



## EFFECT OF SOME MEDICINAL PLANTS ON BROILER PERFORMANCE

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### ABSTRACT

This study was conducted to investigate the effects of using Marjoram (M), Anise (A), and Peppermint (P) as a growth promoter in broiler diets on their growth performance. A total of 432 Unsexed one-day old; broiler chicks of the Cobb 500 strain were weighed and allotted to eight experimental groups in a completely Randomized Design as follows: T<sub>1</sub>) Basal Diet (BD) control, T<sub>2</sub>) BD + M (1.5 g./kg diet), T<sub>3</sub>) BD + A (0.5 g./kg diet), T<sub>4</sub>) BD + P (0.5 g./kg diet), T<sub>5</sub>) BD + combination of (M 1.5% g./kg. diet+A 0.5% g./kg. diet), T<sub>6</sub>) BD + combination of (M 1.5% g./kg. diet + P 0.5 g./kg. diet), T<sub>7</sub>) BD + combination of (A 0.5%g./kg. diet + P 0.5% g./kg. diet), and T<sub>8</sub>) BD + combination of M 1.5% g./kg. diet + A 0.5 g./kg diet + P 0.5% g./kg. diet). Each treatment had 3 replicates with 18 chicks each (8 treatment × 3 replicates × 18 chicks). Growth parameters determined were average final live weight and average body weight gain, average daily feed intake and feed conversion ratio. The results showed that feed intake and feed conversion were not significantly affected due to application of medicinal plants and their mixtures. There was significant ( $P \leq 0.05$ ) increase in final live body weight due to treatment 4. Same treatments showed significant ( $P \leq 0.05$ ) increase in final live body weight compared with control group. Otherwise, treatment 6 had the highest value for each of net revenue and economic efficiency compared with the control group.

**Key words:** Poultry, medicinal plants, broiler performance, growth promoters, productive performance, broiler nutrition, aromatic plants, marjoram, anise, peppermint.

### INTRODUCTION

Plants (Specially herbs) have been used as food for medicinal purposes for centuries and some of them have played a significant role in maintaining human health and improving the quality of human life for thousands of years. In addition, nutritional substances necessary for growth and development of chicks, the feed is regularly supplemented with pharmacological products, either for preventive purposes, as preventive against certain diseases (coccidiostatics) or as growth stimulators (antibiotic), primarily in case of young chicks. During the past 50 years, the growth rate of broiler has been improved greatly.

However, recently many countries tend to prevent application of antibiotic for their side effect on both bird and mankind. The alternatives to antibiotic as growth stimulators are numerous, amounting to finding an adequate non-pharmacological product from the group.

Probiotic, organic acids and other essential oils, medicinal plants or parts of plants such as thyme, basil, oregano and others. There is evidence suggesting that herbs, spices and various plant extracts have appetizing, digestion-stimulating and antimicrobial properties. Medicinal Plants and their products including plant extracts or essential oils are introduced as candidates for use in broiler diets in which

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their beneficial effects as phytogetic feed additives have been proven. So, the aim of this study was to describe the effects of dietary inclusion of dry Marjoram (*Origanum majorana*), Anise (*Pimpinella anisum* L.), Peppermint (*Mentha piperita*), at various levels as growth promoters on the performance of broiler chicks.

## MATERIALS AND METHODS

The experimental work was conducted to study the effect of three medicinal plants (Marjoram, Peppermint, and Anise) on growth performance, some blood parameters, and economic efficiency of broiler chicks, using completely randomized design during the starter (from 7-21 days of age) and growth (from 21-42 days of age) periods.

### Chicks and Housing

A total of 432 Unsexed one-day old; Cobb 500 broiler chicks were obtained from a commercial local source and used in this study. Chicks were randomly divided into 8 treatment groups. Each treatment had 3 replicates with 18 chicks each. Chicks in each replicate within each treatment had nearly similar initial live body weight ( $50 \pm 2$ ). Chicks were housed in floor pens with wood shavings in a controlled environmental house. Continuous lighting was provided throughout first week, and then lasted 23 hours throughout the experiment. The ambient temperature was gradually decreased by about 2°C weekly until about 24°C at the fourth week up to the end of experiment (at 6 weeks of age). Experimental diets and water offered *ad-libitum* over the experimental period.

### Diets and management

The experimental period was divided into two feeding phases; starter (from 0-3 weeks of age) and grower (from 4-6 weeks of age). Experimental diets were formulated to meet all nutrients requirement for broiler as recommended by NRC (1994). Chicks were fed basal diet 23% and 3071, 21% CP and 3191 Kcal/kg during the starter and

grower periods, respectively, as shown in Tables 1 and 2.

### Measurements

Body weight gain and feed intake of broiler chicks in different groups were weekly recorded. Feed conversion ratio (FCR) were calculated. Blood analysis. Liver function (as measured by GPT and GOT).

### Estimated blood parameters

At the end of the experimental period, blood samples were taken from 3 birds of different groups. The blood samples were taken from the jugular vein of the birds in the evening at the same time of slaughtering. The blood samples were centrifuged immediately after collection at 3000/rpm for 17 min, and serum were transferred into clean tubes and stored in a deep freezer at approximately -20 °C till the time of chemical analysis. Various chemical analyses were conducted using commercial kits and measuring the optical density by spectrophotometer, following the same steps as described by manufactures.

### Economic efficiency (EEf)

For economic efficiency (EEf) determination meat production management factors in all treatments were considered constants, and the amount of feed consumption and weight gains per treatment were calculated. Prices of experimental diets and feed additives (M, A, and P) were calculated according to the price of local market at the time of the experiment (November 2015). Economic efficiency was estimated as:

$$\text{Economic efficiency} = \frac{\text{Net revenue}}{\text{Total production cost}}$$

### Statistical analysis

Analysis of variance was conducted on all data using the general Linear Models Procedure (SAS, 2004). Significant differences between treatment, means were determined using Duncan's multiple-range test (Duncan, 1955).

**Table 1: Composition and calculated chemical analysis of starter diets (7-21 days of age)\***

Ingredients [%]	Starter period							
	T1 Contr.	T2 Marjoram M	T3 Anise A	T4 Peppermint P	T5 M+A	T6 M+P	T7 A+P	T8 M+A+P
<b>Corn (grains)</b>	57.61	56.54	58.13	58.13	55.82	55.82	57.28	54.97
<b>Soybean meal (48%)</b>	31.87	30.41	30.5	30.5	30.5	30.5	30.5	30.5
<b>Corn gluten meal (62%)</b>	4.48	5.37	5.36	5.36	5.37	5.37	5.45	5.29
<b>Soybean Oil</b>	1.85	2.07	1.54	1.54	2.34	2.34	1.8	2.6
<b>Dicalcium phosphate</b>	1.29	2.12	1.92	1.92	1.93	1.93	1.92	2.1
<b>Limestone</b>	2.1	1.19	1.3	1.3	1.29	1.29	1.3	1.29
<b>DL-Methionine</b>	0.25	0.25	0.2	0.2	0.2	0.2	0.2	0.2
<b>Premix**</b>	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
<b>Salt (NaCl)</b>	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
<b>Marjoram</b>	0	1.5	0	0	1.5	1.5	0	1.5
<b>Anise</b>	0	0	0.5	0	0.5	0	0.5	0.5
<b>Peppermint</b>	0	0	0	0.5	0	0.5	0.5	0.5
<b>Total</b>	100	100	100	100	100	100	100	100
<b>Calculated Analysis</b>								
<b>Metabolizable energy **(ME Kcal / kg diet)</b>	3053.4	3036.37	3040	3040	3.40.6	3040.6	3058.2	3034.3
<b>Crude protein (%)</b>	23	23	23	23	23	23	23	22.8
<b>Calcium (%)</b>	1.16	1	1	1	1	1	1	1
<b>Available phosphorus (%)</b>	0.35	0.5	0.47	0.47	0.47	0.47	0.47	0.50
<b>Methionine (%)</b>	0.63	0.6	0.58	0.58	0.58	0.58	0.58	0.58
<b>Lysine (%)</b>	1.13	1.1	1.1	1.1	1.1	1.1	1.1	1.1
<b>Meth+Cyc</b>	1.0	1	0.97	0.97	0.96	0.96	0.97	0.95

\* Formulated according to the requirements of NRC (1994)

\*\*Vitamins and minerals premix provided per kilogram of the diet: Vitam A, 14000000 IU; D<sub>3</sub> 4000000 IU; Vitam E, 80000 mg; Vitam K<sub>3</sub>, 3000 mg; Vitam B<sub>1</sub>,4000 mg; Vitam B<sub>2</sub>, 6500 mg; Vitam B<sub>6</sub>, 5000 mg; Vitam B<sub>12</sub>, 20mg; Niacin, 50000 mg; Biotin, 200mg; Folic acid, 2000 mg; Pantothenic acid, 15000 mg; Zink 80000 mg; Manganese, 100000mg; Copper, 10000 mg; Iron, 50000 mg; Iodine, 1000 mg; Cobalt, 200 mg; and Selenium, 300 mg.

**Table 2: Composition and calculated chemical analysis of grower diets (22-42 days of age).**

Ingredients [%]	grower period							
	T1	T2	T3	T4	T5	T6	T7	T8
	Contr.	Marjoram M	Anise A	Peppermint P	M+A	M+P	A+P	M+A+P
<b>Corn (grains)</b>	63.53	61.5	62.94	62.94	60.7	60.73	62	60.35
<b>Soybean meal (48%)</b>	25.8	25.21	25.55	25.55	25.4	25.4	25.52	24.2
<b>Corn gluten meal (62%)</b>	4.9	5.62	5.3	5.3	5.3	5.3	5.3	6.37
<b>Soybean Oil</b>	1.98	2.64	2.18	2.18	2.85	2.85	2.44	3
<b>Dicalcium phosphate</b>	1.8	1.43	1.42	1.8	1.8	1.8	1.8	1.6
<b>Limestone</b>	1.24	1.35	1.36	1.06	1.2	1.2	1.2	1.25
<b>DL-Methionine</b>	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
<b>Premix**</b>	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
<b>Salt (NaCl)</b>	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
<b>Marjoram</b>	0	1.5	0	0	1.5	1.5	0	1.5
<b>Anise</b>	0	0	0.5	0	0.5	0	0.5	0.5
<b>Peppermint</b>	0	0	0	0.5	0	0.5	0.5	0.5
<b>Total</b>	100	100	100	100	100	100	100	100
Calculated Analysis								
<b>Metabolizable energy **(ME Kcal / kg diet)</b>	3131.85	3140.1	3140.2	3140.2	3126.4	3127.4	3133.2	3139.7
<b>Crude protein (%)</b>	20.8	21.0	20.9	20.9	20.9	20.8	20.9	20.9
<b>Calcium (%)</b>	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.9
<b>Available phosphorus (%)</b>	0.4	0.37	0.37	0.4	0.4	0.4	0.4	0.4
<b>Methionine (%)</b>	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>Lysine (%)</b>	0.97	0.96	0.9	0.9	0.9	0.9	0.9	0.9
<b>Meth+Cyc</b>	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

\* Formulated according to the requirements of **NRC (1994)**

\*\*Vitamins and minerals premix provided per kilogram of the diet: Vitam A, 14000000 IU; D<sub>3</sub> 4000000 IU; Vitam E, 80000 mg; Vitam K<sub>3</sub>, 3000 mg; Vitam B<sub>1</sub>, 4000 mg; Vitam B<sub>2</sub>, 6500 mg; Vitam B<sub>6</sub>, 5000 mg; Vitam B<sub>12</sub>, 20mg; Niacin, 50000 mg; Biotin, 200mg; Folic acid, 2000 mg; Pantothenic acid, 15000 mg; Zink 80000 mg; Manganese, 100000mg; Copper, 10000 mg; Iron, 50000 mg; Iodine, 1000 mg; Cobalt, 200 mg; and Selenium, 300 mg.

## RESULTS AND DISCUSSION

### Live body weight

The results in Table 3 show significant differences ( $P \leq 0.05$ ) for live body weight (LBW, g) due to using medicinal plants and their mixtures during grower period. Feeding broiler chicks diets supplemented with T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>7</sub>, and T<sub>8</sub> significantly ( $P \leq 0.05$ ) increased final live body weight compared with the control group (T<sub>1</sub>).

### Feed consumption and feed conversion

Results in Table 4 present the effect of medicinal plants and their mixtures during the whole experimental period from 7-42 days on body weight gain (g), feed Intake (g) and feed conversion (g. feed/g. gain). Chicks bird fed diets supplemented with T<sub>3</sub>, T<sub>4</sub>, T<sub>5</sub>, T<sub>7</sub>, and T<sub>8</sub> significantly ( $P \leq 0.05$ ) increased final live body weight compared with the control group (T<sub>1</sub>). However, no significant effect observed on feed intake and feed conversion when birds were fed medicinal plants and their mixture during the whole experimental periods. These results in the agreement with those of Al-Kassie (2008), Osman *et al.* (2010), Ali (2014), Eltazi *et al.* (2014), Mahmood *et al.* (2014) and Asadi *et al.* (2017).

### Some blood constituents

Results are presented in Table 5. It is obvious that dietary marjoram, anise and peppermint or their mixture did not affect ALT (U/L). Chick birds fed on diet supplemented with 1.5% marjoram had high ( $P \leq 0.05$ ) serum total protein, albumin and A/G compared with the other treatments.

Significant difference ( $P \leq 0.05$ ) was found for serum globulin, (BWG, g) due to using medicinal plants and their mixtures. Feeding broiler chicks diets supplemented with T<sub>4</sub>, T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub> and T<sub>8</sub> significantly ( $P \leq 0.05$ ) increased final live body weight compared with T<sub>1</sub>.

Chick birds fed on diet supplemented with T<sub>2</sub> and control diet (T<sub>1</sub>) significantly ( $P \leq 0.05$ ) had the higher serum cholesterol compared with the other treatments.

However, birds fed in diet supplemented with T<sub>7</sub> significantly ( $P \leq 0.05$ ) had the lowest cholesterol value compared with other treatments. serum triglyceride significantly ( $P \leq 0.05$ ) decreased in birds fed with medicinal plants and their mixture compared to control group.

Birds fed in control diet significantly ( $P \leq 0.05$ ) had the highest triglyceride value. However, birds fed in diet supplemented with T<sub>8</sub> significantly ( $P \leq 0.05$ ) had the lowest one compared with the other treatments.

Chick birds fed on diet supplemented with T<sub>4</sub> significantly ( $P \leq 0.05$ ) had higher serum creatinine compared with the control and other treatments.

However, birds fed diet supplemented with T<sub>5</sub> significantly ( $P \leq 0.05$ ) had the lowest cholesterol value compared with the control group and other treatments.

Chick birds fed control diet significantly ( $P \leq 0.05$ ) had higher serum alkaline phosphate compared with the other treatments.

However, birds fed in diet supplemented with T<sub>7</sub> significantly ( $P \leq 0.05$ ) had the lowest cholesterol value compared with the other treatments.

Chick birds fed control diet significantly ( $P \leq 0.05$ ) had higher serum AST compared with the other treatments.

However, birds fed in diet supplemented with T<sub>7</sub> significantly ( $P \leq 0.05$ ) had the lowest cholesterol value compared with the other treatments.

### Economic efficiency

The effect of medicinal plants and their mixture on the economic efficiency values displayed in Table 6. The lowest values of

**Table 3: Effect of feeding dietary levels of natural feed additives on live body weight (g) of broiler chicks during the grower period (21 - 42day).**

Item	Body weight gain (g)	Feed intake (g)	Feed conversion ratio (g. feed/g. gain)
Control	2181.00 <sup>b</sup> ±54.37	4518.33 <sup>a</sup> ±84.64	2.07 <sup>a</sup> ±0.06
Marjoram (M) 1.5%	2393.00 <sup>ab</sup> ±50.74	4258.67 <sup>a</sup> ±42.27	1.78 <sup>b</sup> ±0.05
Anise (A) 0.5%	2442.33 <sup>a</sup> ±90.14	4248.33 <sup>a</sup> ±170.54	1.74 <sup>b</sup> ±0.04
Peppermint (P) 0.5%	2531.33 <sup>a</sup> ±67.50	4572.67 <sup>a</sup> ±78.37	1.81 <sup>b</sup> ±0.07
M 1.5% + A 0.5%	2505.00 <sup>a</sup> ±84.60	4462.00 <sup>a</sup> ±57.97	1.78 <sup>b</sup> ±0.04
M 1.5% + P 0.5%	2351.67 <sup>ab</sup> ±113.76	4439.33 <sup>a</sup> ±104.94	1.89 <sup>b</sup> ±0.08
P 0.5%+ A 0.5%	2538.00 <sup>a</sup> ±12.50	4562.00 <sup>a</sup> ±93.66	1.79 <sup>b</sup> ±0.03
M 1.5% + P 0.5% + A 0.5 %	2444.67 <sup>a</sup> ±34.74	4453.67 <sup>a</sup> ±370.2	1.82 <sup>b</sup> ±0.16

**Table 4: Effect of feeding dietary levels of natural feed additives on live body weight (g) of broiler chicks during the grower period (7 - 42day).**

Item	28 day	35 day	42 day
Control	1406.00 <sup>a</sup> ±36.00	1951.67 <sup>b</sup> ±44.35	2353.33 <sup>b</sup> ±51.02
Marjoram (M) 1.5%	1464.00 <sup>a</sup> ±10.53	2066.33 <sup>ab</sup> ±27.03	2568.00 <sup>ab</sup> ±52.20
Anise (A) 0.5%	1392.33 <sup>a</sup> ±24.26	1956.00 <sup>b</sup> ±33.41	2611.33 <sup>a</sup> ±87.53
Peppermint (P) 0.5%	1450.00 <sup>a</sup> ±23.63	2145.00 <sup>a</sup> ±27.84	2710.00 <sup>a</sup> ±67.56
M 1.5% + A 0.5%	1406.67 <sup>a</sup> ±24.04	2193.67 <sup>a</sup> ±107.98	2684.67 <sup>a</sup> ±88.06
M 1.5% + P 0.5%	1450.33 <sup>a</sup> ±17.61	2046.67 <sup>ab</sup> ±62.27	2525.00 <sup>ab</sup> ±66.06
P 0.5%+ A 0.5%	1381.67 <sup>a</sup> ±71.20	2100.0 <sup>ab</sup> ±10.26	2709.67 <sup>a</sup> ±12.02
M 1.5% + P 0.5% + A 0.5 %	1430.00 <sup>a</sup> ±37.86	2040.00 <sup>ab</sup> ±15.28	2622.33 <sup>a</sup> ±38.12

**Table 5: Effect of feeding dietary levels of natural feed additives on live body weight (g) of broiler chicks during the grower period (7 - 42day).**

Treatments	Total Protein (g/L)	Albumin (g/L)	Globulin (g/dl)	A/G ratio	Cholesterol mg	Triglyceride (mg)	Creatinine (mg)	Alkaline Phosphate (u/l)	AST (U/L)	ALT (U/L)
<b>Control</b>	2.20 <sup>ab</sup> ±0.22	1.61 <sup>a</sup> ±0.27	0.82 <sup>ab</sup> ±0.71	2.12 <sup>ab</sup> ±0.51	130.33 <sup>a</sup> ±24.35	58.0 <sup>a</sup> ±4.00	0.76 <sup>abc</sup> ±0.12	712.33 <sup>a</sup> ±126.19	8.0 <sup>a</sup> ±0.58	5.0 <sup>a</sup> ±1.53
<b>(M) 1.5%</b>	2.50 <sup>a</sup> ±0.09	1.68 <sup>a</sup> ±0.03	0.66 <sup>b</sup> ±0.10	2.56 <sup>a</sup> ±0.37	148.00 <sup>a</sup> ±20.03	54.00 <sup>ab</sup> ±4.00	0.72 <sup>bc</sup> ±0.021	554.33 <sup>abc</sup> ±139.84	6.33 <sup>ab</sup> ±0.88	3.33 <sup>a</sup> ±0.33
<b>(A) 0.5%</b>	2.17 <sup>b</sup> ±0.04	1.39 <sup>ab</sup> ±0.16	0.78 <sup>ab</sup> ±0.12	1.92 <sup>abc</sup> ±0.46	110.67 <sup>ab</sup> ±12.21	49.78 <sup>abc</sup> ±7.22	0.75 <sup>abc</sup> ±0.03	354.00 <sup>abc</sup> ±116.67	5.67 <sup>bc</sup> ±0.67	3.33 <sup>a</sup> ±0.33
<b>(P) 0.5%</b>	2.01 <sup>b</sup> ±0.02	1.12 <sup>b</sup> ±0.04	0.89 <sup>a</sup> ±0.05	1.26 <sup>bc</sup> ±0.12	60.77 <sup>c</sup> ±10.17	41.33 <sup>bcd</sup> ±4.33	0.83 <sup>a</sup> ±0.01	224.77 <sup>c</sup> ±44.25	4.77 <sup>bc</sup> ±0.33	4.33 <sup>a</sup> ±0.33
<b>M 1.5% + A 0.5%</b>	1.98 <sup>b</sup> ±0.04	1.10 <sup>b</sup> ±0.058	0.88 <sup>a</sup> ±0.04	1.25 <sup>bc</sup> ±0.12	77.33 <sup>bc</sup> ±7.31	45.67 <sup>abc</sup> ±4.33	0.73 <sup>bc</sup> ±0.02	305.00 <sup>bc</sup> ±204.59	5.00 <sup>bc</sup> ±0.78	3.33 <sup>a</sup> ±0.33
<b>M 1.5% + P 0.5%</b>	2.02 <sup>b</sup> ±0.03	1.0 <sup>b</sup> ±0.03	0.98 <sup>a</sup> ±0.02	1.21 <sup>bc</sup> ±0.15	58.00 <sup>c</sup> ±12.77	37.00 <sup>cde</sup> ±00	0.69 <sup>c</sup> ±0.01	678.00 <sup>ab</sup> ±142.15	5.00 <sup>bc</sup> ±0.58	3.67 <sup>a</sup> ±0.67
<b>P 0.5%+ A 0.5%</b>	1.98 <sup>b</sup> ±0.01	1.02 <sup>b</sup> ±0.02	0.97 <sup>a</sup> ±0.01	1.05 <sup>c</sup> ±0.03	41.33 <sup>c</sup> ±4.91	29.00 <sup>de</sup> ±4.00	0.79 <sup>ab</sup> ±0.06	147.00 <sup>c</sup> ±53.9	4.00 <sup>c</sup> ±0.58	3.33 <sup>a</sup> ±0.33
<b>M 1.5% + P 0.5% + A 0.5 %</b>	2.00 <sup>b</sup> ±0.02	1.06 <sup>b</sup> ±0.04	0.94 <sup>a</sup> ±0.02	1.13 <sup>c</sup> ±0.07	72.00 <sup>bc</sup> ±7.37	25.00 <sup>e</sup> ±00	0.75 <sup>bc</sup> ±0.01	227.67 <sup>c</sup> ±70.82	4.33 <sup>c</sup> ±0.33	3.33 <sup>a</sup> ±0.33

**Table 6: Effect of dietary levels of natural feed additives on economic efficiency of broiler chicks.**

Treatment	Fixed cost <sup>1</sup> (LE)	Feed intake (kg.)		Feed cost of Kg		Feed cost		Total feed cost	Total cost (LE)	LBW (Kg.)	Total revenue <sup>2</sup> (LE)	Net revenue <sup>3</sup> (LE)	Economic efficiency <sup>4</sup>	Relative economic efficiency <sup>5</sup> [%]
		St. Period	Gr. Period	St. Period	Gr. Period	St. Period	Gr. Period							
<b>Control</b>	5.7	1.12	3.4	3.42	3.29	3.83	11.19	15.02	20.72	2.40	33.6	12.88	0.62	100
<b>(M) 1.5%</b>	5.7	1.07	3.19	3.77	3.64	4.03	11.61	15.65	21.35	2.60	36.4	15.05	0.71	113.4
<b>(A) 0.5%</b>	5.7	1.1	3.17	3.56	3.37	3.92	10.68	14.60	20.30	2.60	36.4	16.10	0.79	127.5
<b>(P) 0.5%</b>	5.7	1.13	3.45	3.52	3.45	3.98	11.90	15.88	21.58	2.70	37.8	16.22	0.75	120.9
<b>M 1.5% + A 0.5%</b>	5.7	1.14	3.32	3.9	3.31	4.45	10.99	15.44	21.14	2.70	37.8	16.66	0.79	126.8
<b>M 1.5% + P 0.5%</b>	5.7	1.14	3.3	3.8	3.77	4.33	12.44	16.77	22.47	2.50	35.0	12.53	0.56	89.6
<b>P 0.5%+ A 0.5%</b>	5.7	1.14	3.42	3.7	3.62	4.22	12.38	16.60	22.30	2.70	37.8	15.50	0.70	111.8
<b>M 1.5% + P 0.5% + A 0.5 %</b>	5.7	1.09	3.39	4	3.96	4.36	13.42	17.78	23.48	2.60	36.4	12.92	0.55	88.4

<sup>1</sup> Fixed cost: Bird price + rearing cost.<sup>2</sup> Total revenues: Assuming that the selling price of 1 kg live body weight is 14 LE<sup>3</sup> Net revenue: total revenue – total cost.<sup>4</sup> Economic efficiency (E.E.f): Net revenue per unit total cost.<sup>5</sup> Relative economic efficiency (R.E.E): Assuming that the relative economic efficiency of the control.

net revenue and economic efficiency were recorded for chicks fed diet supplemented with peppermint 0.5% during the starter and growing period.

The worst values of net revenue and economic efficiency were recorded for those fed diet supplemented with mixture of 1.5% marjoram + 0.5% peppermint during the whole experimental period.

## CONCLUSION

From the nutritional and economical point of view, it could be concluded that feeding broiler on diet supplemented with marjoram, peppermint and anise and their mixtures as a natural source of antioxidants improved growth promoter during starter and grower period. Also increase the profitability of growing broilers, with the occurrence of any side effects either on growth performance.

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## الملخص العربي

## تأثير بعض النباتات الطبية على الأداء الإنتاجي لدجاج التسمين

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تهدف هذه الدراسة إلى معرفة تأثير إضافة بعض النباتات الطبية (أوراق البردقوش والنعناع الفلفي وبذور الينسون) ومخلوطها على الأداء الإنتاجي لبدراى التسمين، استخدم في هذه التجربة ٤٣٢ كتكوت تسمين عمر يوم غذيت الطيور في الأسبوع الأول على عليقة أساسية تحتوي على ٢٣% بروتين وعند عمر ٧ أيام تم توزيعهم عشوائيا على ٨ مجموعات تجريبية تحتوي كل مجموعة على ٥٤ طائر تم توزيع الطيور في كل مجموعة على ثلاثة مكررات بكل مكررة ١٨ طائر. قسمت مدة التجربة إلى مرحلتين غذائيتين (مرحلة البادئ) من عمر ٧ إلى ٢١ يوم وتم تغذية الطيور فيها على علائق تحتوي على ٢٣% البروتين و(مرحلة النمو) فبدأت من عمر ٢٢ حتى نهاية التجربة (عمر ٤٢ يوم) وغذيت الطيور فيها على علائق تحتوي على ٢١% من البروتين، وكانت المعاملات كما يلي: المعاملة الأولى (العليقة الأساسية بدون إضافات)، المعاملة الثانية (العليقة الأساسية + ١,٥% أوراق البردقوش)، المعاملة الثالثة (العليقة الأساسية + ٠,٥% بذور الينسون)، المعاملة الرابعة (العليقة الأساسية + ٠,٥% أوراق النعناع الفلفي)، المعاملة الخامسة (العليقة الأساسية + ١,٥% أوراق البردقوش + ٠,٥% بذور الينسون)، المعاملة السادسة (العليقة الأساسية + ١,٥% أوراق البردقوش + ٠,٥% أوراق النعناع الفلفي)، المعاملة السابعة (العليقة الأساسية + ٠,٥% بذور الينسون + ٠,٥% أوراق النعناع الفلفي) والمعاملة الثامنة (العليقة الأساسية + ١,٥% أوراق البردقوش + ٠,٥% بذور الينسون + ٠,٥% أوراق النعناع الفلفي)، أوضحت النتائج وجود زيادة معنوية في وزن الجسم النهائي ومعدل الزيادة اليومية في الطيور المغذاة على علائق مضاف إليها ٠,٥% أوراق النعناع الفلفي، من هذه الدراسة يوصى بتغذية بدراى التسمين على علائق مضاف إليها أوراق البردقوش و النعناع الفلفي و بذور الينسون ومخلوطها خلال مرحلة البادئ والنمو على التوالي بدون حدوث أي آثار جانبية على الصفات الإنتاجية للطائر، كما أن استخدام هذه العلائق يحقق أفضل أداء إنتاجي، مع التأثير الإيجابي على الكفاءة الاقتصادية لبدراى التسمين.

الكلمات الأسترشادية: الأداء الإنتاجي، دجاج التسمين، أوراق البردقوش، النعناع الفلفي وبذور الينسون.

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