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Broiler Performance Under Different Levels of Live Microbial Culture in Drinking Water

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ABSTRACT

Effect of EM_4 (live microbial culture) in drinking water on the performance of broilers was studied in 96 day-old (Hubbard) broiler chicks. Use of EM_4 in the drinking water significantly ($P<0.05$) improved the weight gain in all groups as compared to control. Feed consumption was higher in untreated chicks. There was significant effect of EM_4 on feed conversion ratio in all groups as compared to untreated. The mortality was highest (6%) in untreated chicks. The profit per broiler in group A, B, C and D was rupees 3.44, 6.53, 7.26 and 8.32, respectively. It was concluded that EM_4 may be used in drinking water with no adverse effect @ 1 ml/litre to improve the broiler performance.

Key Words: Broiler; Live microbial culture; Economics

INTRODUCTION

Probiotics, yeasts and fungi in diets reduce stress, act as natural growth promoters, improve production/general health of birds, help regulating the environment of the intestines, decrease digestive disturbances, inhibit pathogenic intestinal micro-organisms and improve feed conversion efficiency (Chapman, 1988; Dhingra, 1993). Probiotic is a combination of beneficial bacteria adaptable to the intestinal tract of all warm-blooded animals. These include *Lactobacillus casei, L. acidophillus, L. sporogens* and Streptococci, which promote metabolism and suppress other undesirable bacteria.

EM_4 (Probiotic) already under trials in agriculture production, is a live culture of different bacteria, yeast and fungi. It improved meat type poultry birds by improving the over all growth rate, feed conversion ratio (FCR) and reducing the mortality (Jayakumar *et al*., 1986). This paper describes the effects of EM_4 on the performance of broiler birds and feasibility for its use in broiler raising.

MATERIALS AND METHODS

This study was carried out at Poultry Research Centre, University of Agriculture, Faisalabad. EM_4 containing five families, 10 genera and 80 species of micro-organisms mainly lactic acid bacteria, ray fungi, photosynthetic bacteria and yeast etc. was obtained from Department of Soil Science, University of Agricultyure, Faisalabad. The experiment was conducted in strict hygienic conditions. Ninety-six, day-old (Hubbard) broiler chicks were maintained on deep litter in pens and randomly divided into different groups: control (A= without EM_4) and three treatment groups (B= 0.5 ml/litre EM_4, water ratio 1:500; C= 1.0 ml/litre EM_4 , water ratio 1:1000 and D= 1.5 ml/litre EM_4 , water ratio 1:1500). The chicks were initially brooded at 95°F during first week and afterwards, the temperature was reduced by 5°F every week until it reached 75°F. Twenty-four hours light was provided throughout the experimental period. Fresh clean water was made available at all the time. The chicks were reared under similar management conditions. EM_4 was mixed in drinking water and offered to birds from day first to the end of the experiment. Two commercial rations (starter and finisher) were fed to the experimental birds. The chicks were fed starter ration up to 28 days and finisher ration from 29th to 49th day of age. In order to get immunity among birds against certain viral diseases following vaccination schedule was adopted.

Diseases	Time of vaccination	Route
ND	6th day	Intraocular
IBD	10th day	Intracular
HPS	18th day	Intramuscular
ND	25th day	Subcutaneously
IBD	30 day	Intramuscular

ND= Newcastle disease; IBD= Infections Bursal disease; HPS= Hydropericardium syndrome

The observations were recorded for seven weeks on initial and weekly body weight per chick, feed consumption, FCR and mortality. The recorded data was subjected to statistical analysis (Sokal & Rohlf, 1995).

RESULTS AND DISCUSSION

Weight gain. Significant (P<0.01) improvement in weight gain of chicks on different levels of EM_4 was recorded (Table I). Comparison of mean values by Duncan's Multiple Range test revealed significantly more weight gain in case of chicks fed on treatment D (1:1500) followed by those on treatments B, C and A, respectively. The results are in line with Tahir (1983), and Agarwal and Verma (1996) who reported the improvement in weight gain in broilers by presence of more effective micro–organisms which reduced the stress and improved the digestibility of protein and dry matter by favouring the flow rate of ingesta. The increase in weight gain in treatments may be attributed to the result of inclusion of EM_4. However, higher dose level increased the growth rate, which could be due to the increased population of beneficial micro-organisms in the gut resulting in the more body weight than control (without EM_4).

Table I. Average weight gain, feed consumption, FCR and mortality of chicks

Description	Treatments			
	A	B	C	D
NOB	24	24	24	24
EP (days)	49	49	49	49
AIW (g)	42.33	42.33	42.83	42.16
AFW (g)	1603.33	1693.66	1685.33	1700.00
WG (g)	1561^{c}	1651.33^{ab}	1642.50^{b}	1657.84^{a}
TFC (g)	3782.83^{a}	3726^{a}	3621.33^{b}	3551^{c}
FCR	2.43^{a}	2.25^{b}	2.20^{c}	2.20^{c}
Mortality %	6.00	3.00	5.67	0.00
NP Rs/bird	3.44	6.53	7.26	8.32

Means with different superscripts in a row shows significant differences; NOB= Number of birds; EP= Experimental period; AIW= Average initial weight per chick; AFW= Average final weight per chick; WG= Weight gain per chick; TFC= Total feed consumed per chick; FCR= Feed conversion ratio; NP= Net Profit

Feed consumption. Group A consumed significantly more feed but it was non-significant with group B. The chicks in group A consumed maximum feed (3782.83 g) followed by B (3726 g), C (3621.33 g) and D (3351 g). Group C and D were statistically different from each other. The birds in group C consumed significantly more feed than group D. It is evident from these results that feed consumption was decreased with the addition of EM_4 which is comparable with the findings of Tahir (1983), Santos and Gomez (1983) and Jassim *et al*. (1986) who reported significant differences in feed consumption due to the use of microbial culture in broiler chicks.

Feed conversion ratio. Results revealed significant (P<0.01) improvement in FCR in treated groups. Birds showed best performance in group C and D (2.20) and poorest in group A (2.43). The results coincide with Tortuero *et al*. (1989), Parova *et al.* (1994), and Agarwal and Verma (1996) who fed *Lactobacillus acidophilus* to the chicks and reported that average feed conversion was improved. The optimum level of micro flora improved the feed conversion of chicks when EM4 was used @ 1.5 ml/litre. This may be due to best utilization of nutrients in the gut. The established population of beneficial organisms in the intestine resulted in the decreased digestive disturbance, due to less pathogenic intestinal micro-organisms which may also be helpful in the improvement of FCR.

Mortality. The mortality of chicks fed on treatments A, B, C and D was 6, 3, 5.67 and 0%, respectively. Mortality in treatments A, B, C was due to heat stress.

Economics. The profit per broiler in group A, B, C and D was rupees 3.44, 6.53, 7.26 and 8.32, respectively. Net profit per broiler was more from broiler supplemented with EM_4 @ 1.5 ml/litre of water. Similar results were reported by Mandal *et al.* (1996) who found that the use of probiotics in broiler chicks is financially profitable.

REFERENCES

Agarwal Z.K. and C.P. Verma, 1996. Effect of feeding growth stimulators on the performance and gut microflora profile in broilers during summer. *Proc. Wrld Poult. Cong.,* 2–5 September, New Delhi, India, 4: 262.

Chapman, I.D., 1988. Probiotics, acidifiers and yeast cultures: a place for natural additives in pig and poultry production. *Proc. Alltech's Fourth Annual Symposium,* Nicholasville, U.S.A. Alltech Technical Publications, 210–33.

Dhingra, M.M., 1993. Probiotics in poultry diet. *Poult. Advisor,* 26: 43.

Jassim, A.H., N.A. Hussain, A.A., Hussain, B.M. Alak and S.Y. Al-Haidary, 1986. The effect of using SCP on productive performance, level of nucleic acids and histopathological change in broilers. *J. Agri. Water Resources Res. Anim. Prod.,* 5: 275.

Jayakumar, K., T. Munagowda and W.T. Honegowda, 1986. Probiotics in Poultry Nutrition. *Poult. Advisor*, 19: 25.

Mandal, L.S., K. Sarkar, S.K. Mandal and Baidya, 1996. Comparative studies of antibiotics and probiotics on the growth and economics of broiler raising. Deptt. Anim. Nutr., West Bengal University of Animal and Fishery Sciences: Mohanpur-741252, Nadia, West Bengal, India.

Parova, J. Jumprecht, I. Robosova, 1994. The effect of application of probiotics based on Badillus C.I.P. 5832 on utility and economical parameters in duck fattening. *Zivocisna Vyroba,* 39: 983.

Santos, J. and G. Gomez, 1983. Fungal protein produced on cassava for growing rats and pigs. *J. Anim. Sci.,* 56: 264.

Sokal, R.R. and F.J. Rohlf, 1995. Biometry. *The Principles and Practice of Statistics in Biological Research.* W.H. Freeman and Company, New York, U.S.A.

Tahir, M., 1983. Application of *Lactobacillus acidophilus* in the water of growing turkey poults. *Feed Stuff,* 55: 22.

Tortuero, F., L. Roderiguez and J. Barrera, 1989. Lactic acid bacteria and beans in the diet for broiler chickens. *Archivos de Zootechnia,* 38: 151.

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