Duck breeding performances using a natural feed additive

M. VETESI[1]*, E.KÓSA[1], L. KISS[2], E. BAJCSY[1], M. ERDÉLYI[1], T. KÓSZÓ[1]

[1] Szent István University, H-2103 Gödöllő, Páter K. u. 1., [2] Szarvasi Kacsafarm Ltd., Szarvas Hungary
*Corresponding author: Vetesi.Margit@mkk.szie.hu

In the present study effects of IMUNOVET HBM, a prebiotics based on wheat germ, was observed in laying ducks production. Effect of this natural feed additive on performance, immune response and health protection in other species (cattle, swine, chicken) have been reported by several authors.
Peking type duck (breed Szarvasi K94) was used in the study from the 2nd week to the end of the laying period. Vaccination against avian pasteurellosis, hepatitis and Newcastle disease was done preliminary the experiment. Control birds (n=392) were fed with commercial layer diet and experimental group (n=397) was fed with commercial layer diet supplemented with 1 kg/t IMMUNOVET HBM. Data of mortality, average feed consumption, average number of laid eggs, feed conversion ratio, fertility rate of eggs, hatchability, number of day-old ducks per layer were recorded.
Laying performance of the control group was lower than that of the experimental one from the 8th week of the laying period. Average numbers of laid eggs were 119.1 and 108.5 eggs/layer in the experimental and the control group, respectively. This means 9.8 per cent difference, which is statistically significant (P<0,1%).
Feed consumption of the two groups was similar, thus the layers in the experimental group took 10% (0.36 kg vs. 0.40 kg of the control one) lower amount feed/egg.
Egg fertility rate was 91.8% in the experimental group, while it was 91.6%in the control. Whereas, hatchability was almost the same in the two groups (79.7% in the control and 80.5% in the experimental group). Considering the laying and hatchability performance data, 86.5 day-old ducks were produced by one layer in the control group, while this parameter was 10.75% higher for the experimental group, according to the 95.9 day-old ducks per layer.
Price of the experimental diet was 7.2% higher than that of the control diet due to the additive. Thanks to the higher egg and even though the treated diet was more expensive than the control one.
According to the recorded performance parameters it can be declared that the long term use of IMMUNOVET HBM in the diet of ducks having high metabolic rate results in improved performance.

Keywords: feed additive; prebiotics; breeding duck; laying performance; hatchability

Introduction

Due to food safety and sustainable production aspects inclusion of proteins of animal origin in feed grade products has been restricted, and use of growth promoting antibiotics has been prohibited.

Besides the evident economic benefits, withdrawal of the antibiotic growth promoters (AGP) was the consequence of the appearance of resistant micro organisms, and toxic symptoms occurred, when AGP supplemented diets were fed.

These tendencies enhance the research for natural feedstuffs or supplements capable to maintain the high production performance and health status, which are effective and do not have any destroying effect and no risk of residuum in the product.

There are several efforts to replace AGPs like the use of probiotics – live bacteria (*Garriga et al.. 1998, Gusils et al. 1999*), and yeast cultures.

Besides probiotics, use of substances enhancing the colonisation of the resident and beneficial microflora is also spreading. These products, called prebiotics, are usually indigestible oligosaccharides, like mannane oligosaccharides (MOS) isolated from the cell wall of yeast and their action is to prevent the colonisation of the potential pathogen microbes and their attachment to the intestine wall (*Pettingrew, 2001*) consequently they improve the resistance of the digestive tract to the pathogens (*Ferket, 2003*). Fructo oligosaccharides (FOS) are nutrients for the beneficial flora, while they prevent the colonisation of the pathogens, as well.

To be effective, not only the nutrients, but also the beneficial bacteria should be present at the same time in the digestive tract symbiotics (products containing pro- and prebiotics) *(Apalayahti, 2003)* might be successfully used. Similar conclusion was done by *Jamroz et al. (2003)* studying the effects of plant extracts, or *Owens et al. (2003)* used yeast extract and mixture of yeast extract and acidifier together, or *Morales et al.(2003)* studying the effects of different yeast extracts and yeast cell wall products in chicken. Substrate specificity seems to be the cornerstone of efficiency of growth promoters.

Beneficial effects of organic acids and their salts on reducing the number of pathogen micro organisms in the digestive tract have been reported in the literature. According to *Verstegen and Williams (2003)* further effect of acids is creating proteolytic environment due to the reduced pH and the pepsin activity, which improves the digestibility of the nutrients.

Enzyme supplementation enhances the hydrolysis of the nutrients in the digestive tract and improves their conversion. Phytase and NSP enzymes are the most commonly used exogenous enzymes. According to *Schulze and Böhme (2000)* using these enzymes, even 8 per cent increase might be reached in the metabolisable energy content of the diet, and feed conversion ratio as well as weight gain might be improved.

Herb extracts and herb mixtures are also regarded as members of the new generation of growth promoters. In this context essential oils of aromatic plants are the most important ones, as most of the plants having antibacterial effect contain such oils (Wad, 2004). Several herb extracts were reported to have bateriostatic, antibacterial, fungicide and/or antioxidant effects *(Jamroz et al. 2003, Wald, 2004 etc.*). There are also feed additives, which improve the mineral and vitamin status and absorption in the animals (*Nys, 1999, Huyghebaert et al, 2003, Whitehead, 1999*).

In the presented experiment the effect of a prebiotics, the IMMUNOVET HBM feed additive was studied on breeding ducks. This natural additive has been produced with digestion and chemical treatment of wheat germ. There were several overwhelming research projects to prove the beneficial effects of this product on the performance, immune response, and health status in poultry, swine and cattle, so far.

Purpose of this study was to examine how this additive (IMMUNOVET HBM) modifies the performance of breeding duck.

Materials and methods

Place of Research: breeding duck farm of the Szarvasi Kacsafarm Ltd in Hungary.

Experimental animals: Pedigree Peking type ducks (Szarvasi K94) were used in the experiment during their laying period.

Table 1. Treatments

Group	Diet	No of animals
Control	Common vaccination protocol Commercial layer diet	326 layer + 66 drake = 392 birds (sex ratio – 1:5)*
Experimental	Common vaccination protocol Commercial layer diet supplemented with 1 kg/t IMMUNOVET HBM	329 layer + 68 drake = 397 birds (sex ratio – 1:5)

Period of the Experiment: from the 2nd week to the end of the laying period.Vaccination against avian pasteurellosis, hepatitis and Newcastle disease was done before starting the experiment.

Measured performance parameters: Mortality, average feed intake, average egg production, feed conversion ratio, ratio of fertile eggs, hatchability, day-old ducklings per layer data were recorded during the experiment in both groups.

Results

Mortality rate was low over the total laying period (control – 3.11%, experimental group – 3.54%) and the difference between the groups was not notable.

Marked difference in the egg production of the two groups appeared from the 8th week of production as the production of the layers in the experimental group exceeded that of the control ones. This tendency became even more significant afterwards.

Average egg production was 108.5 eggs/layer in the control group, while the production of the experimental group was 9.8% higher (119.1eggs/layer). The difference was significant (P<0.1%) (Figure 1).

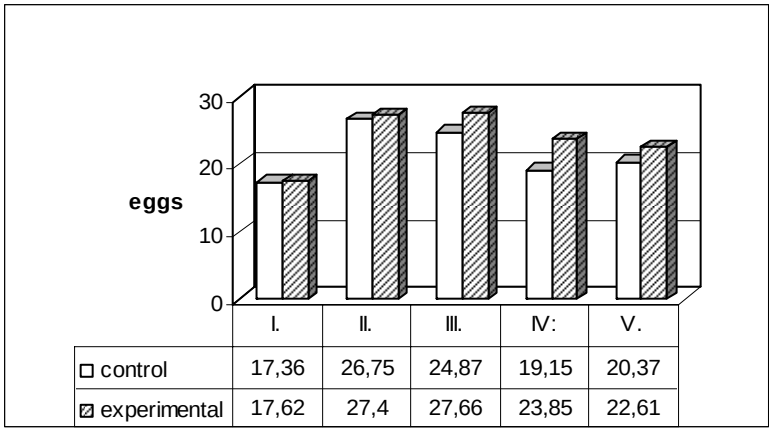


Figure 1. Average monthly egg production (eggs/layer)

Feed consumption of the two groups was similar as no significant difference was found between them in the average daily feed intake.

This also means that the experimental group fed with IMMUNOVET HBM supplemented diet, took 10% (0.36kg vs. 0.40 kg of the control one) lower amount of feed to produce an egg (Table 1).

Table 1: Feed conversion to egg production (kg/no of eggs)

Date	Feed conversion to egg production (kg/number of eggs)	
	Control	Experimental
2005 March	0.53	0.49
2005 April	0.32	0.32
2005 May	0.34	0.30
2005 June	0.41	0.33
2005 July	0.39	0.35
average	0.40	0.36
%	100.0	90.0

Rate of fertile eggs in the experimental group was 91.8% in average, while it was 91.6% for the control one. Hatchability data were similar, 79.7 and 80.5% in the control and the experimental groups, respectively.

Considering the egg production and hatchability data, 86.5 ducklings were produced by one layer in the control group, while the same parameter of the experimental group was 10.75% higher (95.9 ducklings/layer).

Calculations were done to evaluate the cost efficiency of the production (table 2).

Table 2: Comparison of feeding costs and incomes

Costs vs. Income	Control group	Experimental group
Price of diet (EUR/100kg)	18.9	20.2
Feed consumption (kg/bird)	35.05	34.61
Price of consumed feed (EUR/bird)	6.6	7.0
Day-old duckling (pieces/layer)	86,5	95,9
Income from selling ducklings (EUR/layer)	38,1	42,2
profit (EUR/layer)	31,4	35,2
Difference (EUR/layer)		3.7

Price of the experimental feed was 7.2% higher (1.3 EUR/100kg feed) than that of the control diet.

Considering the higher egg and day-old duck production of the experimental layers, the realised income occurred to be 11.9 % (3.7 EUR/layer) higher in the experimental group, even though the experimental diet was more expensive the control due to the IMMUNOVET HBM supplementation.

Conclusions

According to the recorded performance data it can be declared that production performance of the experimental group fed with IMMUNOVET HBM supplemented diet has exceeded that of the control group after 8 weeks of feeding the additive. This tendency was present until the end of the laying period. Therefore, egg production of the experimental layers was 9.8% higher than that of the control ones. Due to the higher performance feed conversion ratio was 10% lower, while income was 11.9% higher for the IMMUNOVET HBM supplemented breeding ducks.

Altogether our results suggest that the long term use of IMMUNOVET HBM on the diet of ducks having high metabolic rate results in improved performance.

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