EFFECT OF DIETARY INCORPORATION OF SPENT CUMIN SEEDS (*Cuminum cyminum*) ON SERUM LIPID PROFILE IN BROILERS

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Abstract

Cumin seeds(Cuminum cyminum Linn) is an annual plant of the family Umbelliferne with antifungal, antioxidant and antimicrobial properties. Traditionally, it is used as a food additive for increasing the flavour of different food preparations. It is used for various ayurvedic medicine preparations and the spent cumin is available in large quantities in ayurvedic pharmaceuticals in Kerala. Hence,the present study was carried outto assess the effect of dietary incorporation of spent cumin on serum lipid profile in broilers at 5 and 10 per cent in standard broiler ration. One hundred and fifty numbers, day old broiler chicks (vencobb-400) having body weight 50 ± 4 gram were used for the experiment. Birds were divided into three groups of five replicatesand ten chicks in each replicate. All the birds were fed according to BIS, 2007. Birds of T1 fed on standard broiler ration (SBR) as control, T2 and T3 on SBR containing 5 and 10 per cent spent cumin, respectively and reared for a period of 42 days. The result revealed that birds fed with T3 (SBR containing 10 per cent spent cumin seeds) showed significant ($p < 0.05$) increase in serum HDL cholesterol level.

Keywords: Broiler, cumin seeds, lipid profile

India is the one largest producer and consumer of cumin seed in the world. Gujarat and Rajasthan are the top cumin producing states in the country which account for 80 per cent of cumin production. It has many phytochemicals like cuminaldehyde, alpha- pinene, cymene, gamaterpinene, parrialdehyde, myrcene. It is commonly used in Ayurvedic pharmaceutical for medicinal preparation and residue is thrown as waste. The spent cumin generated as by-product in ayurvedic pharmaceuticals is of good nutritive value and can be used in livestock and poultry. The objective of the study is to know the effect of dietary incorporation of spent cumin seeds (*Cuminum cyminum*) on serum lipid profile in broilers

Materials and methods

Experiment design

The present study was carried out for a period of 42 days. One hundred and fifty (day old) broiler chicks (vencobb -400) weighed around 50 ± 4 grams were selected and reared at experimental shed under department of poultry science , College of Veterinary and

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Animal Science, Mannuthy. Birds were divided into 3 groups of 5 replicates and 10 birds in each replicate and randomly allotted to one of three treatments (T1, T2and T3). All the experimental birds were fed according to BIS 2007.Spent cumin seeds were collected from nearby pharmaceutical SNA ovushathasala, Kizhakumpatukara, Thrissur and were sun dried and finely powdered. Packed in a sterile polyethylene bags and used for the study. Birds in T1 group were fed with standard broiler ration without spent cumin, while those in T2 and T3 werefed with standard broiler diet containing 5 and 10 percent spent cumin, respectively.Feed and clean drinking water was provided *ad libitum* in all the pens throughout the experimental period.Blood was collected from five birds of each group at 6thweek of age into vacutainer bypuncture of tarsalvein and centrifuged at 2500rpm for 10 mins for serum separation.Serum samples were analysed for total cholesterol, triglyceride and HDL cholesterol concentration estimated by using Semi Automated Biochemical Analyser (Master T). The standard biochemical kits used for these assays were purchased from M/s. Agappe Diagnostics Limited, Ernakulam, and Kerala.

Statistical analysis

Data were statically evaluated by using one – way ANOVA. Wherever the ANOVA values were found to be significant Duncan' method was applied (SPSS computer software). The value were considered significant when $P < 0.05$.

Result and discussion

The serum lipid profile concentration of the three treatment groups of broiler chicken studied is represented in the Table.1 and graphically presented in Figure.1

Total cholesterol concentration in

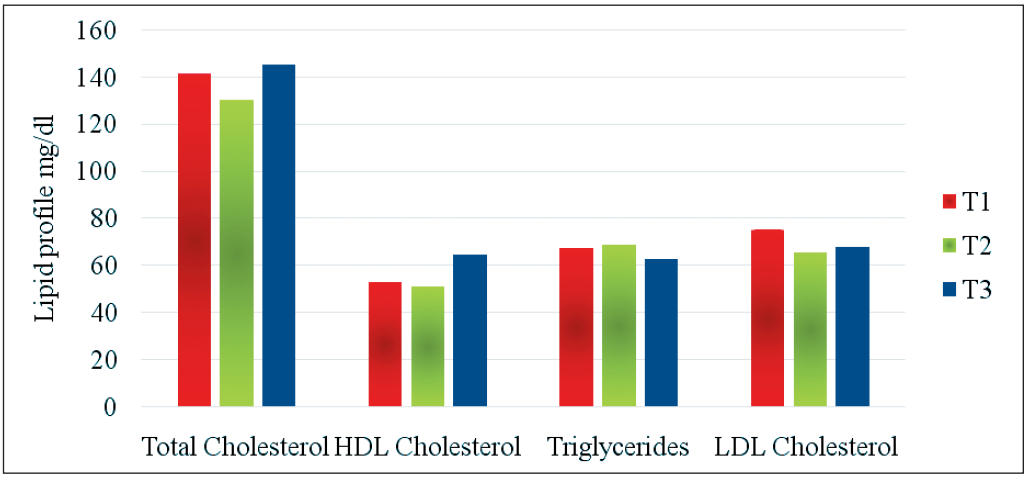

Fig. 1. Serum lipid profile of birds maintained on three dietary treatments, mg per dl

Table 1. Effect of dietary in corporation of spent cumin seeds on lipid profile of experimental birds

PARAMETERS	Serum lipid profile, mg per dl †			F value	P value
	T_1	T_2	T_3		
Total Cholesterol	141.71 ± 7.29	130.69 ± 8.31	145.43 ± 14.64	0.524 ^{ns}	0.605
HDL Cholesterol	52.91 ± 2.93^{a}	51.21 ± 2.04^{a}	64.84 ± 1.64^{b}	10.712*	0.002
Triglycerides	67.38 ± 1.87	68.77 ±1.99	63.19 ± 2.94	1.570 ^{ns}	0.248
LDL Cholesterol	75.32 ± 8.93	65.72 ± 8.25	67.95 ± 13.76	0.224 ^{ns}	802.802

† Mean of 5 observations with SE, ns – non significant

* a, b – means with different superscripts within the same row differ significantly ($p< 0.05$)

broilers after 42 days were 130.69 and 145.43 mg per dl in T2 and T3 respectively and was statistically similar value with that of control (T1) 141.71 mg per dl, values were obtained with in the normal range . Generally cumin seeds reduces total cholesterol level by inhibiting 3- hydroxyl 3-ethylglutarylcoenzyme A (HMG-CoA) reductase, (Crowell *et al*., 1999) which is not observed in present study is in agreement with Golian *et al.,* 2010 ; Ali *et al.,* 2011 due to reduced level of phytochemicals in the spent cumin. Instead, significant increase in HDL cholesterol (64.84 mg per dl) was noticed in T3fed on standard broiler ration containing 10 per cent spent cumin compared to T1 and T2, the values being 52.91 and 51.21 mg per dl, respectively. In the present study significant increase in HDL cholesterol may be due to glycosylation of HDL by cumin seeds and thereby reducing catabolism and increasing the same. Treatment with cumin seeds (*Cuminum cyminum)* leads to hyperglycaemia and result in decrease activity of hepatic lipase, thereby increases HDL cholesterol levels (Andallu and Ramya, 2007; Zare*et al*., 2014). Presence of Niacin at 2.7 mg per 100g (Milan *et al*., 2008) in cumin seeds (*Cuminum cyminum*) may be the reason for elevating HDL levels since, niacin acts as putative HDL holoparticle catabolic receptor blocker, and it decreases intrahepatic degradation of HDL and results in increased HDL cholesterol concentrations. Niacin is the most potent drug currently available to raise HDL cholesterol levels (Grundy *et al*., 2002).Value of LDL cholesterol level in T1, T2and T3 (table 1) were similar and within the normal range, the values being 75.32, 65.72 and 67.95 mg per dl, respectively. Triglyceride concentration at 42 days of age were 68.77 and 63.19 mg per dl of T2 and T3 respectively showed similar triglycerides level with control (T1) 67.38 mg per dl, Cumin specific phytochemicals such as polyphenols, tannins and saponins might be reason behind rectifying lipid abnormalities

Conclusion

The result of the present study indicated that standard broiler diet containing 10 per cent spent cumin had significantly increased serum HDL cholesterol level in broiler chicken. Hence, 10 per cent in corporation of spent cumin seed improved HDL cholesterol level without affecting other lipid profiles (total cholesterol, triglycerides and LDL cholesterol) normal concentration in serum. Future research required to know other serum profile

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