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EFFECT OF ADDING THYME POWDER AND TOMATO POWDER IN DIET ON THE CARCASS AND MEAT CHARACTERISTIC OF QUAIL

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Abstract

Thyme leaf powder (TLP) and tomato fruit powder (TFP) were used in this experiment to demonstrate their effect on the carcass and meat characteristic. A total number of 120 birds quail (*Coturnix coturnix*) males that lasted for 60 days. The birds were 55 days old randomly distributed in 4 treatments each containing 6 replicates and each containing 5 birds were feeding free and program lighting was used as continuously. The experiment was divided in 4 treatment; first treatment feed with basal diet (without use any additive), the second treatment: use 0.5% TLP and the third treatment: use 0.5% T'FP, forth treatment: 0.5% TLP + 0.5% TFP. The results of the experiment showed no significant differences (P<0.05) between the treatments when using thyme leaf powder and tomato fruit powder on the carcass characteristics such as live body weight (LBW), carcass weight (CW), dressing percentage (DP), breast weight percentage (BWP), thighs weight percentage (TWP). In meat characteristics, breast showed that significant differences (P<0.05) between the treatments on the water holding capacity (WHC), the edit treatment (TLP 0.5%, TFP 0.5%, TLP 0.5%+ TFP 0.5%) was better than control treatment. In thighs thawing loose was less than when use TLP 0.5% compared with control which is the grater in thawing loose.

***Keywords*:** Quail, thyme, tomato, quail meat

Introduction

In standoff quail birds are small birds, they are third in production of eggs and meat after chickens and ducks. The high production of quail in eggs or meat is due to the high efficiency of food conversion ratio, which characterizes quail in low production costs and high production of eggs and meat. The modern science has proved that quail meat is the best types of poultry meat in terms of taste and benefits to a cure of many diseases, additional the beard has high resistance to diseases and extreme weather conditions than other poultry (chickens, ducks and turkeys). Recently the birds have been very interested by researchers because of its productivity of eggs and meat when measured on the basis of the production of kilo grams of eggs and meat (Vali, 2008). The meat of quail is one of the best types of white meat as it is characterized by smooth meat because of the muscle tissue is considered to be soft, which makes it easy to chew and palpability as well as high levels of unsaturated fats especially omega-3, omega-6, linoleic, linolenic and low concentration of cholesterol in meat compared with chicken meat (Rogerio, 2009). So, this meat can be oxidation and rancidity, which necessary to use antioxidant especially natural ones like thyme and tomato (Wang *et al.*, 1998 and Seung-Joo *et al.*, 2005) which contain potent substance activity material such as phenolic compounds which are highly effective as antioxidants that exceed vitamin E (Bölükbaşi *et al.*, 2006). Tomato contains the colored material that gives the tomatoes the distinctive red color, this substance called Lycopene which have a strong antioxidants and these substances work to prevent the generation of free radicals produced by various vital functions in the body of the bird (Bartosikova *et al.*, 2003, Prakash and Joshi, 2004, Sahin *et al.*, 2008).

On this facts we consider to use of thyme leaf powder and tomato fruit powder as natural stuffs compounds antioxidant to reduce fat oxidation of quail meat and improve the activity of the organism in bird body then improve beard performance and quality of meat.

Materials and Methods

The trial period was 60 days, with 120 male quail (*Coturnix coturnix*) aged 55 days and similar mean weight were weighed and randomly distributed to 6 treatments each containing 6 replicates and each replicate containing 5 birds. In this experiment use thyme leaf powder and tomato fruit powder as follows: first treatment feed with basal diet (without use any additive) was formulated according to National Research Council (NRC) recommendations, the second treatment: use 0.5% TLP, third treatment: use 0.5% T'FP and forth treatment: use 0.5% TLP + 0.5% TFP (Table 1). All birds were under the same environmental conditions of 25 °C and continuous lighting 24 hours a day to stimulate the birds to eat as much feed as possible to increase their weight. Feed and water were provided *ad libitum*.

- Thyme leaf powder: - Thyme leaves powder was obtained from the local markets.
- Tomato powder: - The fruit of tomato was purchased completely from the local markets and dried in the shade until the moisture drop to the extent of 10-15% in order to be milled in the form of powder and easy to add to the birds diet.
- Samples of animal and carcass characteristic: - At the end of the experiment random samples were taken from each treatment (two males from each replicate) to measure live body weight (LBW), then slaughtered and cleaned well then cut the carcasses in two main pieces thighs and breast were stored at 7°C for 12 hours after that we takin carcass weight (CW), dressing percentage (DP) which calculated by CW/LBW*100, thighs weight percentage (TWP), breast weight percentage

(BWP), and then frozen under temperature of -17°C. The required measurements were then taken on the specific qualities of the breast and thighs meat such as the thawing loss (TL) (Nam *et al.*, 2000), cooking loss (CL) (Rasmussen and Mast, 1989) and water holding capacity (WHC).

Table 1 : Ingredient and chemical composition of treatment for quail diets.

Ingredient %	Treatment			
	Control	TLP 0.5%	TFP 0.5%	TLP 0.5% + TFP 0.5%
Wheat ground	35.00	43.00	43.00	43.00
Barley	31.75	23.25	23.25	22.75
Soybean meal (44% protein)	22.60	22.60	22.60	22.60
Animal protein concentration* (40% protein)	5.00	5.00	5.00	5.00
Vegetable oil	3.70	3.70	3.70	3.70
Calcium	0.50	0.50	0.50	0.50
Dicalcium Phosphate	0.85	0.85	0.85	0.85
Sodium Chloride	0.15	0.15	0.15	0.15
Vitamin and Mineral premix	0.10	0.10	0.10	0.10
Enzyme premix	0.10	0.10	0.10	0.10
Lysine	0.10	0.10	0.10	0.10
Methionine	0.15	0.15	0.15	0.15
Thyme powder	——	0.50	——	0.50
Tomato powder	——	——	0.50	0.50
Total	100	100	100	100
Chemical composition**				
Crude protein %	20.06	19.93	19.91	20.09
ME (Kcal/Kg diet)	3211	3194	3191	3215

*The Animal protein provided the following: 40% crude protein, 2100 kcal/ kg, 5% crude fat, 3.85% lysine 3.70% methionine, 4.12% methionine + systeine, 5% calcium and 4.68% phosphorus.

** The values of the chemical composition of the feed materials included in the feed composition were calculated according to NRC recommendations for the year 1994.

Statistical Analysis

The Statistical Analysis System (SAS) Program used in this experiment (SAS, 2001). performed using full random design (CRD). In order to significantly test (P<0.05) the differences between the treatments was used Duncan Multidisciplinary Test (Duncan, 1955).

Results

The results of the statistical analysis in Table (2) show no significant differences (P<0.05) between the treatments of live body weight, empty carcass weight, dressing percentage and thighs weight percentage and breast weight percentage.

In Table (3), there was no significant difference (P<0.05) in thawing loose of breast meat and cooking loose what ever in treatments grubs the water holding capacity is decreased and the control was the best in water holding capacity. In thigh cut the treatment 0.5% TLP were the lowest in thawing loose compared to birds fed on tomato fruit powder and mixing of thyme and tomato while control group was the highest in thawing loose. When comparing control treatment with the rest of the treatments there were no significant differences (P<0.05) between them in cooking loose and water holding capacity.

Table 2 : Effect of thyme leaf powder and tomato fruit powder upon the live body weight, carcass weight, dressing percentage, thighs weight percentage, breast weight percentage in quail. (Mean ± SE)

	Treatments			
	Control	TLP 0.5%	TFP 0.5%	TLP 0.5% + TFP 0.5%
Live body weight (g)	187.67±4.43	202.58±7.07	193.50±9.61	182.75±3.90
Carcass weight (g)	138.25±3.72	149.25±5.45	143.67±7.12	135.50±2.96
Dressing percentage %	73.62±0.01	73.67±0.01	74.40±0.01	74.21±0.01
Thighs weight percentage %	22.10±0.01	22.60±0.02	23.06±0.02	22.35±0.01
Breast weight percentage %	34.46±0.01	34.29±0.01	33.99±0.01	34.71±0.02

a, b: A letter in the same column means significantly different between the treatment (p<0.05).

*control: basal diet, TLP 0.5%: basal diet+0.5% thyme leaf powder, TFP 0.5%: basal diet+0.5% tomato fruit powder, TLP 0.5%+TFP 0.5%: basal diet+0.5% thyme leaf powder+0.5% tomato fruit powder.

Table 3 : Effect of thyme leaf powder and tomato fruit powder upon thawing loss, cooking loss, water holding capacity on breast and thighs meat quail. (Mean±SE)

	Treatments*			
	Control	**TLP 0.5%**	**TFP 0.5%**	**TLP 0.5%+ TFP 0.5%**
Breast				
Thawing loose %	7.21±0.01	5.35±0.01	4.18±0.01	7.20±0.01
Cooking loose %	34.34±0.02	31.78±0.02	29.46±0.01	31.23±0.02
Water holding capacity %	5.62±0.01[a]	2.28±0.01[b]	2.05±0.01[b]	1.74±0.01[b]
Thighs				
Thawing loose %	8.10±0.02[a]	3.34±0.01[b]	5.53±0.02[ab]	4.95±0.01[ab]
Cooking loose %	25.43±0.02	23.39±0.02	20.84±0.01	24.30±0.02
Water holding capacity %	0.40±0.01	1.14±0.01	0.46±0.01	0.75±0.01

a, b: A letter in the same column means significantly different between the treatment ($p<0.05$).
*control: basal diet, TLP 0.5%: basal diet+0.5% thyme leaf powder, TFP 0.5%: basal diet+0.5% tomato fruit powder, TLP 0.5%+TFP 0.5%: basal diet+0.5% thyme leaf powder+0.5% tomato fruit powder.

Discussion

The results indicate that the feeding of male quail on thyme powder and tomato did not effect on live body weight and carcass weight this may be due to the fact that these birds have reached the age of 55 days in which decrease body weight gain which leads to stability the weight of birds even when adding thyme and tomatoes to the diet, which are considered as antioxidants and are working to increase the vital events in the body of birds (Sahin *et al*., 2008), leading to increase in body weight but they did not have a significant impact on the male quail. About no effect of treatment on dressing percentage, thighs weight percentage and breast weight percentage are due to decline composition of muscle proteins or increase the decomposition of proteins in the muscles of birds in this age (Hayashi *et al.*, 1994) then decreased thighs and breast weight percentage, and this has been confirmed by Khaksar *et al*. (2012) when using thyme oil in feeding quail has increased the weight of the carcass and breast weight percentage but did not affect on the rest of carcass components such as the weight of thighs, drumsticks. Leal et. al., (1999) showed that when broiler exposed to the fungal toxins lead to a decrease in the body weight of birds and feed consumption and feed conversion ratio and the addition of antioxidants have reduced the effect of these toxins' fungal on bird's performance. In an experiment of Jain et. al., (1999) on rats did not affect the addition of likopene on live weight and feed consumption under normal conditions. Lee *et al.* (2003) found when they added 200 ppm of thyme in the diet of female broilers did not affect on body weight, feed consumption and feed conversion ratio.

Sahin *et al*. (2008) use tomato powder (0%, 2.5% and 5.0%) in the feeding of quail males, there were no significant differences between the treatment in raising the birds at normal temperatures, while there was a significant effect when increase stress on birds by increased environment temperature, in this point the effect appeared of likopene, vitamin C, vitamin A, phenols and flavonoids, which have a high anti-oxidant found in tomatoes. (Beecher, 1998, Agarwal and Rao, 2000).

Conclusions

These results indicate that it is not necessary that plant food additives affect the productivity of birds, especially if they are healthy and under good environmental conditions (Botsoglou *et al*., 2004). It is not useful to breed quail males for the fattening purpose after the age of 55 days, even if the addition of materials that may help to improve the growth of birds, but these materials can be used as natural antioxidants when there is stress on birds (thermo neutral conditions) such as warming of the atmosphere which increase free radicals in the body of birds and thus affect the performance of birds and the quality of their meat.

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