



Effect of Peppermints and Thyme powder on performance and carcass characteristics in broiler

¹M. Adibnezhad*, ²B. Chaharaeen, ¹H.R. Mohammadian-Tabrizi, ¹M.R. Pourelmi and ²H. Khamis Abadi

¹Islamic Azad University-Chalous Branch, Mazandaran, Iran; ²Associate Research Centre of Kermanshah, Iran

Abstract

This study was conducted to evaluate the effects of combination of two herbs Peppermint and Thyme powder on broiler performance and carcass characteristics. This experiment was done in a completely randomized design using 300 one day-old broilers (Ross) with five treatments and three replicates. Treatments include control (without any additives; T1), 1% Peppermint and 0.5% of Thyme (T2), 1% Peppermint and 1% Thyme (T3), 2% Peppermint and 0.5 % Thyme (T4) and 2% Peppermint and 1% of Thyme (T5). Results showed that feed intake in whole period (42 d) was not affected by treatments ($P>0.05$), although in the period of 1 to 21 d, there was significant increase ($P<0.05$) in T2 in terms of daily feed intake. Average daily gain in 1-21d, 22-42d and in the entire period was not affected by treatment ($P>0.05$), although numerically the largest weight gain was found in T5. The lowest feed conversion ratio (FCR) was observed in T3 in total periods although FCR was not affected significantly in all three experimental periods ($P>0.05$). The results showed that carcass weight, thigh weight, wing weight, chest weight, neck weight and liver weight at the end of the period was significantly high in T5 ($P<0.05$). However, the back weight, gizzard weight, intestinal length and abdominal fat were not affected by treatments ($P>0.05$). The results showed that the use of T5 in poultry rations have a good impact on performance and carcass characteristics.

Keywords: Peppermint powder; Thyme powder; Ross strain; broilers

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Introduction

According to WHO estimates, more than 80 percent of the populations in developing countries owe their health directly and indirectly to herbs and medicinal plants (Canter et al., 2005). The natural medicines of plant origin is such that only in US represented the amount of the drug trade to reach \$ 62 billion per year and in 2050, this figure is expected to reach \$ 5,000 billion (Kumar and Gupta, 2008). More than 70 percent of the 50,000 species of medicinal plants that are used are collected from nature, moreover, fewer than 10 percent of them are cultivated in European countries which due to the pressure on natural resources require further study (Canter et al., 2005). Vegetable additives and plant derivatives are used in poultry and other livestock feed for improving the properties and composition of food, food quality

and they could improve production performance and increase animal production and profitability (Windisch, 2008).

Different parts of plants including roots, stems and flowers can be added to the animal feed. Used species can be varied in terms of taste and odour. Many *in vitro* and *in vivo* studies have demonstrated the antibacterial, antimicrobial and antiseptic of these plants (Windisch, 2008). Notable benefits of herbal additives in poultry nutrition include the palatability of food (through increased stimulation and secretion of digestive enzymes) and thereby improve feed intake, stimulate the immune system and depress bacterial, antiviral activities and inflammation (Nasir and Grashon, 2009). Study on the herb additives has been done frequently, however, the combination of two or more plants in poultry diets has been least practised. The objective of the present study was to find the effect of Peppermints

*Corresponding author: M. Adibnezhad, Islamic Azad University-Chalous Branch, Mazandaran, Iran

and Thyme powder on the performance and carcass quality of broiler.

Materials and Methods

This experiment was done according to a completely randomized design from 1-42d including one week of adaptation period to the basal diet. The experiment was designed with 5 treatments, 3 replicates and 20 chicks per replicate. Experimental treatments were isoenergetic and isonitrogenous. Treatments include Treatment 1 (without any additives; control), T2 (containing 1% Peppermint and 0.5% of Thyme; T3 (containing 1% Peppermint and 1% Thyme), T4 (containing 2% Peppermint and 0.5% of Thyme and T5 (containing 2% Peppermint and 1% of Thyme respectively). Feed intake and weight gain was measured and calculated at specific intervals. At the end of the experiment, two birds per replicate were slaughtered. The skin was eviscerated. Liver, neck, chest, wing, thigh and whole carcass were weighed for each group.

Analysis of variance was done by SPSS software using Duncan multiple range test ($P < 0.05$) unless otherwise mentioned. The composition of the basal diet was formulated based on NRC (1994).

Results and Discussion

Effect of treatments on feed intake was not significant in the entire period ($P > 0.05$) as shown in Table 1. The amount of feed intake was significantly different between treatments during the first 21 d ($P < 0.05$). The highest amount of food intake in the total was seen in T5, although the difference was not significant. These results are consistent to results of Hernandez et al. (2004) who showed that a mixture of Thyme and Rosemary essential oils had no significant effect on feed intake. In a study (Jang et al., 2007), a mixture of volatile oils containing Thymol and Carvacrol had no significant effect in different periods on broiler performance. Furthermore, effect of different treatments on weight gain in the entire period was not significant ($P > 0.05$) as shown in Table 2. In the total period of experiment, the T5 had the greatest weight gain, and the lowest belonged to the control treatment. In consistent with the result of this study Al-

Mashhadani et al. (2011) demonstrated that the body weight gain was significantly higher in treatments containing Thyme and Anise oil, and a mixture of these two treatments compared with control treatment. In another study, Demir et al. (2010) showed that birds fed the Flavomycin had higher weight gain and feed intake than those supplemented Peppermint, Sage and Thyme.

Effect of different treatments on feed conversion ratio (FCR) in 1 to 21 d, 22 to 42 d and the entire period was not statistically significant (Table 3). The lowest FCR ratio for the entire period was seen in T3 and T5. However, T4 had the highest FCR. Ocaik et al. (2008) studied the effect of diets containing dried leaf of Thyme

Table 1: The effect of various experimental treatments on daily feed intake (g/d)

Treatments	1-21 Days	22-42 Days	1-42 Days
T1	83.93 ^{ab}	142.32	113.62
T2	86.55 ^a	143.08	115.00
T3	83.10 ^b	143.84	113.97
T4	82.87 ^{bc}	145.42	114.65
T5	81.95 ^c	143.40	115.43
SEM	0.15	1.95	0.76
P value	0.01	0.43	0.11

Different letters in a column indicate significant differences between the experimental groups ($P < 0.05$)

Table 2: Effect of different treatments on average daily gain (g/d)

Treatments	1-21 Days	22-42 Days	1-42 Days
T1	41.75	70.23	55.99
T2	42.49	71.04	56.76
T3	40.89	71.56	56.21
T4	40.79	72.40	56.60
T5	40.62	74.19	57.41
SEM	1.12	0.13	0.93
P value	0.59	0.63	0.234

Table 3: The effect of various experimental treatments on feed conversion ratio (g/g)

Treatments	1-21 Days	22-42 Days	1-42 Days
T1	2.01	2.02	2.02
T2	2.03	2.01	2.02
T3	2.03	2.01	2.01
T4	2.03	2.01	2.02
T5	2.01	1.93	2.01
SEM	0.04	0.01	0.04
P value	0.95	0.81	0.87

Table 4a: Effect of experimental treatments on carcass characteristics (g)

Treatment	Liver weight	Neck weight	Chest weight	Wing weight	Thigh weight	Carcass weight
T1	60.50 ^b	115.00 ^b	716.17 ^c	184.83 ^b	492.17 ^c	1710.20 ^{cd}
T2	61.00 ^{ab}	134.00 ^{ab}	791.67 ^b	209.83 ^{ab}	528.3 ^a	1866.30 ^c
T3	52.50 ^c	129.33 ^{ab}	811.67 ^{ab}	211.3 ^{ab}	553.00 ^b	1867.30 ^c
T4	69.83 ^a	131.67 ^{ab}	885.50 ^{ab}	211.67 ^{ab}	595.67 ^b	2014.30 ^b
T5	67.83 ^a	136.67 ^a	975.83 ^a	213.17 ^a	664.17 ^a	22020 ^a
SEM	4.75	5.10	25.89	4.08	23.68	37.20
P value	0.001	0.002	<0.04	0.04	0.03	0.05

There are different letters in each column indicate significant differences between the groups ($P < 0.05$)

Table 4b: Effect of experimental treatments on carcass characteristics (g)

Treatment	Gizzard weight (g)	Fat (g)	Intestinal length (cm)	Back weight (g)
T1	37.33	27.83	202.16	208.17
T2	41.50	35.66	216.83	221.17
T3	40.33	41.50	221.16	206.85
T4	35.66	45.50	219.33	231.50
T5	45.50	37.3	219.3	243.67
SEM	3.82	8.60	5.94	14.28
P value	0.51	0.35	0.02	0.07

and Mint on broiler performance and concluded that diets containing Mint and Thyme had no significant impact on FCR. Furthermore, Narimani Raad et al. (2011) observed that treatments including Oregano, Thyme and Peppermint consumption resulted in the greatest weight gain and the best FCR which was inconsistent with the results of this study.

As can be seen from the results of Table 4a, the effect of different treatments on carcass weight, thigh, wings, breast, neck and liver was significant ($P < 0.05$). T5 had the highest carcass weight, thigh, wing and breast, and T3 had the highest weight of neck and intestinal length. Durrani et al. (2007) reported that average percentage of carcass in chicken fed with alcoholic extract of Peppermint caused significant increase in broiler which is consistent with the result of this study. In a survey, Hosseini Mansoub and Poor Yousef Myandoab (2011) showed that different levels of Thyme had significant effect on carcass traits of broiler chicken. Durrani et al. (2007) also found chickens that received diets containing Peppermint had higher pectoral muscle weight than the control group. Al-Kassie (2010) reported that chickens fed with 0.5% Mint showed increased liver weight than the control group. Also the weight back, gizzard, intestine and body fat were not affected by treatment ($P > 0.05$). There was no significant difference between treatments in weight of back. The lowest weight of back was seen numerically in T3 and the highest in T5.

Statistically no significant difference was found between treatments in gizzard weight (Table 4b). The lowest weight of gizzard was seen in T4 and the highest in T5. It has been shown that the use of Peppermint in broiler diets had no effect on gizzard weight (Durrani et al., 2007). Consistent to our results, Denly et al. (2004) reported that the essential oil of Thyme and black beans in Japanese quail diet had no significant effect on the relative weight of gizzard. Dry leaves of Thyme and Peppermint in poultry diets showed no significant impact on the intestinal length (Ocak et al., 2008). Nanekarani et al. (2012) showed that abdominal fat in broilers decreased with supplementation of 0.3 percent Peppermint.

Conclusion

Based on the results of this study, we concluded that Thyme and Peppermint powder at level of 3%

(Peppermint 2 % and thyme 1%) had positive effects on performance and carcass characteristics.

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