (treat. 14) had the lowest significant ($p < 0.01$) differences in body weight and gain, while, those in treatment 14 were statisticaly equal to the body weight and gain for all other treatments except the chicks reared in treatments (10,11 and 9).

The data of feed intake during the experimental period (3-7) weeks in Table 3 indicated significant ($p < 0.05$) differences among treatments. The highest feed intake was recorded with the broiler fed 2.5 kg CH.F +2.5 kg N.S. / ton (treat 10), without significant differences with broiler chicks in treatments 16, 15, 13, 12, 11, 9, 6, 5, 3, 2 and control (treat. 1). The data of feed conversion indicated highly significant ($p < 0.01$) differences between all treatments. The chicks fed 2.5 kg CH.F +2.5 kg N.S. / ton (treat 10) and 5.0 kg TH.F + 2.5 kg N.S. / ton (treat. 11) had the best feed conversion than all treatments without significant differences with chicks fed 2.5 kg CH.F +2.5 kg H.S. (treat. 9) and 5.0 kg TH.F (treat. 5). The combination between two of medicinal plants in treatments 10, 11 and 9 had the best synergetic effects and improved feed conversion compared with the other treatments, except treatment 5. These improvements may be due to the synergetic effect of the chemical constituents (Nigellone, Matricarin, Thymol and Harmalina) presente in M.P. These chemical constituents had antimicrobial, antifungal, antioxidant and anti- inflammatory effects (Kotb, 1979). These results are in agreement with the results of Abdel- Malak *et al.*(1995). They showed that overall body weight gains of broiler chicks were improved by increasing Bio- tonic herbal mixture supplementation up to 1% in broiler diets.

Osman and El- Barody (1999) found that the addition of N.S at levels (0.8 and 1.0 %) in broiler diets had insignificant effect on average body weight at all age intervals, but reduced feed intake and improved feed conversion at 4 and 6 weeks of age. Vogt *et al.* (1989) found that dried thyme at level 100 mg / kg in broiler diets improved the body weight gain. On the other hand Allen (1992) found that the final body weight and body weight gain were insignificantly affected by the incorporation of VIR at levels 5, 10 and 20 mg / kg of broiler diets.

Digestibility values

Adding of Zn B or VIR individually and M.P. either individually or in combination shown in Table 4 had highly significant ($p < 0.01$) effects on the percentage of nutrient digestibility values among all treatments and control group. The best digestibility values of DM, OM, C.P., C.F and NFE were recorded by the chicks fed 2.5 kg CH.F + 5 kg TH.F + 2.5 kg H.S. / ton (treat. 14), while, the best values of E.E and C.F digestibility were recorded by the chicks fed 2.5 kg N.S. (treat. 7) and 5 kg TH.F + 2.5 kg N.S. (treat. 12), respectively. Ghazalah and Faten (1996) reported that the groups fed Thymol or Nigella seed oil increased their NFE digestibility values.

Carcass characteristics

The results of carcass indicated insignificant differences among treatments for carcass, abdominal fat, blood, heart, liver, spleen, pancreas, gizzard, bursa of fabricius weights and total intestinal length with overall means equal 717.69, 10.92, 19.95, 4.36, 26.98, 1.79, 2.47, 21.56, 1.42 g / kg body weight, and 88.16 cm / kg body weight, respectively. Abdel- Malak *et al.* (1995) showed that Bio- tonic had no significant effect on dressing and total edible parts. However, highly significant ($p < 0.01$) differences were found among treatments for ceccum length (ranged between 8.03 and 14.43 cm / kg body weight). The lowest ceccum length was recorded with control chicks (treatment 1), while, the highest length was recorded with the chicks in treatment 15 (fed 2.5 kg CH.F + 5.0 kg TH.F + 2.5 kg N.S. / ton of diet), followed by chicks in treatmeant 12 (fed 5.0 kg TH.F + 2.5 kg N.S. / ton of diet) and chicks in treatment 10 (fed 2.5 kg CH.F + 2.5 kg N.S. / ton of diet). Generally, using M.P at all addition levels (either individually or in combination), showed that the length of ceccum (cm / kg BW) in all treatments was longer than control treatment and the length of ceccum for chicks fed Zn B or VIR (treat. 2 and 3). These results may be due to that M.P. had beneficial effect on increasing the count of beneficial microorganism in ceccum of broiler chicks, which was reflected on increase of ceccum length. Several reports indicated that M.P. had antimicrobial and antifungal activity (Kotb, 1979).

Blood Constituents

The values of total proteins, albumin, globulin (g / 100 ml) and total cholesterol (mg / 100 ml) in blood serum of broiler chicks at the end of the experiment are presented in Table 5.

The broiler chicks fed on the experimental diets showed highly significant ($p <$

0.01) differences among treatments for the estimated serum constituents. Serum total protein for the chicks fed 2.5 kg H.S / ton of diet (treat. 6), 1 kg ZnB (equal 20 g active principle) /ton diet (treat. 2), control diet (treat. 1), and 5.0 kg TH.F /ton diet (treat. 12), did not statistically differ being 4.69, 4.61, 4.44 and 4.27 g / 100 ml serum, respectively. The lowest value of serum total proteins was recorded by chicks fed 5.0 kg TH.F + 2.5 H.S. + 2.5 kg N.S. (treatment 16) The highest values of serum albumin were recorded for the chicks fed control diet (treat.1), without significant differences among treatments (9,10,6,12,16,13 and 2). The lowest value was recorded with the chicks fed diet included 5.0 kg TH.F / ton of diet (treat. 5).

The highest values of serum globulin were recorded for the chicks fed 2.5 kg H.S. / ton diet (treat. 6), without significant differences among treatments (2,12 and 1). The lowest value was recorded with treatment 16. The highest value of serum total cholesterol (mg / 100 ml) was recorded for the chicks fed control diet (treat. 1). The value of total cholesterol for the chicks fed control diet (treat. 1), was statistically insignificant as compared to with treatments 5,3,14,16 and 10. The lowest values were recorded by treatments 8 and 9. These results agreed with Meluzzi *et al.* (1992). They reported that the serum total protein, albumin and total cholesterol for broiler chicks varied between 2.58 to 5.22 g / 100 ml, 1.17 to 2.74 g / 100 ml and 87.0 to 192 mg / 100 ml, respectively.

Economical efficiency

The results of economical efficiency (E.E) and relative economical efficiency (R.E.E.) estimated for the experimental diets used during the experiment are shown in Table 6.According to the input – output analysis, the best (R.E.E.) were recorded by the chicks fed 2.5 kg CH.F + 2.5 kg N.S / ton of diet (treat. 10), followed by chicks which were fed 2.5 kg CH.F / ton of diet alone (treat. 4), chicks fed 2.5 kg CH.F + 2.5 kg H.S / ton of diet (treat. 9) and chicks fed 5.0 kg TH.F + 2.5 kg H.S. / ton of diet (treat. 11), respectively. These results indicated that the diets containing M.P. individually and the combination between two types of M.P. were more economical than the other experimental diets including either ZnB or VIR (treat. 2 and 3) and the experimental diets including a mixture of three medicinal plants (treat. 14, 15, and 16).

Table 1. Composition and calculated chemical analysis of the basal diet.

Ingredients	%
Yellow corn	51.3
Soybean meal (44%)	41.3
Soybean oil	2.0
Bone meal	2.6
Limestone	0.8
Salt (NaCl)	0.4
DL methionine	0.1
Vit. & Min. Mix. **	0.4
Anticoccidiosis	0.1
Sand	1.0
Total	100
Calculated chemical analysis*	
Crude protein %	21.48
ME kcal/ kg	2833
C/P ratio	132
Crude fat %	4.37
Crude fiber %	3.50
Calcium %	1.03
Phosphorus (available) %	0.51
Arginine % of protein %	6.97
Lysine of % protein %	5.75
Methionine % of protein %	2.03
Cystine % of protein %	1.63
Linoleic acid %	2.14

*According to Scott, et al. (1976).

** Each 1000 gm of vitamin and minerals mixture contain : 8000000 IU vit.A, 160000 IU vit.D3, 3000 mg vit.E, 1500 mg vit.K3, 750 mg vit.B1, 2250 mg vit.B2, 750 mg vit.B6, 5000 mg vit.B12, 500 mg D.Calcium pantothenate, 60000 mg Choline choloride, 100 mg Folic acid, 5 mg Biotin, 10000 mg Mn, 240 mg I, 60 mg Co, 10000 mg Zn, 1000 mg Cu, 6500 mg Iron, 40 mg Se, 5000 mg Ethoxyquiue, 1000 g Carrier.

Table 2. Formulation of diets used in the experiment from 3-7 weeks.

Tr. No.	Basal diet (kg)	Sand (kg)	Sources of MP additives (kg)	Total (kg)
1	990	10	Control diet	1000
2	990	9	1 kg ZnB*	1000
3	990	9	1 kg VIR**	1000
4	990	7.5	2.5 CH.F	1000
5	990	5	5 TH.F	1000
6	990	7.5	2.5 HS	1000
7	990	7.5	2.5 N.S	1000
8	990	2.5	2.5 CH.F + 5 TH.F	1000
9	990	5	2.5 CH.F + 2.5 HS	1000
10	990	5	2.5 CH.F + 2.5 N.S	1000
11	990	2.5	5 TH.F + 2.5 HS	1000
12	990	2.5	5 TH.F + 2.5 N.S	1000
13	990	5	2.5 HS + 2.5 N.S	1000
14	990	-	2.5 CH.F + 5 TH.F + 2.5 HS	1000
15	990	-	2.5 CH.F + 5 TH.F + 2.5 N.S	1000
16	990	-	5 TH.F + 2.5 HS + 2.5 N.S	1000

* Each 1 kg ZnB produced by Fizer company contains 20 g active principle.

** Each 1 kg VIR produced by Amon company contains 20 g active principle

Table 3. Effect of different experimental treatments on growth performance of broiler chicks from 3-7 weeks.

Tr. No.	B.W*. at 3 weeks g	B.W*. at 7 weeks g	B.W.G**. g (3-7) weeks	F.I***. g/ bird period	F.C****. g feed / g gain
1	530.00 ± 13.70	1772.67 ± 63.16 ^{cd}	1242.67 ± 64.51 ^{cd}	2923.33 ± 8.19 ^{ab}	2.32 ± 0.03 ^{a}
2	529.33 ± 14.78	1788.80 ± 40.71 ^{cd}	1259.47 ± 40.85 ^{cd}	2914.33 ± 27.71 ^{ab}	2.31 ± 0.04 ^{a}
3	528.00 ± 14.37	1777.33 ± 55.80 ^{cd}	1249.33 ± 60.49 ^{cd}	2901.67 ± 1.67 ^{abc}	2.32 ± 0.03 ^{a}
4	530.67 ± 14.20	1854.67 ± 31.20 ^{abcd}	1324.00 ± 24.56 ^{abcd}	2836.33 ± 29.16 ^{bcd}	2.14 ± 0.02 ^{ef}
5	530.00 ± 14.56	1878.33 ± 44.16 ^{abc}	1348.33 ± 36.61 ^{abc}	2873.33 ± 41.38 ^{abcd}	2.13 ± 0.02 ^{fg}
6	530.00 ± 14.56	1862.00 ± 28.38 ^{abcd}	1332.00 ± 25.08 ^{abcd}	2895.00 ± 6.03 ^{abcd}	2.17 ± 0.01 ^{def}
7	529.00 ± 14.75	1849.33 ± 41.39 ^{abcd}	1320.33 ± 39.14 ^{abcd}	2846.61 ± 29.06 ^{bcd}	2.16 ± 0.01 ^{ef}
8	528.00 ± 14.99	1821.00 ± 37.49 ^{bcd}	1293.00 ± 31.29 ^{bcd}	2814.00 ± 8.72 ^{cd}	2.18 ± 0.01 ^{def}
9	523.60 ± 14.12	1885.27 ± 33.03 ^{abc}	1361.67 ± 31.54 ^{abc}	2886.67 ± 17.64 ^{abcd}	2.13 ± 0.02 ^{fg}
10	529.00 ± 16.21	1960.00 ± 29.52 ^{a}	1431.00 ± 32.00 ^{a}	2963.33 ± 18.56 ^{a}	2.07 ± 0.00 ^{g}
11	528.00 ± 15.48	1931.67 ± 40.12 ^{ab}	1403.67 ± 32.76 ^{ab}	2912.33 ± 18.59 ^{ab}	2.07 ± 0.00 ^{g}
12	528.00 ± 12.94	1836.33 ± 37.69 ^{abcd}	1308.33 ± 29.03 ^{abcd}	2879.00 ± 17.16 ^{abcd}	2.20 ± 0.01 ^{cde}
13	528.00 ± 13.59	1822.67 ± 35.09 ^{bcd}	1294.67 ± 30.83 ^{bcd}	2874.00 ± 29.87 ^{abcd}	2.22 ± 0.01 ^{bcd}
14	528.67 ± 12.36	1735.00 ± 28.19 ^{d}	1206.33 ± 30.33 ^{d}	2806.00 ± 9.17 ^{d}	2.33 ± 0.01 ^{a}
15	529.00 ± 11.36	1829.67 ± 38.73 ^{abcd}	1300.67 ± 38.98 ^{bcd}	2926.67 ± 26.67 ^{ab}	2.25 ± 0.01 ^{bc}
16	530.00 ± 10.11	1797.00 ± 42.22 ^{bcd}	1267.00 ± 43.47 ^{cd}	2872.67 ± 70.15 ^{abcd}	2.27 ± 0.03 ^{ab}
Overall mean	528.70 ± 3.38	1837.61 ± 10.41	1308.90 ± 10.04	2882.83 ± 8.27	2.20 ± .01
Significance	N.S	Sign. at P >0.01	Sign. at P >0.01	Sign. at P > 0.05	Sign. at P > 0.01

Means within column with the same litter are not significantly different. (P < 0.01)

* Body weight

** Body weight gain.

*** Feed intake.

**** Feed conversion

Table 4. Effect of different experimental treatments on digestibility values of different nutrients by broiler chicks (%).

Treat.	DM.	OM.	C.P.	E.E	C.F.	NFE.
1	65.58 ± 0.92 ^{cd}	68.87 ± 0.81 ^{ef}	85.59 ± 0.61 ^{bc}	82.12 ± 1.39 ^{cde}	30.60 ± 0.93 ^{cd}	78.25 ± 1.55 ^{de}
2	66.60 ± 0.69 ^{cd}	70.51 ± 1.36 ^{ef}	85.22 ± 0.39 ^{cd}	77.85 ± 1.02 ^{gh}	28.77 ± 0.15 ^{d}	79.75 ± 0.06 ^{bcde}
3	66.17 ± 0.70 ^{cd}	68.12 ± 2.71 ^{f}	85.54 ± 0.75 ^{cd}	76.27 ± 0.07 ^{h}	29.55 ± 0.56 ^{cd}	81.32 ± 0.25 ^{bc}
4	67.51 ± 0.55 ^{c}	72.00 ± 0.31 ^{cde}	84.47 ± 0.27 ^{cd}	79.03 ± 0.03 ^{fg}	32.85 ± 0.80 ^{bcd}	79.79 ± 0.97 ^{bcde}
5	67.98 ± 0.28 ^{c}	71.60 ± 0.29 ^{def}	85.62 ± 0.37 ^{cd}	79.05 ± 0.18 ^{fg}	32.86 ± 0.22 ^{bcd}	79.12 ± 0.53 ^{cde}
6	67.50 ± 0.98 ^{c}	71.50 ± 1.50 ^{def}	87.35 ± 0.02 ^{ab}	80.20 ± 0.27 ^{ef}	33.28 ± 2.39 ^{bcd}	80.31 ± 0.93 ^{bcde}
7	71.66 ± 0.29 ^{b}	75.81 ± 0.97 ^{ab}	85.12 ± 0.27 ^{cd}	87.73 ± 0.52 ^{a}	35.54 ± 1.44 ^{b}	82.14 ± 0.04 ^{b}
8	66.93 ± 0.62 ^{cd}	71.19 ± 1.13 ^{def}	84.05 ± 0.48 ^{d}	85.28 ± 0.63 ^{b}	33.95 ± 0.16 ^{bc}	77.73 ± 0.30 ^{de}
9	67.95 ± 0.62 ^{c}	72.46 ± 0.71 ^{bcde}	85.38 ± 0.07 ^{cd}	82.25 ± 0.13 ^{cde}	32.09 ± 0.35 ^{bcd}	80.16 ± 0.68 ^{bcde}
10	64.84 ± 0.49 ^{d}	69.76 ± 0.08 ^{ef}	84.07 ± 0.46 ^{d}	83.99 ± 0.71 ^{bc}	31.80 ± 0.52 ^{bcd}	77.37 ± 1.22 ^{e}
11	71.72 ± 0.78 ^{b}	75.61 ± 1.66 ^{abc}	88.06 ± 0.15 ^{a}	81.09 ± 0.40 ^{def}	42.99 ± 1.00 ^{a}	81.95 ± 0.95 ^{bc}
12	71.90 ± 0.78 ^{b}	75.39 ± 1.12 ^{abc}	87.36 ± 0.38 ^{ab}	78.99 ± 0.72 ^{fg}	46.01 ± 1.81 ^{a}	81.47 ± 1.18 ^{bc}
13	70.80 ± 0.86 ^{b}	74.60 ± 0.86 ^{abcd}	88.04 ± 0.80 ^{a}	83.11 ± 0.02 ^{bcd}	29.91 ± 0.61 ^{cd}	81.32 ± 0.98 ^{bc}
14	74.91 ± 0.68 ^{a}	77.93 ± 0.55 ^{a}	88.56 ± 0.61 ^{a}	80.34 ± 1.20 ^{ef}	42.23 ± 2.81 ^{a}	85.35 ± 0.53 ^{a}
15	66.48 ± 0.14 ^{cd}	71.44 ± 0.37 ^{def}	85.89 ± 0.48 ^{bc}	78.78 ± 0.62 ^{fg}	32.23 ± 0.7 ^{bcd}	80.46 ± 0.02 ^{bcd}
16	65.16 ± 0.27 ^{d}	68.75 ± 0.13 ^{ef}	84.60 ± 0.38 ^{cd}	77.13 ± 0.90 ^{gh}	31.97 ± 2.91 ^{bcd}	77.44 ± 1.36 ^{e}
Overall mean	68.37 ± 0.52	72.22 ± 0.54	85.96 ± 0.27	80.83 ± 0.55	34.16 ± 0.92	80.25 ± 0.39

Means within column with the same litter are not significantly different.

Table 5. Effect of different experimental tratments on some chemical blood serum parameters of broiler chicks at 7 weeks of age.

Tr. No.	Total protein g/ 100 ml	Albumin g/ 100 ml	Globulin g/ 100 ml	Total Cholesterol mg/ 100 ml
1	4.44 ± 0.05 ^{abc}	1.58 ± 0.00 ^{a}	2.86 ± 0.05 ^{abc}	196.67 ± 1.93 ^{a}
2	4.61 ± 0.05 ^{ab}	1.29 ± 0.17 ^{abcd}	3.32 ± 0.22 ^{ab}	146.70 ± 0.00 ^{efg}
3	3.75 ± 0.05 ^{def}	1.00 ± 0.05 ^{def}	2.75 ± 0.00 ^{bcde}	186.67 ± 3.84 ^{ab}
4	3.66 ± 0.40 ^{cdef}	1.21 ± 0.12 ^{bcde}	2.44 ± 0.27 ^{cdef}	136.67 ± 1.93 ^{g}
5	3.13 ± 0.50 ^{ef}	0.83 ± 0.00 ^{f}	2.30 ± 0.50 ^{cdef}	190.00 ± 5.77 ^{ab}
6	4.96 ± 0.05 ^{a}	1.83 ± 0.12 ^{abc}	3.58 ± 0.07 ^{a}	156.67 ± 13.48 ^{def}
7	3.39 ± 0.15 ^{ef}	0.92 ± 0.14 ^{ef}	2.47 ± 0.01 ^{cdef}	160.00 ± 0.00 ^{cde}
8	3.48 ± 0.00 ^{def}	1.04 ± 0.02 ^{cdef}	2.44 ± 0.02 ^{cdef}	93.30 ± 11.55 ^{h}
9	3.66 ± 0.10 ^{cdef}	1.42 ± 0.24 ^{ab}	2.24 ± 0.34 ^{cdef}	83.37 ± 1.93 ^{h}
10	3.83 ± 0.20 ^{bcde}	1.42 ± 0.05 ^{ab}	2.41 ± 0.15 ^{cdef}	180.00 ± 7.86 ^{ab}
11	2.87 ± 0.25 ^{fg}	1.00 ± 0.05 ^{def}	1.87 ± 0.20 ^{ef}	130.00 ± 1.91 ^{g}
12	4.27 ± 0.25 ^{abcd}	1.34 ± 0.05 ^{abcd}	2.93 ± 0.20 ^{abc}	176.67 ± 1.93 ^{bc}
13	3.31 ± 0.30 ^{ef}	1.29 ± 0.02 ^{abcd}	2.02 ± 0.28 ^{def}	173.37 ± 7.71 ^{bcd}
14	3.48 ± 0.60 ^{def}	1.17 ± 0.14 ^{bcdef}	2.81 ± 0.46 ^{bcd}	183.37 ± 1.93 ^{ab}
15	2.85 ± 0.06 ^{fg}	1.13 ± 0.07 ^{bcdef}	1.73 ± 0.14 ^{f}	140.00 ± 3.87 ^{fg}
16	2.26 ± 0.00 ^{g}	1.32 ± 0.04 ^{abcd}	0.95 ± 0.04 ^{g}	183.30 ± 5.77 ^{ab}
Overallmean	3.61 ± 0.11	1.21 ± 0.04	2.43 ± 0.10	157.30 ± 4.93
Significant	Sign. at P < .01	Sign. at P < .01	Sign. at P < .01	Sign. at P < .01

Means within column with the same litter are not significantly different. (P < 0.01)

Table 6. Economical efficiency (E.E.) and relative economical efficiency (R.E.E.) estimated for the different experimental diets .

Tr. No.	1 Average B.W.G. gm.	2 T. revenue/ chick L.E.	3 T.F.C/ chick Kg.	4 Kg F. cost L.E.	5 T.F. cost L.E.	6 Net Rev. / chick L.E.	7 E.E.	8 R.E.E.
1	1242.7	5.592	2.923	0.800	2.338	3.254	1.392	100.0
2	1259.5	5.668	2.914	0.814	2.372	3.296	1.390	99.9
3	1249.3	5.622	2.902	0.820	2.380	3.242	1.362	97.8
4	1324.0	5.958	2.836	0.805	2.283	3.675	1.610	115.7
5	1348.3	6.067	2.873	0.830	2.385	3.682	1.544	110.9
6	1332.0	5.994	2.895	0.815	2.359	3.635	1.541	110.7
7	1320.3	5.941	2.847	0.820	2.335	3.606	1.544	110.9
8	1293.0	5.819	2.814	0.835	2.350	3.469	1.476	106.0
9	1361.7	6.128	2.887	0.820	2.367	3.761	1.589	114.2
10	1431.0	6.440	2.963	0.825	2.444	3.996	1.635	117.5
11	1403.7	6.317	2.912	0.845	2.461	3.856	1.567	112.6
12	1308.3	5.887	2.879	0.850	2.447	3.440	1.406	101.0
13	1294.7	5.826	2.874	0.835	2.400	3.426	1.428	102.6
14	1206.3	5.428	2.806	0.850	2.385	3.043	1.276	91.7
15	1300.7	5.853	2.927	0.855	2.503	3.450	1.338	96.1
16	1267.0	5.702	2.873	0.865	2.485	3.217	1.295	93.0

Price of the ingredients and test materials used in the experimental diets L.E/kg yellow corn 0.525,Soyben meal 0.960, DL methionine 18, Bone meal 0.750, limestone 0.020, Salt 0.020, premix 6, Anti-coccidiosis 19, ZnB 14, VIR 20, oil 2,N.S 8,CH.f 2, TH.f 6, HS 6.

Table 7. Proximate analysis of medicinal plants (MP) used in the experimental diets.

M.P	Moisture %	C.P. %	E.E %	C.F. %	Ash. %	N.F.E. %
Nigella seeds (N.S)	6.54	24.46	28.38	11.44	5.69	23.49
Thyme flowers (TH.F)	11.53	13.25	3.63	16.65	16.41	38.53
Harmala seeds (H.S.)	9.96	11.21	1.53	16.47	9.78	51.05
Chamomile flower heads (CH.F.)	7.63	19.80	7.36	8.34	9.46	47.41

The data determined as air dried basis

In conclusion results indicated that, the combination between two of the medicinal plants had the best values of body weight, weight gain, feed conversion, the economical efficiency and the relative ecnomical efficiency than using M.P, individually, in combination of three of M.P. or using antibiotics (ZnB or VIR). The combination between 2.5 kg CH.F + 2.5 kg N.S. / ton of diet (treat. 10), using 2.5 kg CH.F / ton of diet (treat. 4) and the combination between 2.5 kg CH.F + 2.5 kg H.S. / ton of diet (treat. 9) had the best economical results compared to either control group or the other treatment groups.

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تأثير إضافة مسحوق حبة البركة والشيح والزعتر والحرمل على أداء بدارى التسمين

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تم تقسيم ٢٤٠ كتكوت هبرد عمر ٣ أسابيع إلى ١٦ مجموعة كل مجموعة تضم مكررات وذلك لدراسة تأثير إضافة مسحوق حبة البركة والشيح والزعتر والحرمل بمستويات (٢,٥ ، ٢,٥ ، ٢,٥ كجم / طن علف على التوالى إما بصورة فردية أو فى صورة خلطات منها مقارنة بإستخدام باستراسين أو الفرجينيات بمستويات ٢٠جم / طن علف كمنشطات للنمو فى أعلاف كتاكيت اللحم علىأداء النمو ، معدلات الهضم ، مكونات الدم كذلك الكفاءة الإقتصادية.

ويمكن إيجاز أهم النتائج المتحصل عليها فى النقاط الآتية :

* إستخدام مسحوق حبة البركة - الشيح - الزعتر - الحرمل بنسب ٠,٢٥ - ٠,٥ - ٠,٢٥ - ٠,٢٥٪ على التوالى إما بصورة فردية أو فى صورة خلطات حسنت من الأداء الإنتاجى بالمقارنة الزنك باستراسين أو الفرجينياميسين .

* إستخدام الخليط الثنائى من مسحوق حبة البركة والشيح بنسبة ٠,٢٥٪ لكل منهما حسن فى وزن الجسم و الزيادة فى وزن الجسم والكفاءة الغذائية وكانت أفضل إقتصاديا من المعاملات الأخرى وكذلك الكنترول .

يمكن التوصية بالآتى : -

* إمكانية إستخدام عدد من النباتات الطبية كمنشطات ومحفزات للنمو .

* إستخدام النباتات الطبية مثل مسحوق حبة البركة وزهار الزعتر وبذور الحرمل والبراعم الزهرية للشيح بصورة فردية أو فى صورة خلطات يكون له تأثير أفضل كمنشط للنمو من إستخدام المضادات الحيوية مثل الزنك باستراسين أو الفجينياميسين .

* استخدم خليط من ٢,٥ كجم من أزهار الشيح مع ٢,٥ كجم من مسحوق حبة البركة /طن علف أعطى أفضل تأثير تعاونى وتكاملى محفز للنمو و كذلك أفضل كفاءة إقتصادية عن الأعلاف الأخرى .