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Comparative Effect of Yogurt as Probiotic on the Performance of Broiler Chicks

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Abstract: This study was conducted to investigate the comparative effect of yogurt as probiotic with the commercially available probiotic protexin on the overall performance of broiler chicks, measured in terms of gain in body weight, feed intake, feed efficiency and economics. One hundred and twenty day old broiler chicks were randomly distributed into 3 main groups A, B and C, that were further divided into 4 sub groups comprising of 10 birds each. Commercial ration was fed ad libitum to all the three groups. The probiotics, yogurt and protexin were given at the rate of 5 mL⁻¹ of water and 1 g L⁻¹ of water to group B and A, respectively while group C was kept as control. The data were statistically analyzed, using Completely Randomized Design. The yogurt resulted in significantly ($p < 0.05$) higher weight gain, feed efficiency, dressing percentage and gross return both in starter as well as finisher phases and Protexin did not affect ($p > 0.05$). Mean FCR value in starter phase was 1.86, 1.69 and 1.84 for groups A, B and C, respectively. Group B showed significantly ($p < 0.05$) improved feed efficiency than other two groups. Mean weight gain in starter phase for group A, B and C was 592.5, 633.8 and 610.0 g, respectively. Group B had significantly higher body weight gain ($p < 0.05$). Feed intake in starter phase was 1104.5, 1076.2 and 1115.7 grams for group A, B and C, respectively, there was no significant difference ($p > 0.05$) in all the three groups. Mean FCR in finisher phase were 2.55, 1.98 and 2.51 for group A, B and C, respectively. Group B showed significantly improved feed efficiency ($p < 0.05$) as compared to other groups. No significant ($p > 0.05$) difference was found in feed intake in finisher phase for groups A, B and C. Feed intake was 3281.075, 3136.37 and 3227.25 g, respectively. Mean weight gain in finisher phase for group A, B and C was 1282.3, 1579.5 and 1280.6 g, respectively. Group B had significantly ($p < 0.05$) higher weight gain than group A and C. The dressing percentage of group B was found highly significant ($p < 0.05$), that was 62.95, 67.82 and 62.89% for group A, B and C, respectively. Mortality was recorded during experimental period. Percent Mortality was 5, 0 and 5% for group A, B and C, respectively. Economics was calculated for feed cost and gross return. Mean feed cost per bird was 70.08, 55.76 and 56.45 rupees for group A, B and C, respectively. Group A, showed significantly higher ($p < 0.05$) feed cost as compared with other groups. Gross return calculated were 93.74, 110.7 and 94.53 rupees for group A, B and C, respectively. Group B had significantly higher gross return ($p < 0.05$) as compared with other groups A and C. It was found that yogurt successfully improved the over all performance and gross return of the experimental birds. Further research is needed to investigate the effect of different levels of yogurt in broilers, layers and breeders.

Key words: Broilers, probiotic, growth performance, mortality, economics

INTRODUCTION

Feed is a major component, affecting net return from the poultry business, because 60 to 75% of the total input, in terms of money is spent on feed purchase^[1,2]. To ensure more net return and to minimize high expenses on feed, are the main challenges, for which many research strategies have been practiced such as introducing feed supplements and feed additives etc.^[3].

Different feed additives are used either in feed or water to improve growth and production performance of poultry birds. Probiotics is one of the effective feed

additives. Probiotic is derived from Greek word probios meaning for life. A probiotic is a live microbial feed supplement, which quickly establishes in the gut to suppress colonization and growth of harmful bacteria and improving its intestinal microbial balance^[4]. There are different types of bacteria that are found to have a positive key role on the performance of poultry birds.

Yogurt a dairy product can be used effectively as probiotic. Yogurt contains mainly lactobacilli and other beneficial bacterias that have strong positive health effects. Yogurt could aid digestion and inhibit the development of pathogens by improving the balance of

microbes living in the digestive tract^[5]. *Lactobacillus* one of many friendly species of intestinal microflora is considered as beneficial bacteria in its ability to aid in the breakdown of proteins, carbohydrate and fats in food and help absorption of necessary elements and nutrients such as minerals, amino acids and vitamins by the host. They lower the pH of the gut by converting sugar to lactic acid, which inhibits the growth of enteropathogens. *Lactobacillus* sp. can get quickly colonized in the gut epithelium to deprive sites for attachments of pathogens. They have immunoregulatory actions by increasing macrophage activity and also by enhancing the production of immunoglobulins.

The present study was conducted with the objective to compare the efficacy of yogurt as probiotics (locally and conventionally prepared in houses) containing mainly lactobacilli and other beneficial bacteria with the commercially available Protexin probiotics containing Lactobacilli, Bifidobacteria and others and to investigate broiler performance and to calculate the economics.

MATERIALS AND METHODS

An experiment was conducted at NWFP Agricultural University Peshawar, Poultry Farm during summer months, 2004.

One hundred and twenty day old broiler chicks were purchased from local market and were divided randomly into 3 groups A, B and C for treatment protexin, yogurt and control, respectively. Each group was subdivided into 4 replicates, having 10 birds per replicate. The birds were kept in pens, provided with bulb, feeder and drinker. Commercial ration was fed *ad libitum* and data for feed intake, weight gain, FCR, mortality, dressing percentage and economics was calculated and recorded. The data were analyzed statistically using Completely Randomized Design^[6] and M. Stat computer package.

RESULTS AND DISCUSSION

Performance of broilers during starter phase: The mean gain in live weight was 592.5, 633.8 and 610.0 g for groups A, B and C, respectively (Table 1). Group B was significantly different ($p < 0.05$) higher than A and C. There was no significant difference between A and C. The results of this study are in agreement with those reported by Omprakash *et al.*^[7] who found the highest gain in body weight by incorporating probiotic at 5 or 10 mL⁻¹ drinking water in broilers at starter phase. Manickan *et al.*^[8] reported significantly better performance (weight gain, feed conversion and feed efficiency) for treated group compared with controlled group. Treated groups were given probiotic-containing lactobacilli and therefore better

results were found, he claimed. Wolke *et al.*^[9] also confirmed significant results in male broiler chicks given probiotic *Bacillus* ($p < 0.05$) for intake, gain in body weight and FCR. Miljkovic *et al.*^[10] reported significantly increase in body weight and better FCR with 0.5% probiotic in treated group compared to control. The results are in disagreement to Baidya *et al.*^[11] who reported that various combination of supplementing antibiotics (Aureomycin) and probiotic (Lactobacilli) that did not affect gain in body weight during phase feeding.

Feed consumption: Average feed consumption of birds in respective groups A, B and C were 1104.5, 1076.25 and 1115.75 g chick⁻¹, respectively. There was no significant difference observed in feed intake for all the three groups during the starter phase. The results of the present study are in agreement with the study of Samanta and Biswas^[12] who found no significant difference in feed intake between probiotic treated versus control group. The results of the present study are in contrast with that found by Wolke *et al.*^[9] who observed increase in feed intake in broiler chicks treated with probiotic as compared to control. These results are also in contrast to the results of Kumprecht and Zobac^[13]. They found significant difference in chicks given probiotic paciflor compared to non treated chicks. The results of both yogurt and Protexin are also not in agreement to the results reported by Shoeib *et al.*^[14] who evaluated commercial probiotic, pronifer, which contained lactic acid bacteria.

FCR: Mean FCR value for the three groups A, B and C during starter phase was 1.86, 1.69 and 1.84, respectively (Table 1). FCR for group B was significantly lower ($p < 0.05$) than the other two group A and C, which are not significantly different. The results are in agreement with Ahsan *et al.*^[15] and Abu *et al.*^[16]. Manickan *et al.*^[17] also reported significantly better performance in treated group with lactobacilli compared with controlled group. Wolke *et al.*^[9] also confirmed better results in male broiler chicks given probiotic *Bacillus* ($p < 0.05$). Miljkovic *et al.*^[10] found significantly better FCR and weight gain with 0.5% in treated group as compared to control. The results for yogurt are in contrast and that of Protexin are in agreement to the results reported by Baidya *et al.*^[11] who supplemented antibiotic and probiotic singly and in combination but did not found any significant ($p > 0.05$) difference in treated groups for FCR.

Performance of broilers during finisher phase

Body weight gain: In response to control and treated groups the mean weight gain during finisher phase was 1282, 1580 and 1281g for groups A, B and C, respectively (Table 2).

Table 1: Over all performance of broiler chicks in starter phase

Groups	Probiotic used	Mean weight gain chick ⁻¹ (g)	Mean FCR value of chick	Mean feed intake chick ⁻¹ (g)
A	Protexin 1 g L ⁻¹ of water	592.5 ^b	1.86 ^b	1104.50 ^a
B	Yogurt 5 mL ⁻¹ of water	633.8 ^a	1.69 ^a	1076.25 ^a
C	Control	610.0 ^b	1.84 ^b	1115.75 ^a

Means in the columns with different superscripts are significantly different

Table 2: Overall performance of chicks in finisher phase

Groups	Probiotic used	Mean body weight gain chick ⁻¹ (g)	Mean FCR value of chick	Mean feed intake chick ⁻¹ (g)
A	Protexin 1 g L ⁻¹	1282 ^b	2.55 ^b	3281.075 ^a
B	Yogurt 5 mL ⁻¹	1580 ^a	1.98 ^a	3136.370 ^a
C	Control	1281 ^b	2.51 ^b	3227.250 ^a

Means with different superscripts are significantly different

Mean weight gain was significantly higher for group B ($p < 0.05$) then the other two group that are not significantly different. The results obtained by the present study are in agreement with the results of Tarakanov *et al.*^[18] and with Goh and Hwang^[19]. Milijkovic *et al.*^[10] also reported significantly increased in final body weight, body weight gain. Furthermore, Omprakash *et al.*^[7] also got highest body weight gain in Cornish chickens fed probiotic. The results of the present study are in agreement to Ham *et al.*^[20] who reported higher body weight gain with lactic acid bacteria.

Feed consumption: Mean feed consumed during finisher phase for the three group was 3281.075, 3136.370 and 3227.250 for A, B and C, respectively (Table 2). There is no significant difference among the three groups for feed consumption during finisher phase. The results of the present study are not in agreement with Kumprecht and Zobac^[13] and also with that of Shoeib *et al.*^[14] who reported low feed intake in the chicks fed on probiotic as compared to the control group.

FCR: Mean FCR values given in Table 2 for the three groups A, B and C is 2.55, 1.98 and 2.51, respectively. FCR value for group B was significantly lower than the other two groups A and C. The results of this study are in agreement with those reported by Ahsan *et al.*^[15] and Abu *et al.*^[16]. The results of the present study are also in agreement to Ham *et al.*^[20], who fed lactic acid bacteria to broiler chicks every day; and found significantly better FCR in treated groups. Milijkovic *et al.*^[10] reported the effect of feeding probiotic significantly increased their final body weight, body weight gain and feed conversion efficiency. Omprakash *et al.*^[7] and Ham *et al.*^[20] reported similarly better FCR fed probiotics in treated groups than control. The results of present study are in contrast to Shivani *et al.*^[21] who reported non significant results of FCR in all groups.

Dressing percentage: There was significant difference in the dressing percentage of group B ($p < 0.05$) and there was no significant difference in the group A and C

Table 3: Mean dressing percentage of chicks at the end of experiment

Groups	Probiotic used	Mean dressing percentage chick ⁻¹
A	Protexin 1 g L ⁻¹ water	62.95 ^b
B	Yogurt 5 mL ⁻¹ water	67.82 ^a
C	Control	62.89 ^b

Means with different superscripts are significantly different

Table 4: Percent mortality during experimental period of various groups

Groups	Probiotic used	Mortality (%)
A	Protexin 1 g L ⁻¹ water	5
B	Yogurt 5 mL ⁻¹ water	0
C	Control	5

Table 5: Mean cost of feed consumed chick⁻¹

Group	Probiotic used	Mean feed cost chick ⁻¹ Rs	Mean gross return ⁻¹ chick
A	Protexin 1 gL ⁻¹ of water	70.05 ^b	93.74 ^b
B	Yogurt 5 mL ⁻¹ of water	55.76 ^a	110.70
C	Control	56.45 ^b	94.53 ^b

Means with different superscripts are significantly different

(Table 3). Chiang and Hsieh^[22] found a higher dressing percent for chicks fed on probiotic containing lactobacilli and the results of the present study are in agreement with these findings.

Mortality: Mortality was recorded during the experimental period and expressed in terms of percentages for each group. Total four numbers of birds were died two each in group A and C while there was no mortality in the group B. Table 4 shows that ($p > 0.05$) and there is no significant difference among group A, B and C. These results are in agreement to Samanta and Biswas^[23] who found that percent mortality was lower in group given probiotic. Group A given protexin is however not in agreement to these findings, having 5% mortality.

Economics of the Experimental study: In the present study, one of the objectives was to determine the feasibility of the probiotic in the broiler rearing in term of economics. Mean feed cost consumption chick⁻¹ was 70.05, 55.76 and 56.45 for group A, B and C, respectively (Table 5) A significant results were found in the cost of feed consumption, cost was significantly higher for the group A ($p < 0.05$) and no significant difference was found between groups B and C. The cost of feed also includes

the cost of probiotic used for groups B and C. The mean gross return per chick was Rs.93.74, 110.66 and 94.53 for groups A, B and C. The gross return for group B was significantly higher ($p < 0.05$) than the other two groups, which are not significantly different. Results of present study are in agreement to Baidya *et al.*^[11] who reported higher cost-benefit analysis, Income bird⁻¹ was the highest in groups alternatively given antibiotics and probiotics at weekly intervals. However, this economic picture is in contrary to the results presented by Choudhury^[24] who reported higher profit for the groups given antibiotics than control and those given probiotics.

It may be concluded from the experiment that the use of yogurt in broiler production is much useful and have higher efficacy than protexin. It is suggested that yogurt could be used in broilers and also research should be conducted to find its beneficial effects on layer and breeder production. Further research is needed to be carried out to study the efficacy of natural resources that are available locally and could be prepared conventionally.

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