



# Effect of targeted delivery of Probeads-EC<sup>®</sup> on the production performance of Aseel cross chicks



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## Abstract

The present study was carried out to assess the production performance on supplementation of targeted delivery of Probeads-EC<sup>®</sup> in the diet of Aseel cross chicks (240 birds) for a period of 8 weeks. Two experimental diets were formulated - control diet (T<sub>1</sub>) with no Probeads-EC and treatment diet (T<sub>2</sub>) in which birds were supplemented at the rate of 5 beads/bird with commercial feed. The biweekly body weight, body weight gain and feed conversion ratio was significantly ( $P < 0.05$ ) different between the two groups. Feed intake showed no significant difference between the two groups. The percentage of livability showed no significant difference between the groups. The effect of Probeads-EC on gut health evaluated by the analysis of intestinal samples showed the presence of *E. coli*, *Clostridium* and *Staphylococcus* and absence of *Salmonella* in both the groups. The above study concluded that supplementation of Probeads-EC had improved the growth performance of Aseel cross chicks without negatively influencing the gut health.

**Keywords:** Aseel cross chicks, production performance, gut health

The field of biotechnology has made a great impact upon poultry nutrition and hence poultry feed industry. Appreciable efforts have been poured into producing better and more economic feed. Not only a good feed but also its better utilization is essential to improve production. Dietary changes as well as lack of a healthy diet can catapult the balance of gut microflora thus predisposing to digestive disturbances. A well-balanced ration sufficient in energy and nutrients is thus of paramount importance in maintaining a healthy gut. A great deal of attention has recently been received for proper utilization of nutrients and the use of probiotics for growth promotion of poultry. Probiotics are microorganisms exhibiting many beneficial effects to host if given in adequate amounts. The objective of this study was to study the effect of probiotics on the production performance of Aseel cross chicks on body weight, feed consumption and gut microbiota of poultry.

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## Materials and methods

Two hundred and forty (240) day-old, straight run Aseel cross chicks were divided into two groups, each having four replicates of 30 chicks each. The control group T<sub>1</sub> was fed with standard commercial desi chicken ration and T<sub>2</sub> was fed with standard commercial desi chicken ration with Probeads-EC® (5 beads / bird). The chicks were provided with optimum conditions of brooding and management.

The Probeads-EC® is an enteric coated probiotic bead developed by Translational Research Platform for Veterinary Biologicals (TRPVB), Tamil Nadu Veterinary and Animal Sciences University using a unique polymer, Cellulose Acetate Phthalate. The probiotic strains available in the Probeads-EC® are *Bacillus firmus*, *Bacillus subtilis*, *Enterococcus faecium*, *Enterococcus faecalis* and *Saccaromyces cerevisiae*.

The experiment was conducted for a period of eight weeks and the diet was formulated based on the commercial desi chick starter mash formulated as per BIS specifications (1992) containing 23 per cent crude protein and 2800 kcal per kg metabolisable energy.

Individual body weight of chicks and feed intake was recorded every fortnight replicate wise and feed conversion ratio was calculated utilizing the data on body weight gain and feed intake. The results up to eight weeks were calculated for body weight, body weight gain, feed intake and feed conversion ratio. Mortality was recorded replicate-wise during the entire experimental period. The data collected on various parameters were statistically analysed as per the methods described by Snedecor and Cochran (1994).

Intestinal samples were collected from both the groups and analysed for the presence of *E. coli*, *Staphylococcus*, *Clostridium* and *Salmonella* at Poultry Disease Diagnosis and Surveillance Laboratory, Veterinary College and Research Institute Campus, Namakkal.

## Results and discussion

Effect of dietary supplementation

of Probeads-EC® in Aseel cross chicks are shown in Table 1. The body weight was significantly ( $P < 0.05$ ) higher in probiotics supplemented group from the second week of age. The weight gains up to eight weeks of age showed statistical differences between the treatments. The gain in weight was high ( $P < 0.05$ ) in treatment group when compared to control group.

The gain in weight due to probiotics is due to the modification of gut health by multiplication of beneficial microorganisms thereby stimulating the gut barrier function which will lead to competitive exclusion of pathogens and stimulation of the immune system (Jha *et al.*, 2020)

Sanders *et al.* (2003) reported that supplementation of probiotics increased immunity in birds thereby leading to increase in body weight gain during rearing period. Mushki, an Aseel variety was given feed additives by Ahmad *et al.* (2014) who reported higher body weight on ration supplemented with feed additives. Swain *et al.* (2016) studied the effect of probiotic supplementation in liquid form in Vanaraja chicks and recorded similar results.

The feed intake up to eight weeks presented in Table 1 shows that the probiotic supplemented group recorded no significant difference in feed intake. In contrast to our study, the feed intake was significantly higher in a trial conducted by Ahmad *et al.* (2014) in Aseel chicken variety, Mushki, fed on ration supplemented with feed additives. Swain *et al.* (2016) studied the effect of supplementation of probiotic in liquid form in Vanaraja chicks and also recorded similar results.

Feed conversion ratio was significantly ( $P < 0.05$ ) better in Probeads-EC® supplemented group when compared to control group. Reduction of harmful pathogens in the digestive system thereby leading to a favourable environment for the multiplication of beneficial organisms, reduction of antinutritive factors by enzymatic degradation and reduction in the viscosity of the digested feed leads to the improvement of feed conversion ratio (Momtazan *et al.*, 2011).

The improvement in feed efficiency was in accordance with Wolfenden *et al.* (2010) who reported that the improved immunity level in birds results in an increase in body weight with no increase in feed consumption and leads to better feed conversion ratio. Swain *et al.* (2016) in a study on probiotic supplementation in liquid form in Vanaraja chicks also recorded similar results.

No significant difference in mortality pattern was observed between the probiotic supplemented group and control group. Study conducted by Panda *et al.* (2000) and Malik *et al.* (2008) recorded lower mortality rate in desi birds as the intestinal immunity of the birds was boosted due to probiotic supplementation in feed.

Probiotics play a role in altering the balance of the gut microorganisms thereby increasing the health and production performance of the birds apart from reducing the incidence of diseases (Broom *et al.* (2018), Yadav *et al.* (2019).

The intestinal samples analysed showed the presence of *E. coli*, *Clostridium* and *Staphylococcus* and absence of *Salmonella* in both the groups. In a study conducted by Wang *et al.* (2017) and Zhen *et al.* (2018), the supplementation of probiotics reduced the growth of pathogenic organisms and in turn increased the multiplication of beneficial organisms. The above study concluded that supplementation of Probeads-EC® improved the growth performance of Aseel cross chicks without negatively influencing the gut health.

### Conclusion

Supplementation of Probeads-EC® improved the body weight, body weight gain, better feed efficiency and livability percentage in Aseel cross chicks. No difference in feed consumption between the groups was noticed. The effect of Probeads-EC® on gut health evaluated by the analysis of intestinal samples showed the presence of *E. coli*, *Clostridium* and *Staphylococcus* and absence of *Salmonella* in both the groups.

**Table 1.** Dietary supplementation of Probeads-EC as feed additives on production performance in Aseel cross chicks

Parameters	2 <sup>nd</sup> week	4 <sup>th</sup> week	6 <sup>th</sup> week	8 <sup>th</sup> week
<b>Body weight (g)</b>				
T <sub>1</sub> (N=120)	93.05 <sup>B</sup> ± 0.54	202.33 <sup>B</sup> ± 5.52	325.48 <sup>B</sup> ± 9.08	532.16 <sup>B</sup> ± 11.58
T <sub>2</sub> (N=120)	96.87 <sup>A</sup> ± 0.49	211.45 <sup>A</sup> ± 4.57	342.25 <sup>A</sup> ± 7.62	559.45 <sup>A</sup> ± 13.90
P value	0.0023	0.0015	0.0021	0.0009
<b>Body weight gain (g)</b>				
T <sub>1</sub> (N=120)	57.00 <sup>B</sup> ± 1.71	109.28 <sup>B</sup> ± 3.74	123.15 <sup>B</sup> ± 7.55	206.68 <sup>B</sup> ± 15.95
T <sub>2</sub> (N=120)	60.76 <sup>A</sup> ± 1.60	114.58 <sup>A</sup> ± 4.01	130.80 <sup>A</sup> ± 8.64	217.20 <sup>A</sup> ± 11.51
P value	0.0018	0.0024	0.0019	0.0020
<b>Feed consumption (g)</b>				
T <sub>1</sub> (N=120)	160.00 ± 6.05	340.00 ± 8.45	410.09 ± 9.31	725.45 ± 20.14
T <sub>2</sub> (N=120)	165.52 ± 5.32	348.22 ± 7.61	425.00 ± 11.61	745.00 ± 24.87
<b>Feed conversion ratio</b>				
T <sub>1</sub> (N=120)	2.81 <sup>B</sup> ± 0.15	3.11 <sup>B</sup> ± 0.23	3.33 <sup>B</sup> ± 0.19	3.51 <sup>B</sup> ± 0.20
T <sub>2</sub> (N=120)	2.72 <sup>A</sup> ± 0.21	3.04 <sup>A</sup> ± 0.17	3.25 <sup>A</sup> ± 0.26	3.43 <sup>A</sup> ± 0.28
P value	0.0002	0.0015	0.0014	0.0213
<b>Livability (%)</b>				
T <sub>1</sub> (N=120)	97.50 ± 2.00	100.0 ± 0.0	100.0 ± 0.0	100.0 ± 0.0
T <sub>2</sub> (N=120)	97.50 ± 2.00	100.0 ± 0.0	100.0 ± 0.0	100.0 ± 0.0

Means within a column with different superscript small letters differ significantly (P < 0.05)

### Conflict of interest

The authors declare that they have no conflict of interest

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