Effect of adding turmeric powder to local buck rabbit's rations on some production and blood traits

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Abstract. Male rabbits are tested when turmeric powder was added to their daily food over 4-5 weeks. The food consists of 15.8% crude protein including 2865.5 Kcal/ Kg metabolizable energy. The test was carried over three sets of 10 rabbits. The turmeric was fed under a control process of 4 or 8 gram/kg. These groups are classified into T1: without adding nothing, including T2 and T3 with added turmeric with 4 and 8 gram/Kg respectively. The biochemical blood parameters of slaughtered rabbits are investigated and studied. Quite good results were achieved that approve the Turmeric powder has a direct influence on the production and blood traits when T1 and T2 feed control were applied and adopted.

Keywords: Rabbits, Turmeric powder, blood attributes.

1 Introduction

Recent studies confirm there is a good interest in the meat quality from rabbits compared to the one produced from pigs and beef [1]. It is shown that the rabbits convert 20% of protein into meat and this higher than the percentage to 16-18 for pigs and 8-12 beef. Furthermore, the meat of the rabbit is considered a low fats meat because it's the low content of fat. In addition, this fat is low in cholesterol and saturated fatty acids [1]. All these meat features of rabbit's meat and dietary characteristics are increasing the values of this type of meat in the meat industry. Taking under consideration that the rabbit's meat production was reached 1,141,893 tons in 2005 globally [2]. The evaluation of rabbit's meat performance and carcass traits are commonly the main variables used to evaluate the rabbit meat production process. In recent eras, numerous efforts have been made to develop alternatives to antibiotics in order to maintain livestock health; improve animal production, and to enhance the carcass characters [3]. Likewise, Rabbit meat also contains a higher proportion of essential, unsaturated fatty acids, including linoleic, and linolenic, these fatty acids represent a 36% of the total fatty acids in the rabbit's fat. The high demand to identify alternative natural and suitable sources of food antioxidants has increasingly arisen. So, this leads to an increase in the search for natural antioxidants, in particular from plant origin, as highly considered in recent years.

Antioxidants widely considered as food additives to protect against the oxidative degradation of foods like this turmeric [4-6]. The popular herb derived Turmeric has a strong yellow colour [7], and is produced by its polyphenol constituent, curcumin (diferuloylmethane). Curry powder is isolated from the rhizome of the plant Curcuma longa. Apart from its application as food-coloring agent Curcumin, a hydrophobic polyphenol derived from the rhizome of the

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herb *Curcuma longa* has a broad spectrum of biological and pharmacological activities. It also affects to enhance the animal's growth and performance [8]. Chemically, curcumin is a bis-R,-unsaturated-diketone commonly called diferuloylmethane [9]. Many studies showed that curcumin exhibits antimicrobial activity [10], anti-inflammatory،antitumor and ant oxidative properties [11-13], and enhance liver enzyme [14]. Moreover, it has been indicated hypolipidemic effects of turmeric and curcumin [15, 16]. And it has been found the effect to decrease the cholesterol level in humans [17] and in rabbits which suggested the role to manage the cardiovascular disease [12]. Furthermore, it has been indicated the beneficial role of turmeric extract in other diseases and disorders including obesity, diabetes and liver disease [18-21]; whereas to the anti-inflammatory effects the immune system [22-24]. So, this study investigates the effect of the inclusion of turmeric powder in diets on fattening rabbits and some blood biochemical traits.

2 Materials and Methods:

The experiment took place in the Al-Huda Al-Ahly field in the Tall-Kaif region at Nineveh province. Thirty local male rabbits, aged about (4-5 weeks) with mean weight (534 ± 1.5g) was used to study the effect of turmeric powder on fattening rabbits. Three treatments were randomly divided into three groups (10 rabbits/group) and five replications (2 rabbits in each repeater) for each group and put repeater (10 bis) in cages made of wood and wire clamp and placed in the hall. The chamber containing a vacuum pump (for the introduction of fresh air) and room light regulator supported by an electric lamp. For 16 hours a day, Ration was provided manually, daily and the time specified and fixed for all the groups with libitum water, This study used ration and one (Table 1) with the proportion of protein (16.12%) and the amount of energy calculated in Ration is 2684 kcal/ kg feed, according to [25]. and provided the same Ration to all transactions, Add turmeric powder to the second and third treatment, as follows:

- **The first treatment**: ration control.
- **The second treatment:** ration control + 4 g turmeric powder / kg ration.
- **The third treatment:** ration control circuit +8 g turmeric powder/kg ration.

The feed conversion was determined by calculating the amount of feed that required for production and increasing the body weight (g, feed/ g, gain) (Table 2) as the following equation:

$$FCR = Feed\ consumption\ /\ Body\ weight\ gain$$

At the end of the feeding period (8 weeks), the final weight was determined (Table 2) as the following equation:

BWI= ((final body weight – Initial body weight) / Initial body weight) x 100

Then all rabbits from treatments were determined the carcass parameters according to [6]. Rabbits had fasted for 12 hours and weighted then slaughtered based on Islamic rules. Edible offal's (Giblets) that include heart, liver, kidneys, lungs, spleen, and testes were removed and individually weighed. Full and empty weights of small and large intestines were recorded, and contents of small and large intestines were calculated by differences between full/empty and small/large. The hot carcass was weighed and divided into fore, middle and hind parts. The

blood from each rabbit was extracted and the meat considered for the study. Thirty blood samples were processed for heparinized test tubes and centrifuged at 3000 rpm for 15 minutes. The plasma was collected and preserved in a deep freezer at -18°C up to the time of analysis. The total protein in the plasma was calculated as in [26]. Plasma Glutamic Oxaloacetic Transaminase (GOT) and Glutamic Pyruvic Transaminase (GPT) activities were determined as in [27]. Triglycerides and total cholesterol using a kit factory by the company (Bio Labo Reagents, Mazy. France) was determined according to [28].

A statistical method applied to adopt the model procedure of SPSS (2000). To separate the resources of the elements, Duncan's Multiple Range Test (1955) was used for the dietary treatment effect.

The following model was used:

Yij= μ+ ti + eij
Yij= Experiment observations.
μ= the overall mean.
ti= The effect of dietary treatment
eij= The experimental error.

3 Results and discussion:

3.1 The qualities of Productivity*:*

The qualities Productivity: Table 2 shows Supplementation of turmeric powder were significant in the final weight, weight gain, feed intake, feed conversion ratio and relative growth ratio in T2 and T3 when compared to control, Attributed the increase in the body weight gain to the antioxidant activity of Curcuma longa [29]. The results are in concurrence with the supplementation of turmeric (Curcuma longa) increases the growth of broilers when added at the rate of 0.75% level as feed additives in broiler ration [30] or a significant increase in body weight in T2+T3. Turmeric powder may be due to the optimum antioxidant activity of turmeric (Curcuma longa) that can stimulate protein synthesis enzymatic system [31]. The results presented by [32] reported that the growth is enhanced by using curcuminoids and curcumin. A high potential for the use of turmeric extract that prevents pathogenic bacteria in chicken [33].

3.2 Carcass characteristics:

The obtained results in this study are illustrated in the table (3); there were signs in the hot carcass and dressing percentages in treatments (T2+T3). This difference may be due to an increase in the weight (0, 0.05) of hot and cold carcasses, which is based on the addition of 8 kg/kg of calmer powder, which is attributed to the final weight before slaughtering the rabbits fed on the mentioned breeds. This moral difference in the weight of the carcass reflects moral superiority (00.05) in the dressing percentage or enhanced the antioxidant enzyme activity [34].

3.3 Some blood parameters:

Some blood parameters. Table (4) indicated that (TP), ALT and AST remained unchanged significantly in all tested group rabbits. Table (4) it also indicates cholesterol and triglyceride concentration was significantly ($p<0.05$) lower at (4 g and 8g) TP/ kg diet,. The decrease of total lipid and cholesterol may be due to the effect of essential oil compounds present in the turmeric

on lipid metabolism [35], or due to curcumin, that enhances bile production and hence lipid digestion [29]. It has been showed that liver triacylglycerol and cholesterol concentrations were considerably less in rats fed curcumin than in control animals [36].

Table 1: Composition of the rabbit's diet (for 100 kg feed)

Foodstuff	**%**
Barley Black	32
Yellow corn	19
Wheat	10
Wheat bran	25
Soybean meal	12
Bentonite	0,5
Sodium chloride	0,5
A mixture of vitamins	1
Limestone	0,5
Chemical analysis of the diets%	
Dry matter *	91.149
NFE	60.55
E.E	2,36
Fiber *	6.909
Ash *	5.53
Crude protein *	15.8
M.E Kcal/kg	2865.5
DE (kcal/ kg DM)	3229.2346

DE in kcal/ kg DM = 4253 – 32.6 (CF %) – 144.4 (total ash %) [17].

Table 2: the effect of added Turmeric powder to diet on rabbit performance for three months.

Parameters	**Control**	**T2**	**T3**
The number of animals	10	10	10
Initial weight(g)	542.13±50	537.02±55	535.29±45
Final weight (g)	1023.221±66c	1133.008 ±61b	1203.039±52a
weight gain (g	481.091±24c	595.988±35b	667.749±41a
feed intake (g) /	2656.77±32	2768.102±44	2867.045±32
Feed conversion ratio	5.522±24	4.644±24	4.293±17
Relative growth rate%	61.467±24	71.374±24	76.826±24
Digestion coefficient of dry matter (%)	63.688±24	65.354±24	67.277±24

Relative growth rate = [(W2 -W1) x100]/ [1/2 (W2+W1)] Whereas: W1= the initial weight, and W2 = the final body weight Performance index = (final live body weight (kg)/ feed conversion ratio) x 100 [19].

Table 3: Carcass characteristics.

Parameters	T1	T2	T3
Final weight (g)	1023.221±66c	1133.008 ±61b	1203.039±52a
Hot Carcass	529.752±43c	679.793±52b	723.820±74a
Cold carcass	509.748±26	659.730±58	703.817±48
liver	17.383±25	19.077±32	18.014±43
heart	1.661±13	1.862±24	2.022 ±17
kidneys	4.121±0.4	4.104±0.6	4.202±0.3
Dressing percentage	51.772±23c	59.999±36b	60.166±15a

Table 4: Blood plasma elements of the tested samples.

Item	**T1**	**T2**	**T3**
Total protein (g/dl)	5.34± 0.15	5.38± 0.01	5.35± 0.13
Cholesterol (mg/100ml)	140.03±0.03 a	120.271±0.03 b	116.027±0.01 b
Triglycerides (mg/ 100ml)	35.,08±.050 a	27.06±0.23 b	25.3 93±0.02 b
GOT (U/ml)	51.03a±2.10	48.99b±0.31	50.45c±0.53
GPT (U /ml	30.06±0.66	28.73±0.05	27.90±0.18

4 Conclusions

Based on the experimental findings, we state that turmeric could have beneficial effects on performance, digestibility, and growth promoter. And this may improve the performance and some of the rabbit's carcass traits. The results also support the significant role of turmeric in immunomodulation, also, it may have an important role as an exogenous antioxidant.

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