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EFFECT OF THYME (*THYMUS VULGARIS*) LEAVES BOILING WATER EXTRACT ON SOME PRODUCTIVE TRAITS OF BROILERS

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Abstract

This study was conducted to investigate the effect of using the thyme leaves boiling water extract on some productive traits of broilers, 135 broilers from the Ross308 broiler were randomly distributed to 3 treatments with 45 broilers per treatment with three replicates (15 birds per replicate), four-storey cages were placed on each floor containing a cage of 1.0 × 1.5 m, the levels of the thyme leaves boiling water extract were 0, 6 and ml/L drinking water. The results showed a significant increase ($P \leq 0.05$) on some of the production characteristics (body weight, body weight gain and feed cosumption, food conversion efficiency and production index), with a significant increase ($P \leq 0.05$) in mortality for the addition of thyme leaves boiling water extracts in drinking water compared to control treatment.

Key words : Boiling water extract, thyme leaves, productive, broiler.

Introduction

Thyme is a famous plant of the oral species and is commonly cultivated in Mediterranean countries, it is called a joyous mountain because of aromatic smell (De Vincenzi *et al*., 2004), the cultivation of thyme plant in northern Iraq, one of the most important medicinal plants, a herb that is characterized as a natural source of antioxidants (Al-Rawi, 1988), contains antioxidants, phenols and flavonoids (Barnes *et al*., 2002), the active part used medicinally in thyme is the leaves and the growing flowering plants, the leaves contain volatile oils (5-25%), this oil contains about 55% of the phenolic material and is the thymol and carcacrol attributed to the medicinal benefits of thyme plant (Wright, 2002), as well as resinous and linoleic acid (Watt, 1995). Protects the skin by preventing the growth of bacteria and fungi as it inhibits the growth of positive and negative bacteria (Priccaglia and Marotti, 1991), demonstrated the possibility of using thyme as a dwelling for intestinal colic and to treat gastroenteritis and gastric ulcer,it is a regulator of gastrointestinal functions (Bulokbasi and Erhan, 2007), thyme or its primary materials are safe to use in general and have not shown negative effects during the use of thyme (Chivallier, 1996). This study aims at the possibility of using the boiled water extract and its effect on some of the productive characteristics of broilers.

Materials and Methods

Design experience

This experiment was carried out in the poultry field the research and agricultural experiments station, Agriculture Faculty, Al-Muthanna University for the period from 15/10/2015 until 22/11/2015,135 broiler chicks, one day, 40 g were used, divided into three experimental treatments with 45 broilers per treatment and three replicate each treatment (15 chick / replicate), Treatments were as follows:

1. First treatment: (control treatment).

2. Second treatment: 6 ml of thyme leaves water extract were added per 1 liter of water.

3. Third treatment: 8 ml of thyme leaves water extract were added per 1 liter of water.

Traits studied

The birds were weighed weekly to measure weekly body weight and weekly weight gain, the amount of feed

consumed each week was measured by the amount of feed remaining at the end of the period and subtracted from the total quantity provided during the period,the weekly feed conversion coefficient was calculated as reported by Al-Zubaidi (1986) by the following formula:

$$\text{Feed conversion efficiency} = \frac{\text{Average weekly feed intake (g)}}{\text{Average weekly increased in weight (g)}}$$

Production index was evaluated according to Naji (2006), by the formula:

$$\text{Production index} = \frac{\text{Final body weight} \times \text{Availability}}{\text{Duration (days)} \times \text{Feed conversion} \times 10}$$

Aviabilty = 100 – mortality.

Statistical analysis

Data were analyzed for statistically tested characteristics using Completely Randomized Design (CRD), using the ready statistical program (SAS, 2001). The Duncan was used at a probability level (0.05) to test the significant differences between the studied averages (Duncan, 1955).

Results and Discussion

Table 1 shows the effect of the use of the water extract of thyme leaves in the weekly body weight of broiler, there was a significant increased (P≤0.05) for T2 and T3 compared to the control treatment (T1) throughout the research period.

Table 2 shows the effect of using the water extract of thyme leaves on the body gain weekly of broilers, at the first week, T2 and T3 was a significantly increased (P≤0.05) compared with control treatment, at the second week, there were no significant differences between all treatments at the last three weeks of age, T3 showed a significant increased (P≤0.05) compared with the other treatments, T2 was superior to the control treatment at the same age.

A significantly improvement in body weight and weight gain in the treatments in which the thyme leaves water extract was used with drinking water at different levels compared to control treatment,this is due to the role of active substances in thyme leaves, where the leaves contain volatile oils (5-25%). This oil contains about 55% of the phenolic substances. Thymol and carcacrol are attributed to the medicinal benefits of thyme (Wright, 2002), as well as on resinous and linoleic acid (Watt, 1995), as stimulants for the digestive system and improving digestion (Cabuk *et al*., 2003), which lead to the increase of digestive enzymes such as chemotrypsin, amylase, lipase and trypsin in birds (Muthamma *et al*., 2006), the improvement of digestion and increase the benefit of birds from food intake and reflected on the growth of birds and the final yield positively of increase of weight gain and the final weight of birds (Lee and *et al*., 2004). There is a positive correlation coefficient between digestion rate, body weight and feed intake (Abdel Rahman *et al*., 2013).

Table 3 indicates the effect of the use of the water extract of thyme leaves in the weekly feed consumption of broiler, T2 and T3 were significantly (P≤0.05) higher than the control treatment at the first week of age, at the second week there are no significant differences between all treatments, while at the last three weeks of the birds age it was observed that significant superiority (P≤0.05) in control compare with T2 and T3.

Table 4 shows the effect of the water extract of thyme leaves on the efficiency of the feed conversion of broiler,no significant differences were observed in all treatments during the first week of age,at the last four week of the age of the broiler showed all the water extract of thyme leaves treatments a significantly improved (P≤0.05) in the efficiency of food conversion compared to the control treatment,while there were no significant differences between T2 and T3.

A significant superiority of all treatments in which the water extract of thyme leaves was used in the rate of feed conversion efficiency compared to control

Table 1 : Effect thyme leaves boiling water extract on weekly body weight (g) of broilers ± standard error.

Treatments	Age (week)				
	1	2	3	4	5
T1	150.60b±1.47	400.30b±3.87	850.40b±8.62	1320.40b±12.96	1880.10b±17.98
T2	**168.10a**±1.55	421.37a±4.06	883.30a±7.75	1370.00a±13.09	1995.20a±16.45
T3	170.20a±1.39	427.20a±3.73	888.20a±7.88	1375.10a±12.73	2001.30a±16.33
Sig.	*	*	*	*	*

T1: (control treatment). **T2:** 6 ml of thyme leaves water extract were added per 1 liter of water. **T3:** 8 ml of thyme leaves water extract were added per 1 liter of water. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of 0.05.

Table 2 : Effect thyme leaves boiling water extract on weekly body gain (g) of broilers ± standard error.

Treatments	Age (week)					Total weight gain
	1	2	3	4	5	
T1	1.07 ± b110.60	2.37±249.30	4.04 ± b450.10	4.56 ± b470.00	5.35 ± b559.70	17.93 ± b1889.70
T2	1.11 ± a128.10	2.27±253.27	4.11 ± a463.93	4.49 ± a484.70	5.12 ± a625.20	16.88 ± a1955.20
T3	1.10 ± a130.20	2.30±254.00	4.26 ± a464.00	4.61 ± a486.90	5.09 ± a626.20	16.71 ± a1961.30
Sig.	*	N.S	*	*	*	*

T1: (control treatment). **T2:** 6 ml of thyme leaves water extract were added per 1 liter of water. **T3:** 8 ml of thyme leaves water extract were added per 1 liter of water. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05). N.S: Non-significant.

Table 3 : Effect thyme leaves boiling water extract on weekly feed consumption (g) of broilers ± standard error.

Treatments	Age (week)					Total feed consumption
	1	2	3	4	5	
T1	1.22 ± b168.11	3.87±408.85	6.90± a 742.66	7.67 ± a822.50	10.46± c 1091.41	31.36± b3233.53
T2	1.32 ± a192.15	3.66±400.16	6.59 ±b 723.73	7.52 ± b799.75	10.24±b 1137.86	30.49±a 3253.65
T3	1.16 ± a193.99	3.59±401.32	6.72±c 709.92	7.46± c783.90	10.33± a 1114.63	31.54± c3203.76
Sig.	*	N.S	*	*	*	*

T1: (control treatment). **T2:** 6 ml of thyme leaves water extract were added per 1 liter of water. **T3:** 8 ml of thyme leaves water extract were added per 1 liter of water. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05). N.S: Non-significant.

Table 4 : Effect thyme leaves boiling water extract on weekly feed conversion (g) of broilers ± standard error.

Treatments	Age (week)					Average feed conversion
	1	2	3	4	5	
T1	0.01±1.52	0.02 ± b1.64	0.01 ± b1.65	0.02 ± b1.75	0.03 ± b1.95	0.02 ± b1.71
T2	0.02±1.50	0.02 ± a1.58	0.02 ± a1.56	0.02 ± a1.65	0.02 ± a1.82	0.02 ± ab1.66
T3	0.01±1.49	0.02 ±a 1.58	0.01 ± a1.55	0.02 ± a1.61	0.02 ± a1.78	0.01 ± a1.63
Sig.	N.S	*	*	*	*	*

T1: (control treatment). **T2:** 6 ml of thyme leaves water extract were added per 1 liter of water. **T3:** 8 ml of thyme leaves water extract were added per 1 liter of water. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05). N.S: Non-significant.

treatment, this is due to the role of active substances in improving digestion and absorption capacity of digested food due to an increase in the depths of the villi and the length of the crept, as well as increase the process of food analysis by microbiology useful, which increases the utilization of nutrients better and reduce the amount of undigested food within the digestive system, or may be due to the role of active compounds in thyme in mitochondrial balance in the intestines (Cabuk *et al*., 2006).

The beneficial microorganisms outweigh the harmful microorganisms and increase the secretion of enzymes from the intestinal flora, which increases the digested foodstuffs and convert them into simpler units, which are used by the birds more and less quantity with the waste, which is reflected on the efficiency of food conversion (Amin Agha, 2002).

Table 5 shows the effect of the water extract of thyme leaves on mortality and the productive index of broiler,all the thyme leaves water extract treatments (T2 and T3) showed a significant effect (P≤0.05) in reducing mortality compared to control treatment,with a significant increase (P≤0.05) in the production index value for T2 and T3 compared to the first treatment (control), no significant differences were observed between T2 and T3.

The thyme leaves water extract treatments reduced the mortality and increased of the production index values of broilers, this may be due to the fact that active substances such as flavonoids, carvecrol and thymul act as natural antioxidants and antimicrobial agents (Barnes

Table 5 : Effect thyme leaves boiling water extract on mortality (%) and production index of broilers ± standard error.

Treatments	Mortality	Production index
T1	7.79a±0.72	289.82b±2.76
T2	3.45b±0.36	331.56a±2.87
T3	3.38b±0.33	338.94a±2.65
Sig.	*	*

T1: (control treatment). **T2:** 6 ml of thyme leaves water extract were added per 1 liter of water. **T3:** 8 ml of thyme leaves water extract were added per 1 liter of water. *Different letters vertically indicate the existence of significant differences between the averages at the possibility of (0.05). N.S: Non-significant.

et al., 2002), it inhibits many pathogenic bacteria, especially Escherichia coli and Salmonella typhimurium. In addition, they inhibit or kill pathogenic organisms by inhibiting their internal enzymatic system (Priccaglia and Marotti, 1991), which is reflected positively on the vitality and health of birds and the mortality low and all this improvement in the qualities of production performance is reflected positively on the values of the production index, which are important indicators in evaluating the performance of production of broilers.

Conclusion

The use of boiling water extract of thyme leaves with different levels of 6 and 8 ml / liter of drinking broilers, had given the best results throughout the breeding duration, led to an improvement in some of the productive characteristics (body weight, weight gain, feed consumption and feed conversion and production index) as well as reducing the mortality of broilers.

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