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Effect of garlic supplementation on biochemical profile of jersey crossbred calves

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Abstract
The present study was carried out to evaluate the effect garlic supplementation on the blood biochemical profile of Jersey crossbred calves. For this study 18 Jersey crossbred calves in the age group of 2-3 months were randomly divided into three groups (T_1, T_2 and T_3) with six calves in each group. The groups (T_1 and T_2) were supplemented with garlic powder at the dose rate of 250 mg per kg body weight in water and concentrate mixture respectively and T_3 group served as the control. The study was carried out for a period of 150 days. The results of the study revealed blood biochemical profile parameters creatinine, BUN, glucose, SGOT, SGPT, total protein, albumin, globulin and A/G ratio fell within the normal range. Statistical analysis revealed garlic supplemented calves (T_1 and T_2) had significantly lower blood cholesterol ($P<0.01$) and triglyceride ($P<0.05$) values than the non-supplemented calves, however no difference in other blood biochemical parameters of the calves. Thus, by this study we can conclude that dietary garlic supplementation reduces blood cholesterol and triglyceride in Jersey crossbred calves.

Keywords: garlic supplementation, blood biochemical profile, jersey crossbred calves, cholesterol, triglyceride

Introduction
Good supplementation of nutrients and feed additives is of paramount importance for calf growth and health. Garlic (*Allium sativum*) has been a subject of considerable interest as a medicine and therapeutic agent worldwide since ancient times. Garlic benefits in lowering total plasma cholesterol, reducing blood pressure and decreasing platelet aggregation [1]. Supplementation of garlic and onion to growing buffalo calves reduced the lipid level and inhibit the oxidation of low density lipoprotein [2]. Garlic significantly reduced the levels of Total cholesterol (TC), Low density lipoprotein (LDL), Triglycerides (TG) and increased the level of High density lipoprotein (HDL) ($P<0.05$) [3]. Garlic significantly lowered concentration of serum Low density lipoprotein (LDL), elevated High density cholesterol (HDL) at 42 days of age ($P<0.05$) when broiler chicks fed with 4 g garlic powder per kg of concentrate feed [4].

Materials and Methods
The experiment was carried out at Madhavaram - Chennai, Tamil Nadu. The experimental trial was conducted for a period of 150 days. Eighteen numbers of Jersey crossbred calves of 2-3 months were randomly allotted based on the bodyweight to three groups of six animals each with equal number of male and female calves. The calves were managed in intensive system of rearing.

Garlic powder preparation and supplementation
Garlic dried under the shade and the outer husks were removed, then the bulbs were powdered by electrical mixer.
T_1 - supplemented garlic powder @ 250 mg per kg body weight per day mixed in water.
T_2 - supplemented garlic powder @ 250 mg per kg body weight per day mixed in concentrate
T_3 - control with no supplementation.

Results

Table (a): Mean ± SE and analysis of variance of serum biochemical profile

Blood profile	Days / Treatment	Initial	75th day	150th day	'F' value
Creatinine (mg/dL)	T_1	1.49±0.12	1.54±0.06	1.41±0.17	0.265^{NS}
	T_2	1.43±0.08	1.73±0.11	1.47±0.08	3.078^{NS}
	T_3	1.44±0.12	1.54±0.19	1.38±0.14	0.287^{NS}
	'F' value	0.087^{NS}	0.748^{NS}	0.116^{NS}	
BUN (mg/dL)	T_1	21.43±1.09	21.58±0.82	21.52±0.71	0.007^{NS}
	T_2	21.98±0.66	22.32±0.82	22.73±0.83	0.236^{NS}
	T_3	22.58±0.63	22.23±0.78	22.00±0.64	0.183^{NS}
	'F' value	0.491^{NS}	0.247^{NS}	0.710^{NS}	
Glucose (mg/dL)	T_1	81.78±2.81	81.17±4.37	83.33±3.98	0.087^{NS}
	T_2	83.72±2.20	80.48±5.00	80.92±4.61	0.179^{NS}
	T_3	82.83±3.15	81.73±3.15	82.92±3.70	0.038^{NS}
	'F' value	0.1241^{NS}	0.0216^{NS}	0.0986^{NS}	
Cholesterol (mg/dL)	T_1	85.70±1.18	87.62^{b}±1.34	91.90^{ab}±2.74	2.834^{NS}
	T_2	82.70^{B}±1.77	88.07^{Ab}±1.23	90.43^{Ab}±2.07	5.249*
	T_3	87.83^{B}±3.04	100.47^{Aba} ±3.29	107.45^{Aa}±4.95	7.356**
	'F' value	1.4458^{NS}	11.2689**	6.6531**	
Triglycerides (mg/dL)	T_1	7.28±0.79	7.38^{b} ±0.79	8.07^{b}±0.44	0.377^{NS}
	T_2	7.15±0.61	7.77^{b} ±0.31	8.20^{a}±0.39	1.340^{NS}
	T_3	7.92±0.98	10.03^{a} ±0.78	11.02±0.87	3.261^{NS}
	'F' value	0.2593^{NS}	4.6250*	7.5376**	

Means bearing different superscripts (small letter) in a column differ significantly between groups. Means bearing different superscripts (capital letter) in a row differ significantly within groups. ^{NS} Non-Significant.
* Significant at five per cent level (P<0.05).** Significant at one per cent level (P<0.01).

Table (b): Mean ± SE and analysis of variance of serum biochemical profile

Blood profile	Days / Treatment	Initial	75th day	150th day	'F' value
SGOT (U/L)	T_1	87.50±10.76	81.23±3.58	96.38±14.29	0.522^{NS}
	T_2	96.47±15.52	80.05±2.87	81.58±4.81	0.905^{NS}
	T_3	83.95±5.16	80.47±3.67	83.97±5.21	0.181^{NS}
	'F' value	0.3257^{NS}	0.0313^{NS}	0.7445^{NS}	
SGPT (U/L)	T_1	33.23±2.37	33.73±1.60	32.57±1.05	0.088^{NS}
	T_2	31.33±1.95	32.70±1.01	34.13±1.26	0.917^{NS}
	T_3	31.43±1.94	30.77±1.34	29.60±1.32	0.354^{NS}
	'F' value	0.2599^{NS}	1.2694^{NS}	2.3616^{NS}	
Total Protein (g/dL)	T_1	6.58±0.19	6.53±0.15	6.92±0.08	2.0250
	T_2	6.38±0.20	6.23±0.22	6.40±0.22	0.1886
	T_3	6.48±0.22	6.43±0.21	6.35±0.17	0.1155
	'F' value	0.2483^{NS}	0.6140^{NS}	3.6255^{NS}	
Albumin (g/dL)	T_1	2.58±0.12	2.62±0.06	2.68±0.09	0.052^{NS}
	T_2	2.50±0.03	2.53±0.03	2.50±0.03	0.454^{NS}
	T_3	2.70±0.07	2.65±0.06	2.57±0.11	0.629^{NS}
	'F' value	1.5439^{NS}	0.0158^{NS}	1.1369^{NS}	
Globulin (g/dL)	T_1	4.00±0.19	3.92±0.12	4.23±0.13	1.143^{NS}
	T_2	3.88±0.18	3.70±0.24	3.90±0.21	0.276^{NS}
	T_3	3.78±0.24	3.78±0.24	3.78±0.19	0.000^{NS}
	'F' value	0.2758^{NS}	0.2759^{NS}	1.7152^{NS}	
A/G ratio	T_1	0.66±0.66	0.67±0.02	0.64±0.04	0.162^{NS}
	T_2	0.65±0.03	0.70±0.05	0.65±0.04	0.509^{NS}
	T_3	0.73±0.06	0.72±0.05	0.69±0.06	0.134^{NS}
	'F' value	0.7564^{NS}	0.2520^{NS}	0.3497^{NS}	

^{NS} – Non Significant

Discussion

The creatinine, BUN and glucose levels were within the normal range in garlic supplemented and non-supplemented groups [5].The mean cholesterol and triglyceride value are graphically expressed in Fig.1. The mean Cholesterol value for the three treatment groups ranged between 82.70 ±1.77 and 107.45 ±4.95 mg/dL. A positive correlation was noticed between the age and cholesterol levels in all the treatment groups. The non-supplemented calves had a significantly (P<0.01) higher cholesterol levels than the supplemented calves [2]. However the cholesterol levels remained the same within the garlic supplemented groups. A similar trend was also seen with respect to blood triglyceride levels. The blood triglyceride levels ranged between 7.15 ±0.61 and 11.02 ±0.87 mg/dL for the three treatment groups.

The garlic supplemented calves had a significantly (P<0.01) lower triglyceride level than the non-supplemented calves [3, 4]. However the triglyceride levels remained the same within the garlic supplemented groups. Garlic supplementation has no effect on biochemical values of SGOT, SGPT, Total Protein, Albumin (A), Globulin (G) and A/G ratio in all the treatment groups [6, 7].

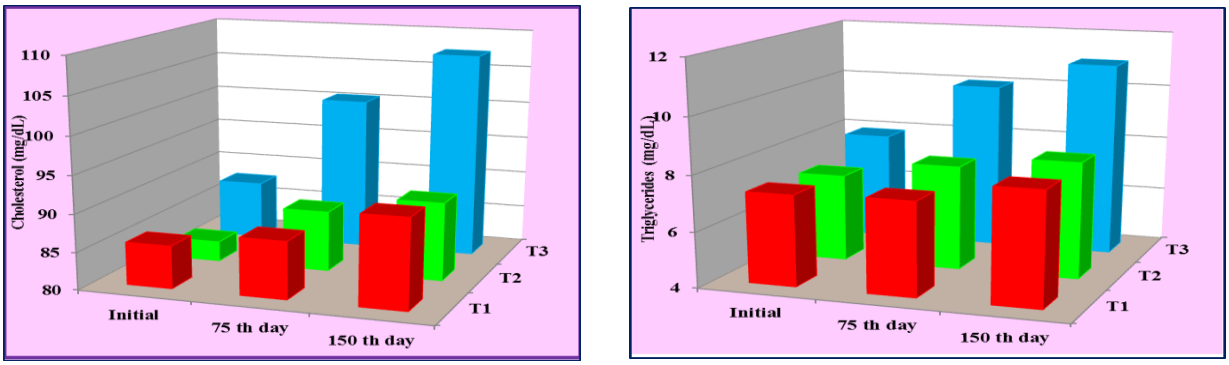

Fig 1

Conclusion

The blood biochemical profile parameters creatinine, BUN, glucose, SGOT, SGPT, total protein, albumin, globulin and A/G ratio fell within the normal range. Statistical analysis revealed no difference between the treatment groups. No significant difference was observed in-between the supplemented groups (T_1 and T_2). Garlic supplemented calves (T_1 and T_2) had significantly lower blood cholesterol ($P<0.01$) and triglyceride ($P<0.05$) values than the non-supplemented calves.

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