

## INFLUENCE OF PROBIOTIC SUPPLEMENTATION ON THE PERFORMANCE OF WHITE PEKIN DUCKS

By

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**Abstract:** *A study was conducted to find out the effect of dietary supplementation of probiotic 'Livesac' in White Pekin ducks for a period of eight weeks. 144-straight run day old ducklings were randomly divided into three groups of four replicates with 12 ducklings in each. Ducklings in T<sub>1</sub> were fed with control ration, T<sub>2</sub>-control+0.025 % probiotic and T<sub>3</sub>-control+0.05 % probiotic. T<sub>3</sub> recorded a higher ( $P<0.01$ ) body weight than other groups from second fortnight and followed a similar pattern till the end of the experiment. The cumulative body weight gain and feed consumption showed a significant ( $P<0.01$ ) difference between treatments and superior values were observed in T<sub>3</sub>. Feed conversion ratio was superior ( $P<0.01$ ) in T<sub>3</sub>. The total feed cost per kg body weight was lower in T<sub>3</sub> upto six and eight weeks of age. Considering the overall performance it was concluded that probiotic supplementation at 0.05 % level is beneficial in White Pekin ducks.*

### INTRODUCTION

Probiotics are reported to help in regulating the microbial environment in the gut, reduce the digestive upsets, prevent pathogenic gut bacteria, provide certain essential nutrients, improve feed utilization and improve production efficiency in chicken (Jin *et al.*, 1996). The use of probiotics is effective in counteracting the stress by its beneficial effects in live weight, feed intake, feed conversion efficiency and meat quality. Duck producers are also adopting measures to maximize efficiency, by optimising birds performance and minimizing feed cost. But usage of probiotics within the duck sector is much less widespread. The beneficial effects of probiotics in chicken production are well documented but its application in duck nutrition is not much emphasised and reports are scanty. Therefore, an experiment was planned to evaluate the effect of supplementation of probiotics on the performance of White Pekin ducks.

## MATERIALS AND METHODS

One hundred and forty four (144) day-old straight run White Pekin (Vigova variety) ducklings were divided into three groups, each having four replicates of 12 ducklings each. These groups were allotted randomly into three dietary treatments i.e., T<sub>1</sub> – standard broiler ration (control), T<sub>2</sub> – control + 250g Livesac / tonne of feed (0.025%) and T<sub>3</sub> - control + 500g Livesac / tonne of feed (0.05%)

The ducklings were reared on litter floor of 2356 cm<sup>2</sup> per duckling and were provided with optimum conditions of brooding and management. Feed and water were provided *ad libitum* throughout the experimental period. The probiotic used in this study was 'Livesac'\*.

*\* A product manufactured by M/S. Zeus Biotech Limited, Mysore. Each kilogram Livesac contains Lactic acid bacteria 120000 million CFU/kg, live yeast cells 5000 billion CFU/kg and traces of enzymes viz., Xylanase, Glucanase, Pectinase, Amylase, Cellulase, Protease, Phytase and Galactosidases.*

The ducklings were fed standard broiler ration formulated as per BIS specifications (1992). The individual body weight of ducklings was recorded biweekly. Feed intake was noted replicate wise at the end of each week. The feed conversion ratio

(FCR) was calculated based on the data on body weight gain and feed intake. At the end of the trial two birds from each replicate (one male and one female) were utilized to study the dressing percentage. Mortality was recorded during the study. Cost benefit analysis was also carried out. The data collected were statistically analysed as per the methods described by Snedecor and Cochran (1985).

## RESULTS

### *Body weight*

Influence of probiotic supplementation on the performance of White Pekin ducks are presented in Table 1. The mean body weight data indicated that 0.05% probiotic supplemented group registered higher body weight at 6<sup>th</sup> and 8<sup>th</sup> week of age than the other two groups. Statistical analysis showed that the body weight in the group fed with 0.05% probiotic (T<sub>3</sub>) was higher (P< 0.01 ) than control group (T<sub>1</sub>) and group fed with 0.025% probiotic (T<sub>2</sub>). The improvement in body weight consequent to probiotic supplementation at 0.025% as compared to control group was 12.46 and 66.09g during 6 and 8 weeks of age, respectively. The corresponding figures with 0.05% supplementation were 131.18 and 179.31g, respectively. In the

study, there was 7.03% increase in body weight at 6 weeks of age and 7.28% increase at 8 weeks of age with 0.05% probiotic supplementation as compared to the control diet.

**Table 1.** Effect of dietary supplementation of probiotic on the performance at six and eight weeks of age in White Pekin ducks

Sl. No.	Parameters	Dietary Treatments		
		T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>
1.	Mean body weight at six weeks (g)	1866.62 <sup>b</sup>	1879.08 <sup>b</sup>	1997.80 <sup>a</sup>
2.	Mean body weight at eight weeks (g)	2463.89 <sup>b</sup>	2529.98 <sup>b</sup>	2643.20 <sup>a</sup>
3.	Cumulative body weight gain upto six weeks (g)	1825.63 <sup>b</sup>	1837.46 <sup>b</sup>	1956.46 <sup>a</sup>
4.	Cumulative body weight gain upto eight weeks (g)	2422.89 <sup>b</sup>	2488.36 <sup>b</sup>	2601.86 <sup>a</sup>
5.	Cumulative feed consumed upto six weeks (g)	4943.66 <sup>b</sup>	4954.25 <sup>b</sup>	5071.54 <sup>a</sup>
6.	Cumulative feed consumed upto eight weeks (g)	7643.97 <sup>b</sup>	7699.97 <sup>b</sup>	7801.03 <sup>a</sup>
7.	Cumulative feed conversion ratio upto six weeks	2.72 <sup>b</sup>	2.70 <sup>b</sup>	2.59 <sup>a</sup>
8.	Cumulative feed conversion ratio upto eight weeks	3.16 <sup>b</sup>	3.08 <sup>b</sup>	3.01 <sup>a</sup>
9.	Livability (per cent)	95.83	97.92	91.67
10.	Ready-to-cook yield (male)	64.78	62.77	60.60
11.	Ready-to-cook yield (female)	60.71	63.85	65.73
12.	Total cost per kg body weight in Rs. (6 <sup>th</sup> week)	35.36	35.66	34.23
13.	Total cost per kg body weight in Rs. (8 <sup>th</sup> week)	35.38	34.84	33.96

Means bearing the same superscript within the row do not differ significantly ( $P < 0.05$ )

### ***Body weight gain***

The mean cumulative body weight gain from 0 to 6 weeks of age for the treatments T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 1825.63, 1837.46 and 1956.46g, respectively. The corresponding figures for the period from 0 to 8 weeks of age were 2422.89, 2488.36 and 2601.86g, respectively. The gain was more among the birds in group T<sub>3</sub>. Statistical analysis revealed that both 0 to 6 and 0 to 8 weeks gain was more ( $P < 0.01$ ) with the group offered 0.05% probiotic and lowest with the control group. The group supplemented with 0.025% probiotic also registered a significant ( $P < 0.01$ ) gain during 0 to 8 weeks period, but it was lower than T<sub>3</sub>.

### ***Feed Intake***

The cumulative feed intake per duck upto six weeks of age was 4943.66, 4954.25 and 5071.54g for the treatments T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively.

The corresponding figures upto eighth week was 7643.97, 7699.97 and 7801.03g, respectively. Birds fed diets supplemented with 0.05% probiotic consumed numerically more feed than those fed control diet as well as diet supplemented with 0.025% probiotic. Statistical analysis revealed that 0.05% probiotic supplemented group consumed significantly ( $P < 0.01$ ) more feed than 0.025% probiotic supplemented group as well as the control during 0 to 6 and 0 to 8 weeks experimental period.

#### ***Feed Conversion Ratio***

The cumulative mean feed conversion ratio up to 6 weeks of age were 2.72, 2.70 and 2.59 and that up to 8 weeks of age were 3.16, 3.08 and 3.01 for the treatments T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively. The statistical analysis of the cumulative FCR up to six and eight weeks indicated that 0.05% probiotic supplemented group recorded significantly superior ( $P < 0.01$ ) FCR than 0.025% probiotic supplemented group and the control.

#### ***Processing Yield***

The mean per cent ready – to- cook (R-to-C) yield for the various dietary treatments T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 64.78, 62.77 and 60.60 in males and 60.71, 63.85 and 65.73 in female ducks. The R-to-C yields did not show any significant difference among treatment groups and between sexes, suggesting that growth promoters used in the trial had little influence on the yields of the carcass.

#### ***Cost of Production***

The cost of production per kilogram body weight showed that 0.05% probiotic supplemented group recorded the lowest cost of production when compared to 0.025% probiotic supplemented group and the control both at 0 to 6 weeks and 0 to 8 weeks of age.

### **DISCUSSION**

Increased body weight consequent to probiotic supplementation observed in the study is in agreement with Cowan and Hastrup (1997), Weis *et al.* (1997) and Hruby (2002) who reported that additives such as probiotics, yeasts and enzymes have been found to increase body weight in ducks. The probiotics supplementation in the diet ay favour colonization with a specific group of beneficial micro organisms and create an environment biased against undesirable organisms and hence could improve the birds performance. The Lactobacillus based probiotic might be responsible for the synthesis of biotin, Vit B<sub>1</sub>, B<sub>2</sub>, B<sub>12</sub> and Vit K, which are required for growth and metabolism. Probiotics may also enhance the

absorption of amino acids, vitamins and pigments, which result in an improvement in body weight.

The cumulative gain in body weight upto 6 weeks was 130.83g higher with 0.05% probiotic supplemented group and 11.83g more with 0.025% supplemented group than the control group. Similarly, cumulative weight gain upto 8 weeks showed that as compared to the control the gain in 0.025% probiotic given group was 65.47g more, whereas 0.05% probiotic supplemented group recorded an additional weight gain of 113.5g. It implies that probiotic supplementation is capable of bringing changes in weight gain performance of ducks and it is in agreement with Jeroch *et al.*( 1995) who reported improvement in body weight gain by the supplementation of enzymes in chicks. Hong *et al.*(2002) also reported a 6 to 8 % increase in body weight gain by the supplementation of enzyme.

Probiotic supplementation at 0.025% level led to an increase in feed intake of only 10.59g during 0 to 6 weeks of age and 56.0 g during 0 to 8 weeks of age over the control. The corresponding values with 0.05% supplementation of probiotics were 127.88 and 157.06g, respectively. NRC (1994) reported feed intake at 8 weeks as 9.86 and 9.61 kg in male and female White Pekin ducks, respectively. Khan(2002) also reported cumulative feed intake of White Pekin ducks as 8.63 kg for a period of 7 weeks. In all these studies the cumulative feed intake was more than the mean values reported in the present trial. But this factor should be considered in conjunction with the body weight recorded at 7<sup>th</sup> or 8<sup>th</sup> week of age. In all these works the body weights were higher than that obtained in the present study. Supplementation of Lactobacillus cultures might have increased the amylolytic activity in the intestine of ducks, which in turn leads to an increase in feed consumption pattern in the treated groups. It is also possible that the increased feed consumption results from a self-regulatory mechanism or appetite.

Supplementation of probiotic at 0.025 and 0.05% levels resulted in superior feed conversion ratio to the tune of 0.02 and 0.13 at 0 to 6 weeks of age and 0.08 and 0.15 at 0 to 8 weeks of age, respectively, in comparison with the control. Probiotic supplementation at 0.05% level resulted in superior(  $P < 0.01$ ) FCR than lower level of supplementation (0.025%) and control. Parova *et al.*(1994) and Weis *et al.* (1997) could also observe significant improvement in FCR with probiotic supplementation in chicks. Cowan and Hastrup (1997) and Hong *et al.* (2002) also reported that enzyme supplementation in ducks resulted improvement in FCR.

The improvement in feed to gain ratio might be due to the fact that supplementation of bacteria like *Lactobacillus* species survive and colonize in the gastro intestinal tract so that their beneficial functions are performed by attaching to the intestinal epithelium.( Jin *et al.*,1996)

The ready- to -cook yield in the study ranged from 60.71 to 65.73%. The average ready-to-cook yield in male Kuttanad ducks was 68.36% (Anon., 2003), which was slightly higher in comparison to the present study. Ahmed *et al.*(1984) has reported the R-to-C yield in Khaki Campbell males as 72.94% and in females as 68.40%.The carcass yield obtained in this study also agrees with research works of Aydin *et al.* (1994) in Pekin ducks. Jeroch *et al.* (1995) also opined that carcass quality variables were not consistently influenced in male Muscovy ducks fed a diet supplemented with enzymes.

## CONCLUSION

The performance of ducks fed with 0.05% probiotic was found to be economical. It could be inferred that addition of 500g probiotic per tonne of feed enhances the utilization of nutrients and increases the overall performance of ducks.

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