



SHORT COMMUNICATION

Effect of Supplementation of Acidifiers with Probiotic on Performance of Broiler Chicken

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ABSTRACT

An experiment was conducted to study the effect of supplementation of acidifiers with probiotic on performance and nitrogen retention of broiler chicken. A total of 300 broilers were reared for six weeks with dietary treatments, T₀ (control diet), T₁ (control plus sodium-diformate at 0.2%), T₂ (control plus sodium diformate at 0.2% plus probiotic at 0.02%), T₃ (control plus blends of acidifiers at 0.2%), T₄ (control plus blends acidifiers at 0.2% plus probiotic at 0.02%). Each treatment consisted of sixty birds with four replicates containing fifteen birds in each replication. The weekly body weight, body weight gain, feed conversion efficiency was found to be better in all treatment groups as compared to control. However, weekly feed consumption, was found to be unaffected. Also, there was increase in dry matter digestibility and nitrogen retention in all treatment groups as compared to control. It was concluded that the supplementation of blends of acidifiers at 0.2% in combination with probiotic @ 0.02% improved the growth performance and nutrients utilization of broiler chicken rearing.

Key words: Acidifier, Broilers, Probiotic, Sodium diformate, Nitrogen retention

Following the ban on use of antibiotics as growth promoters by European Union since 2006, animal nutrition scientist are actively engaged in research focusing on suitable alternative to antibiotics use in animal feeding. Acidifiers and probiotics are alternatives to antibiotics growth promoters in poultry. Most organic acids have antimicrobial as well as growth-promoting properties and also its use could stimulate the natural immune response (Lohakareet *et al.*, 2005). Probiotics are either single blend of live microbial culture which elevate health benefits to the host. *Saccharomyces* is an example of probiotics and is also known to offer a good quality protein and B complex vitamins. Hence, the present study was conducted to assess the effect of supplementation of acidifiers and probiotic alone or in combination in broilers.

A total of 300 broilers were reared for six weeks with dietary treatments (table 1), T₀ (control diet as per BIS, 2007), T₁ (control plus sodium-diformate @ 0.2%), T₂ (control plus sodium diformate @ 0.2% plus probiotic

@ 0.02%), T₃ (control plus blends of acidifiers @ 0.2%), T₄ (control plus blends of acidifiers @ 0.2% plus probiotic @ 0.02%). Each treatment consisted of sixty birds with four replicates containing fifteen birds in each replication. The Probiotic contained encapsulated *Saccharomyces cerevisiae* @ 1 x 10¹⁰ CFU/g. Blends of acidifiers consisted of buffered organic acids like Calcium propionate, sodium formate, fumaric acid, sorbic acid and citric acid in equal quantity. The birds were reared on deep litter system and standard managerial practices were followed during the entire experimental period. Individual body weight of each bird was recorded at weekly interval and bodyweight gain was calculated as mean of each replicate. The cumulative feed intake was recorded weekly and the feed conversion ratio (FCR) was calculated. The economics of broiler production was worked out by considering the prices of input prevalent at the time of experiment in the market. Input considered were the cost of day old chicks, feeds, vaccines, medicines and other miscellaneous items which

were also considered as uniform for all the treatment groups. Net profit per kg body weight of bird was determined by subtracting total cost of production per bird from selling cost and dividing it by average body weight of treatment. A metabolic trial of 5 day collection period was conducted at the end of experiment and apparent metabolizability of nutrients was determined. The data collected during the study was analyzed statistically as per Snedecor and Cochran (1994) and depicted in table 2.

The body weight gain was found to be higher in all the treatment groups, as compared to control.

Similar results were obtained by Thirumeignanam *et al.* (2006). The *Saccharomyces cerevisiae* is considered as rich source of protein, minerals and B-complex vitamins. The performance exhibited by experimental birds in T₄ group may be because of presence of *Saccharomyces cerevisiae* as yeast culture, which play a beneficial role as natural growth promoter (Van Leeuwen *et al.*, 2005). However Vale *et al.* (2004) found non-significant body weight at the end of 6th week on diet containing different levels (0, 0.25, 0.50, 1.0 and 2 %) of mixture of organic acid (70% formic acid and 30% propionic acid). Sheikh *et al.* (2011) reported that

Table 1 Composition of broiler ration

Ingredient	Pre-Starter					Starter					Finisher				
	T ₀	T ₁	T ₂	T ₃	T ₄	T ₀	T ₁	T ₂	T ₃	T ₄	T ₀	T ₁	T ₂	T ₃	T ₄
Maize	46.2	46.2	46.2	46.2	46.2	49	49	49	49	49	54	54	54	54	54
Soyabean cake (DOC)	43.5	43.5	43.5	43.5	43.5	40.6	40.6	40.6	40.6	40.6	35.1	35.1	35.1	35.1	35.1
Soya oil	5.57	5.57	5.57	5.57	5.57	6.3	6.3	6.3	6.3	6.3	6.92	6.92	6.92	6.92	6.92
L-Lysine	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-
DL-Methionine	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
LSP	1.13	1.13	1.13	1.13	1.13	1.15	1.15	1.15	1.15	1.15	1.1	1.1	1.1	1.1	1.1
DCP	2.01	2.01	2.01	2.01	2.01	1.86	1.86	1.86	1.86	1.86	1.79	1.79	1.79	1.79	1.79
Trace-min mix	0.5	0.5	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Vitamin mixture	0.30	0.30	0.30	0.30	0.30	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Salt	0.30	0.30	0.30	0.30	0.30	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Choline chloride	0.1	0.1	0.1	0.1	0.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Coccidiostat*	0.10	0.10	0.10	0.10	0.10	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Toxin binder*	0.10	0.10	0.10	0.10	0.10	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sodium diformate*	-	0.2	0.2	-	-	-	0.2	0.2	-	-	-	0.2	0.2	-	-
Sodium diformate*		210	210	-	-	-	210	210	-	-	-	210	210	-	-
(price ₹ per kg)															
Probiotic*	-	-	0.02	-	0.02	-	-	0.02	-	0.02	-	-	0.02	-	0.02
Probiotic**			2400		2400			2400		2400	-	-	2400	-	2400
(price ₹ per kg)															
Acid Mixtures*	-	-	-	0.2	0.2	-	-	-	0.2	0.2	-	-	-	0.2	0.2
Acid Mixtures**				130	130	-	-	-	130	130	-	-	-	130	130
(price ₹ per kg)															
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
CP (%)	23	23	23	23	23	22	22	22	22	22	20	20.1	20.1	20.1	20.1
ME (kcal/kg)	3000	3000	3000	3000	3000	3100	3100	3100	3100	3100	3200	3200	3200	3200	3200

*Over and above

Table 2 Growth Performance of broilers

Parameters	Phases	T ₀	T ₁	T ₂	T ₃	T ₄
Body weight gain**	Pre-starter	93.09 ^a ±0.49	93.23 ^a ±3.43	93.72 ^a ±2.77	93.97 ^a ±3.08	94.02 ^a ±2.82
	Starter	746.54 ^a ±9.32	755.68 ^{ab} ±13.31	768.47 ^{ab} ±18.36	796.8 ^{bc} ±17.06	822.67 ^c ±1.53
	Finisher	2162.05 ^a ±35.06	2223.02 ^{ab} ±41.58	2256.5 ^{abc} ±16.88	2317.37 ^{bc} ±46.34	2367.45 ^c ±61.23
Feed consumption**	Pre-starter	98.25 ^c ±1.18	97 ^{bc} ±0.71	95 ^{bc} ±1.78	93.25 ^{ab} ±1.49	89 ^a ±2.08
	Starter	1107.5 ^a ±15.44	1100.25 ^a ±8.29	1114.25 ^a ±14.03	1105.25 ^a ±16.6	1098 ^a ±19.41
	Finisher	3850.25 ^a ±122.29	3814.25 ^a ±48.09	3871.5 ^a ±73.94	3852.33 ^a ±60.41	3810.75 ^a ±106.85
FCR**	Pre-starter	1.06 ^a ±0.01	1.05 ^a ±0.05	1.02 ^a ±0.03	1.00 ^a ±0.03	0.95 ^a ±0.04
	Starter	1.63 ^a ±0.05	1.63 ^a ±0.09	1.63 ^a ±0.05	1.57 ^a ±0.04	1.56 ^a ±0.04
	Finisher	2.25 ^a ±0.11	2.1 ^a ±0.26	2.02 ^a ±0.18	1.94 ^a ±0.16	1.95 ^a ±0.21
DM digestibility, %		62.54 ^a ±0.86	64.52 ^{ab} ±0.83	65.01 ^{bc} ±0.75	66.16 ^{bc} ±0.46	66.81 ^c ±0.53
N Retention, %		69.25 ^a ±1.91	71.37 ^b ±2.09	72.45 ^{bc} ±2.29	73.54 ^{cd} ±1.65	75.05 ^d ±2.03
Cost of feed (₹/kg)		32.04	32.06	32.24	32.26	32.71
Net Profit, ₹/kg		8.53	11.21	11.24	13.56	14.88

due to pH reducing properties and direct antimicrobial effect, acidifiers might have resulted in inhibition of intestinal bacteria leading to reduced bacterial competition with the host for available nutrients, which might have improved protein and energy digestibility, resulting in better performance of broiler chicken. The FCR was better in supplemented groups as compared to control and corroborates with Garcia *et al.* (2007) and Bozkurt *et al.* (2009). The DM digestibility and N retention in all treatment groups were found to be higher as compared to control. The results corroborates well with those of Thirumeignanam *et al.* (2006), Garcia *et al.* (2007), Ao *et al.* (2009) and Ramigani *et al.* (2015) who reported that organic acid significantly increased DM digestibility and nitrogen retention. Feed cost per kg gain was highest for T₄ group. Thus, it could be deduced that supplementation of acidifiers with probiotic showed better performance in terms of growth parameters, dry matter digestibility, nitrogen retention in broiler chicken. It was concluded that the feeding of blends of acidifiers at 0.2% in combination with probiotic at 0.02% would be economical in broiler rearing.

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