Effects of Curry Leaf *(Murraya Koengii)* Powder on Growth Performance, Carcass Fat and Serum Cholesterol Levels of Broiler Chicken

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Abstract

Strategies to increase production performance with desired carcass characters such as low fat and cholesterol are among the priority research areas in poultry industry. Some phytogenic feed additives are known to have growth promoting and/or fat lowering effects in broilers. Objective of this study was to determine the effects of dietary curry leaf (Murraya Koengii) powder (CLP) on growth performances, performance, carcass fat and serum cholesterol levels of broiler chicken. Giving a completely randomize design experiment with six replicates, 90 broiler in 30 pens received a broiler finisher diet with either 0 (control), 0.5, 1, 1.5 or 2% CLP *ad libitum* from day 23-43. Serum cholesterol contents were determined on day 42. On day 43, one randomly selected bird from each pen was killed and dissected to determine the internal organ weights and, cloacal, abdominal, gizzard and total fat. Live weight on day 43, weight gain and feed intake and the feed conversion ratio were not significantly affected by the dietary CLP levels. Gizzard fat content was unaffected by the dietary CLP levels. Dietary CLP significantly increased the weight of the abdominal fat pad. However, both cloacal and total fat contents of the control bird significantly increased at lower (0.5 and 1%) dietary CLP levels and then reduced at higher (1.5 and 2%) CLP levels. Organ weights and serum cholesterol contents were not significantly changed due to dietary CLP. It was concluded that dietary CLP had no effect on growth performance. (Upto 1% dietary CLP increases carcass fat contents). Further research are needed to ascertain whether dietary CLP levels beyond 2% have fat reduction effects in broiler chicken.

Keywords: curry leaf, broiler, growth, fat, cholesterol

Introduction

With the ban on the use of antibiotic as growth promotants, poultry industry is looking for alternatives. Meanwhile, both producers and consumers demand carcasses and poultry meat with less fat contents. Herbs, spices, and various plant extracts have received increased attention as possible alternatives to antibiotic growth promotants (AGP), since they are considered natural products (Henandez *et al.,* 2004). A range of phytogenic feed additives including thyme *(Thymus vulgaris),* clove *(Syzygium aromaticum),* turmeric *(Curcuma longa),* black pepper *(Piper nigram),* oregano *(Oregano vulgar),* garlic *(Alum sativa)* and Fenugreek *(Trigonella foenum graecum)* have been studied as pytogenic feed additives in poultry production.

Curry leaf (*Murraya koenigii* L. Spreng) belonging to the family Rutaceae, is a popular spice used in India and Sri Lanka. In indigenous medicine, curry leaves are widely used to increase digestive secretions and to relieve nausea, indigestion, and vomiting. In recent past, curry leaf became even more popular, as medical experiments have proven its ability to control cholesterol levels. A number of studies have shown that curry leaf has anti oxidant (Das *et al.,* 2011) and hypoglycaemic (Kesari *et al.,* 2005) actions as well. In back yard poultry production systems, curly leaves are used as a herbal medicine (Ramdas, 2009). Atapattu *et al.* (2008) have shown that curly leaf extract given with drinking water reduced the yolk cholesterol content of

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chicken egg by 3%. Moorthy *et al.* (2009) have shown that 0.2% dietary curly leaf had no effects on growth performance of broiler chicken. The effects of a phytogenic feed additive depend on a range of factors including its dose. It is hypothesized that when given as unpurified powder, 0.2% is a too low level to evoke an effect. The objective of this study was to determine relatively higher dietary inclusion levels of curry leaf powder on growth performance, carcass fat and serum cholesterol levels of broiler chicken

Materials and Methods

Chicks were brooded on an electrical brooder for 10 days. Until day 22, Chicks were fed with commercial broiler starter diet. On day 22, 90 chicks were allocated into 30 floor pens (70cm x 00cm x 75cm) so that live weight variation among the pens are minimum. Pens were randomly allocated into replicates of five dietary treatments. Each cage had a feeder and a drinker. From day 23-43, birds were fed one of the five experimental diets containing either 0 (control), 0.5, 1, 1.5 or 2% curry leafs powder *ad libitum.* Except for energy (3100 Kcal ME/kg), control diet met the nutrient requirements as set out in NRC (1994). Daily feed and water intakes were taken. Serum cholesterol contents of six randomly selected birds from each pen were determined using a commercial assay kit (SPINREACT, SA Spain), on day 42. One randomly selected bird from each pen was killed by cervical dislocation on day 43 and dissected to determine internal organ weights and gizzard, abdominal, cloacal and total fat contents of the carcass. Data were analyzed as a completely randomize design with six replicates, using SAS. Significant means were compared using DMRT procedure.

Results and Discussion

In general, feed intake and growth performance parameters were not affected by the dietary CLP levels. Moorthy *et al.* (2009) have also shown that 0.2% had no effect on feed intake or growth performance parameters of broiler chicken. Results of this experiment suggest that curry leaf powder levels used does not have growth promoting effects in broilers. In line with Moorthy *et al.* (2009), none of the visceral organ weights was altered due to dietary CLP upto 2%. The lack of positive effect of increasing CLP on intestinal length or weight suggests that the effect of fibre due to CLP is negligible. Similarly, absence of positive effects on pancrease weight indirectly suggests that the levels of CLP used contained little or no anti-proteolytic substances.

The effects of CLP on carcass fat contents revealed two important features. Firstly, CLP had different effects on the fat deposition in different areas of the carcass. For example, dietary CLP did not change the gizzard fat but significantly altered the cloacal and abdominal fat contents. Secondly, when there was an effect, fat levels increased with increasing dietary CLP upto a certain level and then decreased to the level that found in control birds. Importantly, the total fat content was significantly changed by CLP. Since, gizzard is normally included into carcass without removing fat around it, gizzard fat level has little practical implications. The cloacal, abdominal and total fat levels increased upto 1% CLP and then decreased at 1.5 and 2% levels. The fat contents of the birds fed 1.5 and 2% CLP were not significantly different from those of the birds fed no CLP. The effects of phytogenic additive on any of the parameter are influenced by many factors including its dose and duration of treatment. The behavior of fat contents suggests that higher levels above 2% and/or longer duration of feeding may have carcass fat reduction effects. Absence of negative effects of CLP on growth performance and feed intake are simulative of further research in that direction.

Serum cholesterol level was also not affected by the dietary CLP levels. Atapattu and Premakumara (2008) have also shown that curly leaf extract given with drinking water at 5% did not change the serum cholesterol level. However, as in the case with fat contents, further research, involving different doses and/or feeding durations are needed.

It is concluded that dietary CLP upto 2% has no effects on growth performance and feed intake of broiler chicken. Upto 1% dietary CLP increased the cloacal, abdominal and total fat contents of the carcass.

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Table 1. Effects of dietary curly leaf powder on growth performance, visceral organ weight, carcass fat and serum cholesterol contents of broiler chicken

Parameter	Level of dietary curry leaf (%)						
	0	0.5	1	1.5	2	Pooled SEM	Probability
Live weight on							
23 d	817	787	812	797	785	17	0.46
43 d	2101	2075	2146	2174	2107	60	0.67
Weight gain (g)							
23-43 d	1284	1288	1333	1377	1321	56	0.68
Feed intake	2210	2436	2336	2482	2403	122	0.22
Feed conversion ratio							
23-43 d	1.72	1.89	1.75	1.80	1.82	9.08	0.08
Visceral organ weight[1]							
Gizzard	2.89	2.551	2.278	2.415	2.106	0.28	0.35
Liver	2.65	3.35	3.30	2.86	3.06	0.25	0.27
Pancrease	0.22	0.29	0.338	0.2	0.26	0.02	0.25
Small intestine weight	3.68	4.74	4.32	4.01	4.77	5.7	0.22
Small intestine length (cm)[1]	11.6	12.0	10.5	9.9	9.4	9.6	0.22
Carcass Fat (%)							
Gizzard	0.97	1.18	1.26	0.75	0.65	0.22	0.13
Abdominal fat	0.20^{b}	0.44^{a}	0.40^{a}	0.35^{ab}	0.44^{a}	0.04	0.02
Cloacal fat	1.81^{c}	2.51^{ab}	2.71^{a}	2.10^{bc}	1.93^{c}	0.21	0.003
Total fat	2.99^{b}	4.14^{a}	4.37^{a}	3.21^{b}	3.03^{b}	0.24	.0001
Serum cholererol (mg/dl)	121	135	120	115	126	13	0.14

[1] As a % of empty carcass

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