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EFFECT OF PROBIOTIC SUPPLEMENTATION ON THE PERFORMANCE OF BROILERS*

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Probiotic (*Lactobacillus Sporogenes*) has been reported to have growth promoting effect in broilers due to production of lactic acid in the gastro-intestinal tract resulting into favourable microbial population (Tortuero, 1973; Dilworth and Day, 1978; Han *et al.* 1984 a and b). Adler and Da Massa (1980) reported that feeding a *lactobacillus* culture to chicks has resulted in an improvement in body weight and reduced the occurrence of pasted vents. According to Fox (1988), in the truest sense, probiotics are not "growth promotants", but rather "growth permittants" allowing the host to best express its genetic potential. Fuller (1989) reviewed the role of probiotics in poultry nutrition and opined that commercial use of probiotics was found to improve the production performance of birds. Buche *et al.* (1992) evaluated the efficiency of probiotics alone or in combination with Nitrofuran fed to broilers and found that it improved growth when fed alone or in combination. Baidya *et al.* (1994) studied the effects of supplementing Aureomycin and *Lactobacillus sporogenes* in broilers and found that the income per bird was the highest in the group alternately given Aureomycin and *L. sporogenes* at weekly intervals. The performance (weight gain, feed efficiency) of broiler chicks given *L. sporogenes* was significantly better than that of untreated controls (Manickam *et al.*, 1994).

Materials and methods

Day old broiler chicks of Ross strain were sexed, wing banded and reared in separate brooder for each sex. The chicks were selected at random into three groups and each group consisted of 12 males and 12 females.

For 3 weeks the chicks were fed broiler starter mash containing crude protein 23.15 per cent and metabolizable energy 2505 K Cal per kg. From the fourth week onwards broiler finisher mash containing crude protein 21.32 per cent and energy content 2515 KCal. per Kg was fed. From the third week birds were shifted to individual cages with individual feeding and watering arrangements. The birds were offered weighed quantity of feed daily and residue was weighed daily to find the feed intake.

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Lactobacillus sporogenes was administered daily to either sex in each group at 0, 50 and 100 million organisms per chick per day orally from day 1 to 42.

Individual body weights were recorded daily and feed efficiency for each bird was worked out. At the end of 4th, 5th and 6th week, blood was collected from all the birds and biochemical parameters viz., Serum Cholesterol, Total plasma proteins, serum triglycerides and plasma urea nitrogen were estimated. At the end of the experiment the birds were slaughtered and carcass protein, carcass fat and fat pad thickness were recorded. The data was analysed by Randomised Block Design as described by Snedecor and Cochran (1967).

Results and discussion

Supplementation of probiotic at the rate of 100 million organism/chick/day resulted in significant increase in daily body weight gain, feed intake and feed efficiency ($P < 0.01$) (Table 1). Supplementing chick diet with probiotic has been reported to result in significant effects on growth (Dilworth and Day, 1978; Adler and Da Massa, 1980; Han *et al.*, 1984 a, b and Buche *et al.*, 1992); feed intake (Mohankumar and Christopher, 1988) and feed efficiency (Han *et al.*, 1984, Fox, 1988 and Manickam *et al.*, 1994).

A significant reduction ($P < 0.01$) in serum cholesterol was noticed during 4th, 5th and 6th week in probiotic treated birds compared to control (Table 2). *Lactobacilli* have direct effect on cholesterol levels by assimilation and removal from growth medium (Fuller, 1989). Zacconi *et al.* (1992) also observed such reduction in serum cholesterol level in axenic mice where diet was supplemented with probiotic.

Table 1 Effect of probiotic on the performance of broilers (1-42 days)

Particulars		probiotic		
		control	50	100
Initial body Weigh (g)	M	42.50±1.05	44.16±1.12	42.50±0.83
	F	41.16±0.85	42.50±0.85	40.83±1.12
Final body Weight (g)	M	1103.33±17.01	1159.16±13.94	1268.33±16.41*
	F	1092.50±13.80	1088.33±13.80	1268.33±7.26*
Body weight gain (g)	M	1064.16 ±14.68	1126.66±19.09	1226.66±20.12*
	F	1050.83±18.06	1046.66±19.16	1226.66±21.48*
Cumulative feed intake (g)	M	2181.33±18.64	2231.33±22.09	2378.00±23.14*
	F	2140.16±18.64	2144.33±19.96	2357.66±21.64*
Cumulative feed efficiency	M	2.06±0.04	2.00±0.06	1.94±0.02*
	F	2.03±0.02	2.04±0.06	1.92±0.04*

* $P < 0.01$

Table 2 Effect of probiotic on biochemical parameters

Particulars	Period		Control	Probiotic 50	Probiotic 100
Serum Cholesterol (mg/dl)	4th week	M	145.52.5.16	129.27±4.62*	114.63±4.09*
		F	146.84±4.12	126.83±4.36*	119.51±5.60*
	5th week	M	156.91±4.36	137.39±4.76*	1.23.57±5.64*
		F	162.60±6.09	148.78±6.09*	126.01±5.04*
	6th week	M	153.38±6.06	121.26±5.19*	108.02±4.08*
		F	164.24±5.64	128.16±6.04*	109.78±4.02*
Total Plasma Protein (g/dl)	4th week	M	2.42±0.07	2.52±0.06	2.74±0.10
		F	2.39±0.09	2.31±0.06	1.77±0.09
	5th week	M	2.39±0.09	2.39±0.06	2.52±0.06
		F	2.42±0.04	2.46±0.06	2.72±0.06
	6th week	M	2.76±0.09	2.79±0.09	2.91±0.06
		F	2.82±0.10	2.82±0.06	2.88±0.09
Serum Triglycerides (mg/dl)	4th week	M	114.16±4.09	109.16±5.09	102.50±6.02
		F	115.83±4.09	112.50±4.16	102.50±4.64
	5th week	M	117.50±4.09	115.83±5.12	114.16±5.10
		F	119.16±6.09	117.50±4.96	115.83±4.14
	6th week	M	114.79±4.6	114.14±5.01	110.23±4.82
		F	115.44±4.96	112.84±3.94	107.63±5.17
Plasma urea nitrogen (mg/dl)	4th week	M	4.74±0.32	4.03±0.26	4.25±0.29
		F	3.92±0.19	4.02±0.29	4.14±0.32
	5th week	M	3.90±0.32	3.92±0.29	3.83±0.26
		F	3.63±0.35	3.58±0.26	4.03±0.25
	6th week	M	3.60±0.35	3.72±0.29	3.84±0.19
		F	3.42±0.19	3.54±0.20	3.58±0.26

*P < 0.01

Probiotic did not influence the Total plasma protein levels, serum triglycerides, plasma urea nitrogen levels, carcass protein percentage, carcass fat percentage and fat pad thickness (P > 0.05) (Table 3). Sex did not influence any of the parameters. Though probiotic administration had improved live weight and feed efficiency, it has not influenced the biochemical parameters except the serum cholesterol levels.

Table 3 Effect of probiotic on carcass quality

Particulars		Control	Probiotic 50	Probiotic 100
Carcass protein percentage	M	20.84 + 0.19	21.27 + 0.20	21.56 + 0.18
	F	21.01 + 0.22	20.94 + 0.19	21.55 + 0.24
Carcass fat percentage	M	9.89 + 0.16	9.90 + 0.14	9.82 + 0.17
	F	10.06 + 0. 18	10.15 + 0.19	10.00 + 0.16
Fat pad thickness (mm)	M	4.25 + 0.23	4.18 + 0.24	4.00 + 0.23
	F	4.45 + 0.29	4.58 + 0.32	4.40 + 0.31

Summary

Lactobacillus sporogenes was administered daily to broilers of either sex in each group at 0, 50 and 100 million organisms per chick per day orally from day 1 to 42. Probiotic treatment at 100 million organisms per chick per day has shown a significant increase ($P < 0.01$) in weight gain, feed intake and feed efficiency. A significant reduction in serum cholesterol was also noticed in treated birds. Probiotic did not influence total plasma protein, serum triglycerides, total plasma urea nitrogen, carcass protein, carcass fat and fat pad thickness ($P > 0.05$). Sex did not influence any of the parameters.

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