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**Institute of Poultry Diseases
Free University Berlin**



Turkey Production: Current challenges

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EFFECT OF A PREBIOTICUM „IMMUNOVET-HBM™„ ON THE HEALTH STATUS AND PRODUCTION OF HUNGARIAN TURKEY FLOCKS

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Summary

As the AGP-s are banned since 2006 efforts were made to replace them by materials do not risk food safety and corresponds to the prescriptions. So our department developed a plant product corresponding to the EU requirements, enhances immunity of farm animals and improving their production.

Natural resistency of poultry hybrids is decreasing as their production are genetically improving. Therefore the harmful effect of inevitable stressors in large scale animal production should be compensated by increasing of their immune-resistency by immunostimulants and growth promotants do not contain antibiotics. „Avenir” a fermented wheat-germ product has a positive effect on the immunoprocesses against tumor cells and used as a food additive with human patients. In consideration of its results the effect of a similar, but not the same wheat germ product has been tested with farm animals.

Immunovet-HBM™ is a prebiotic manufactured for farm animals from wheat germs by biotechnological way withdrawing different components. Giving to BUT 6 commercial turkey's trials have been executed.

In the trials 72 500 females, 74 200 males as control groups as well as 73 120 females and 75 600 males as experimental groups have been settled as day olds and reared till slaughtering under the same technological conditions. Birds were fed by the same ratio, but the feed of experimental groups has been completed by 1 kg Immunovet-HBM™ per tonne of feed.

Clinical status, mortality (including culling) causes, average body weight, feed consumption and meat yield have been regularly registered and the production parameters compared.

Mortality of experimental females proved to be 1.36% and experimental males 2.07 % lower compared to the controls. With the experimental group significantly less respiratory lesions, aortic rupture, enteric signs and leg disorders have been diagnosed.

Average body weight proved to be 0.87 and 3.23 kg higher with the experimental females and males compared to the controls respectively. The feed conversion rate

has been 0.12 and 0.15 kg lower with the experimental females and males compared to the controls.

By the economical investigation the experimental groups produced 473 Ft/bird (1.9 Euro) extra income mixed sexes in average.

Introduction

Hungary has joined to the European Union in 2004. Since that time also in Hungarian poultry industry all prescriptions of the community must have been fulfilled, among others stopping of AGP-s. In the industrial turkey production the animals are faced to stressors, caused for example by imperfect feed, and feeding, management, technical equipment, diseases etc. It is well known that even a not too strong but long lasting stress situation decreases the production and resistency level of the flock.

By the AGP-s the normal microflora of the gut could have been regulated and the process of digestion of feed and absorption of organic and inorganic nutrients. Because of the immune-resistency of the birds do not break, and the disadvantageous stress-effects are not able to prevail, but the production of the birds can be kept on a closer level of the genetical ability.

Long years before AGP-s have been banned by EU, numerous researches carried out for finding a way to replace the role of antibiotics by natural materials, since *Nurmi and Rantala* published (*Nature*, 1973. 241. 210-211.), that healthy intestinal microflora of old birds can activate the intestinal microflora of day old chicken against colonisation of *Salmonellas*.

The efforts of researches resulted in developing probiotic microorganisms and prebiotic substrates that enrich certain bacterial populations providing an alternative to the sub-therapeutic antibiotics in the feed of livestock. Both pro and prebiotics alter the intestinal microbiota and the immunsystem by reducing pathogen microflora in certain conditions, however in this way increasing food safety.

The team of our Department on the theoretical base of „Avemar”, having a positive effect on the immunprocesses against tumor cells with human patients, developed a plant origine, environment friendly product. This prebioticum is not risky for food safety, can be mixed to the feed of livestock, enhancing the immun-resistency and production parameters. The product is named as: Immunovet-HBM™ and can be detected either qualitatively or quantitatively in the concentrated feed of animals.

Material and methods

After some laboratory trials two series of experiments have been executed on commercial turkey flocks. The experimental groups were fed by feed completed with Immunovet-HBM™ 1kg/tonne and the kontrol groups without it.

Immunovet-HBMTm is a standardized mixture of molecules manufactured by chemical transformation of natural plant products. The basic material is wheat germ from which by chemical, enzymatic, biotechnological methods and

fermentation different compounds are extracted. The process of transformation is checked by HACCP and the quality insured by ISO -9001. The effective agents after concentration are withdrawn by physico-chemical methods and the manufacturing is finished by homogenisation, micro-pelletization and formulation to a natural vehiculum.

Production parameters of experimental and control turkey flocks have been compared in this trial. The feed of the experimental group was completed with 1000 g/1000 kg Immunovet-HBM™ though the feed of controls did not contain any additive.

73 120 females and 75 600 males belonged to the experimental groups and 72 500 females as well as 74200 males to the control groups. The BUT Big 6 poult have ben settled as day olds and kept to the slaughtering. All flocks have been fed by the same ration composed according to requirement of their age.

The nutrient value of the feed is summarized in the table No 1.

Table 1: Nutrient value of commercial turkey feed

<i>Components</i>	Starter I, II 1-56 day		Developer I, II 57-112 day		Finisher 113day-
Crude protein %	28,8	26,6	22,9	19,7	16,6
Digestible protein%	25,3	23,3	19,9	16,9	14,0
Fat %	4,9	4,6	5,4	5,1	5,1
Ca%	1,02	1,56	1,48	1,43	1,12
P (av)%	1,02	0,99	0,89	0,91	0,87
Lysin %	1,7	1,55	1,28	1,03	0,72
M+C%	0,98	0,89	0,79	0,68	0,60
ME (MJ/kg)	12,52	12,52	12,29	12,33	12,84

Changing of different type of feed took place step by step within 2-3 days. The starter feed has been crumbled, the others pelleted. All of the flocks were fed ad libitum. Till the end of the first week birds have been fed from enlightened plastic feeders, afterwards from automatically filled round feeders.

The birds have been supplied by human quality drinking water. The houses were equipped by bell drinkers.

The flocks have been kept in 4 houses equipped by the same technology, with 4 birds/ m² stocking density. The deep litter houses were climatized, enlightened automatically and uniformly. The technology has been adapted to the requirement of the birds and changed according to their age.

Females and males belonging to the experimental and control groups were reared for the equal days by sexes.

During the course of the experiment the following parameters have been collected regularly:

- *Clinical status*
- *Mortality, rate (including culling) and main causes of mortality*
- *Average body weight one day before slaughtering*
- *Feed conversion rate*
- *Meat yield (tigh, breast)*
-

The clinical status has been regularly checked and noticed by the local veterinarian and farm-manager, as well as the number of dead birds. The local veterinarian noticed the main causes of the mortality by autopsy of dead birds.

Average body weight has been determined by scaling 100 birds/group/sexes just before their slaughtering in the house by „Salter weigher”

Feed conversion rate has been calculated at the end of the rearing of groups/sexes on the base of the total live weight and the total quantity of consumed feed.

At the slaughtering the weight of the total tigh and breast meat of 20-20 birds/sex/group have been determined.

Results

a) *Clinical status*

By the regular veterinary inspection the experimental group seemed to be in excellent health status with a good appetite, though in the control group huddling of birds with ruffled, poorly feathered could be seen. Birds showing diarrhoe and leg deformities also often could be observed

b) *Mortality rate (including culling) and main causes of mortality*

The mortality during the whole rearing period is summarized in the table No 2. calculated on the base of the number of settled day olds.

Table 2: Mortality with the experimental and control flocks

Group	Females		Males	
	Experimental	Control	Experimental	Control
No. of settled day olds	73 120	72 500	75 600	74 200
No. of deads	4072	5020	4763	6210
Mortality %	5,56	6,92	6,30	8,37

Fibrinous airsacculitis, catharral pneumonia, fibrinous airsacculitis in 102 cases, aortic rupture and round heart disease in 212 cases, more or less serious enteritis

in 346 cases, different kind of leg disorders in 65 cases have been diagnosed in the control flocks.

With the experimental flocks airsacculitis in 6, aortic rupture in 2, enteritis in 51 leg disorders in 25 cases have been diagnosed.

Results of pathological diagnosis made on the farm are summarized in the table No. 3.

Table 3: Summary of pathological diagnosis

	Experimental	Control
	Females+ Males	Females+ Males
No. of dead birds	8 835	11 230
No. of birds autopsied	641	932
% of autopsied	7,25	8,30
Respiratory signs (airsacculitis, pneumonia)	6 (0,93 %)	102 (10,94 %)
Circulatory signs (aortic rupture, round heart)	2 (0,31%)	212 (22,74%)
Enteral signs (enteritis catarrhalis)	51 (7,95%)	346 (37,90%)
Locomotory signs (tibial dyschondroplasia, Chondrodystrophia, FPD)	25 (3,90%)	65 (6,97%)
Others (suffocation, underdevelopment, culling)	84 (13,20%)	207 (22,21%)

c) Average body weight

Average body weight one day before slaughtering is summarized in the table No 4.

Table 4: Average body weight of the experimental and control groups.

	Females		Males	
	Experimental	Control	Experimental	Control
Average body weight kg	9,52	8,65	19,35	16,12

Uniformity of the experimental group has been normal.

d) Feed Conversion

The feed conversion rate of the groups is summarized in the table No 5.

Table 5: Feed conversion rate with the experimental and control groups

	Females		Males	
	Experimental	Control	Experimental	Control
Feed Conversion Rate (FCR) kg/kg	2,87	3,01	2,97	3,12

e) Meat yield

The breast meat and total thigh yield with the experimental females and males has been found higher than with the controls. The meat yield results are summarized in the *table No 6*.

Table 6: Breast and total thigh meat yield difference (%) of the experimental flocks compared to the controls

	<i>Breast meat yield</i>	<i>Total thigh yield</i>
Females	3,1	2,7
Males	6,4	5,1

Discussion

Probiotics and prebiotics are of two several approaches that have potential to reduce enteric diseases in poultry without completing their feed by antibiotics and prevent contamination of poultry products. Probiotics are live microbial feed supplement improving the intestinal balance (3) prebiotics are nondigestible feed ingredient selectively stimulating the growth of beneficial gut microflora (5). It has been published in a lot of studies, that there is an interaction between the mucosal immunsystem and the intestinal epithelium and stressors has detrimental effects on the immunsystem and intestinal epithelium (1, 13, 19) and the neuro-endocrine system is also involved in the epithelial and immune response given for the stress (2, 12, 15).

The prebiotics must be characterized among others by beneficial alteration of intestinal microbiota and its activity on the intestinal and systemic defense system (18). Researches and commercial applications conducted with prebiotics proved the alteration of immune system, prevention of cancer, reduction of pathogen s colonization etc. Researches pointed out that pro-and prebiotics among others modify the intestinal microflora, stimulate the immunsystem, enhance the animal performance, decrease carcass contamination improve mineral absorbtion (7, 14, 16, 17, 18). Researches with Immunovet-HBM™ proved improving health status and semen quality of horses (10). Decreases immunosuppression caused by mycotoxins with rabbits (11). Improves the milk yield of ewes (4) increases the IBD antibody level and production of broilers (9), plays a positive role in the mycoplasma infection, (20) strenghtens the immunresistency with pigs, (6) improves the production parameters of geese, (8) ducks (21) the reproduction of dairy cows (7).

The advantages of Immunovet-HBM™ can be traced back to the above mentioned effects of prebiotics on the intestinal and systemic stimulation of immunsystem, the beneficial regulation of the gut microflora and the troubleless digestion and absorption of nutrients resulting in better health status and production parameters of turkey flocks.

Conclusions

From the results of our experiments, we can conclude that the feed completed with Immunovet HBM increases the production parameters and improves also the health status of commercial turkey flocks making the activity of turkey producers more profitable. The parameters influencing the profitability of the different groups are compared in the table No 7.

Table 7: Comparison of production parameters of experimental and control Groups

Measurements	Females		Males	
	Experimental	Control	Experimental	Control
Number of birds settled as day olds	73 120	72 500	75 600	74 200
Number of slaughtered	69 048	67 480	70 837	69 990
Mortality and culling %	5,56	6,92	6,30	8,37
Total slaughtered weight, kg	657 337	583 702	1 370 695	1 128 239
Average body weight, kg	9,52	8,65	19,35	16, 12
Total feedconsumption, kg	1 886 603	1 743 413	4 056 595	3 505 288
Feed Conversion Rate (FCR) kg/kg	2,87	2,98	2,95	3,10

From the data comes to light that the experimental flock fed by completed feed produced more meat and consumed less feed for turkey meat.

The difference of the production parameters between the flocks is summarized in the table No 8.

Table 8: Differences of main production parameters between the experimental and control groups by sexes

	Females		Males	
	Experimental	Control	Experimental	Control
Mortality, %		+1,36		+2,07
Average body weight, kg	+ 0,87		+ 3,23	
Feed Conversion Rate (FCR) kg/kg		+ 0,11		+ 0,15

Comparing the production costs and the income a calculation can be made, how beneficial is feeding of turkeys with the feed completed by Immunovet-HBM™

The production cost has been characterized by the purchasing price of day old pullets, feed cost, energy cost, wages, medication and veterinary service, cost of feed investigations, delivery cost etc. The income has been increased by the higher average body weight, the lower feed conversion rate, the better meat yield the lower mortality and culling rate, and the less medical cost of experimental group.

Economical comparison of the income and production cost of experimental and control groups shows 473 HUF (cca. 1,9 Euro) higher profit/ bird in mixed sex.

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