Study of Lipid Profile and Production Performance in Layers as Influenced by Herbal Preperations Abana™ and Garlic Paste

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Abstract

A study was conducted to evaluate the effect of hypocholesteramic herbal preparation Abana™ and garlic paste on lipid profile and production performance in layers. A total of one hundred and eighty BV-300 commercial layers of about 48 weeks age were randomly distributed into 18 groups of 10 layer birds in each. Six dietary treatments with the diet supplemented with Abana™ at 80 mg/kg body weight and 120 mg/kg body weight and garlic paste at 0.5 % individually and in combination were formulated for three periods of 28 days each. Each dietary treatment was offered to three groups of layers reared in individual cages for 28 days in each period. All the birds received similar management practices except the dietary treatments. The feed intake and body weight gains were recorded every 28 days. At the end of every 28 days the serum and egg yolk was collected form each replicate, pooled and analysed for High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Very Low Density Lipoprotein (VLDL) and triglycerides in serum and cholesterol level in egg yolk. Results indicated that there was reduction in the egg yolk cholesterol level but was not significant. Thus, in future research has to be conducted with Abana™ at levels higher than what was used during this research, which may result in significant reduction of egg yolk cholesterol.

Keywords: Garlic paste, Lipid profile, Layer, Herbal, Cholesterol.

Introduction

Researchers have identified that egg is the best vehicle to deliver the health promoting components to the humans at low cost, along with other nutrients already present in the egg. These eggs are called as diet, functional, designer or nutritionally enriched eggs. These eggs contain several folds more of the health promoting components listed above (but within the safety limits), compared to ordinary table eggs, there by making it a health promoting food. More over, hens egg is very tasty and easily digestable, as well as quick and easy to prepare several fast foods. Hence based on its nutritional value, taste, wholesomeness, and health promoting properties and relatively cheaper in cost, hence it is affordable and can to be consumed by all for better health.

To avoid elevation of blood cholesterol level and reduce the risk of coronary heart disease, consumption of no more than 300 mg of cholesterol daily. The poultry industry has continued to seek to reduce egg cholesterol concentrations so that an egg with reduced cholesterol will be available to those consumers who need to lower their dietary cholesterol intake. Egg yolk cholesterol concentrations have been shown to vary depending on genetics of the laying hen (Chowdhary *et al*., 2002). Genetic selection of hens for lower egg cholesterol has resulted in slight reduction in egg cholesterol concentration; however this is associated with a decline in egg production (Hargis, 1988). So the use of nutritional strategies or dietary manipulations to reduce cholesterol concentration is an attractive alternative.

In view of the above said facts, the present investigation was therefore undertaken to study the effect of dietary inclusion of Abana™ and garlic paste on egg yolk cholesterol.

Materials and Methods

The experiment was carried out to study the lipid profile and production performance in layers as influenced by herbal preparations of Abana™ and garlic paste.

The sample of Abana™ which was in powder form was obtained form Himalaya Drug Company and garlic is form of paste was from Dabur Foods Ltd., New Delhi which was obtained form local market. These were included in the experimental diets at

Table-1. Experimental Diets composition

Treatment	Description
T1	Control diet
T2	Control diet with Abana™ 80mg/Kg Body Weight
T3	Control diet with Abana™ 120mg/Kg Body Weight
T4	Control diet with 0.5% garlic paste
T5	Control diet with Abana™ 80mg/Kg Body weight and 0.5% garlic paste
T6	Control diet with Abana™ 120mg/Kg Body Weight and 0.5% garlic paste

appropriate levels.

The conventional practical control layer diets were formulated as per Bureau of Indian Standards (BIS, 1992) specification. In the test diets, the Abana™, an cholesterol lowering herbal preparation, was included at 2 different levels (80 and 120 mg/Kg body weight), garlic paste at 1 level (0.50 %) and Abana™ and garlic paste in combinations as described in Table-1.

A total of one hundred and eighty BV-300 commercial layers of about 48 weeks age and approximately uniform body weight with proper history were selected Healthy birds were housed in twin-bird colony cages

The Biochemical parameters like yolk cholesterol and serum cholesterol, High Density Lipoprotein (HDL) Low Density Lipoprotein (LDL) and Very Low Density Lipoprotein (VLDL), triglycerides and were determined. For the estimation of egg yolk cholesterol, all the eggs were collected from each replicate group at every 28-day interval. Yolk was separated form albumen and it was pooled for each replicate. Yolk cholesterol was extracted and determined by enzymatic method using auto analyzer (HITACHI 704) at Himalaya Drug Company, and the values were expressed as mg% of yolk as per treatment wise.

For the determination of serum cholesterol, HDL, LDL, VLDL and triglycerides, the blood samples of two birds were collected from each replicate group at every 28-day interval. Serum was separated individually and all the three replicates in each treatment were pooled. Samples were subjected to serum HDL, LDL, VLDL and triglycerides estimation by enzymatic method using auto analyzer (HITACHI 704) at Himalaya Drug Company.

Data pertaining to various parameters obtained during the experimental trial was analysed as Completely Randomized Block Design according to the methods described by Snedecor and Cochran (1989).

Results and Discussion

The results of the effect of Abana™ and garlic paste at different levels individually and in combination on yolk cholesterol and lipid profile in laying hens are presented in the table-2.

The results on serum cholesterol concentration revealed that there was little reduction in the cholesterol level in the treatment diets as compared to the control diet but variations among different dietary treatments and periods was non-significant ($P \geq 0.05$).

The possible mechanism by which the egg yolk cholesterol could be reduced is through their ability to suppress the lipogenic enzymes, as indicated by a pronounced decrease in mRNA abundance and enzymes synthesis as observed in rats (Tomilson *et*

Table-2. Cumulative mean+SE values of Biochemical parameters of experimental birds fed different diets during experiment.

Treatment	Cumulative Mean±SE of Biochemical parameters						Herbal Content	% or mg/Kg Body wt.
	Yolk NS Cholesterol (mg%)	Serum NS Cholesterol (mg/dl)	Serum* HDL (mg/dl)	Serum* LDL (mg/dl)	Serum* VLDL (mg/dl)	SerumNS Triglycerides (mg/dl)		
T1	17.67 ± 4.20	126.60 ± 1.80	82.92ab ± 1.67	28.82a ± 2.68	14.89a± 1.94	1972 ± 16.19	Abana™	80 mg
T2	12.13 ± 2.24	119.80 ± 1.00	83.15ab ± 0.37	21.44ab ± 0.48	15.18a ± 0.73	1609 ± 190.00	Abana™	120 mg
T3	10.59± 2.61	115.50 ± 3.69	86.76a ± 1.87	17.33b ± 1.31	11.38bc ± 1.12	1612 ± 156.00	Garlic paste	0.5 %
T4	15.68 ± 3.77	118.20 ± 2.87	78.98b ±0.80	24.84ab ± 2.29	14.35ab ± 0.37	1681 ± 140.10	Abana™ + Garlic paste	80 mg + 0.5 %
T5	17.39 ± 5.78	122.30 ± 0.39	82.29ab ± 1.24	28.50a ± 1.71	11.53bc ± 0.06	1874 ± 19.56	Abana™ + Garlic paste	120 mg 0.5 %
T6	12.10 ± 2.03	117.50 ± 4.45	85.21ab ± 1.52	22.53ab ± 2.24	9.80c ± 1.62	1575 ± 190.80		

NS- Non-significant ($P>0.05$) with in a column. * Within a column, mean bearing at least on common superscript are statically similar ($P>0.05$)

al., 1988). This suppression of hepatic lipogenic enzymes is attributed to their ability to suppress or inhibit the expression of genes coding for lipogenic proteins, resulting in decreasing hepatic cholesterol and fatty acid synthesis (Clarke *et al*. 1990). As most of the yolk cholesterol is synthesized in the liver, decreased hepatic cholesterol and fatty acid synthesis might have reduced the incorporation of cholesterol and its esters into yolk precursors (vitellogenin and lipoprotein particles) with resultant reductions in yolk cholesterol levels.

In contrast, hydrogenated safflower oil at 30 per cent level (Weiss *et al*. 1967) and dietary saturated fat rich coconut oil at 20 per cent level (Bartov *et al*., 1971) in layer's diet have been found to increase the egg yolk cholesterol levels. This was attributed to the ability of dietary saturated fat to increase the activity of HMG-CoA reductase resulting in increased hepatic cholesterol biosynthesis as observed in rats of Triscari *et al*. (1978) and thereby increased the yolk cholesterol level.

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