



THE STIMULATION OF IMMUNE REACTIVITY IN POULTRY AS CONSEQUENCE TO THE ADMINISTRATION OF PROBIOTICS

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ABSTRACT

The researches served as purpose the establishment of the immunostimulator effect of probiotics in poultry vaccinated with an immunogen against the New Castle disease. The experiments were performed on 60 broilers Ross hibrids, grouped in four experimental batches that have had the benefit of the same conditions of alimentation and maintenance.

The immunomodulating effect of the probiotic has been appreciated on the basis of the modification of lysozyme concentration and serum properdin concentration, as well as the antibody titre. The obtained results have shown an intensification in the synthesis of immune effectors, specific and unspecific, in all batches to which the immunomodulating substances were given. Significant results were registered in the case of antibody synthesis and from the unspecific factors it could be said that the probiotic influences mostly the serum lysozyme production.

KEY WORDS: *probiotic, poultry, antibody, lysozyme, properdin*

1. INTRODUCTION

The studies that promote the modern micro-technologies to obtain probiotics are extremely preoccupied to reestablish the natural balance between the probiotic microbiocenosis and antibiotics microbicenosis, starting from the level of ecosystems, as elements of the external environment or of the inner environment, characteristic for the animal and human organisms, disturbed by the use, and mostly by the irrational abuse of antibiotics(1).

The results obtained in zootechnics with probiotics are obvious, and the experiments performed revealed a positive influence on the immune system in animals to which probiotics were administered(2, 3, 4).

2. MATERIALS AND METHODS

Researches were performed on 60 chicks, grouped in four experimental batches, as following:

- the witness batch (M) - unvaccinated and fed with mixed standard fodder;
- the experimental batch 1 (E1) - unvaccinated and fed with standard mixed fodder in association with the immunomodulating product;
- the experimental batch 2 (E2) - vaccinated and fed with mixed standard fodder;
- the experimental batch 3 (E3) - vaccinated and fed with mixed standard fodder in association with the immunomodulating product.

The immunomodulating product was administered in quantity of 250 ppm.

The immunomodulating effect of the probiotic was appreciated after the determination of the concentration of the unspecific immune effectors (lysozyme and serum properdine) and specific (the antibody titre). In order to carry out the serological testing, blood samples were gathered from 10 chicks from each batch, as following:

- R1 - the day of the inoculation
- R2 - seven days after inoculation
- R3 - fourteen days after inoculation
- R4 - twenty-one days after inoculation

The samples gathered were tested in the local laboratory of Immunology and Immunopathology of FMV Timisoara.

The serum lysozyme was determined by using the simple radial spreading test, in agar gel 2% in which was planted a culture of *Micrococcus lysodeicticus*. The diameter of the area of lysis of the germs included in the environment is directly proportional to the concentration of the serum lysozyme.

The quantification of the antibodies against the virus of New Castle disease has been performed through the reaction of inhibition of hemagglutinins (IHA).

The chicks, from the four batches have been checked daily, checking on general status and mortality.

3. RESULTS AND DISCUSSIONS

The immune reaction of the chicken is conditioned by the morphological and functional integrity of the immune system, in which the bursae of Fabricius plays an essential part.

The three parameters monitored indicated relevant values, the results obtained being centered and systematized in tables and graphics.

Analyzing the post inoculation reaction evolution, regarding the unspecific immune parameters, for the batches of poultry taken into study, were noticed significant differences from one batch to another and from an immune parameter to another.

In what regards the serum lysozyme, the higher values were registered in the vaccinated batches E2 and E3, with the mention that the maximal value 54,65 $\mu\text{g}/\text{cm}^3$ was registered in batch E3, three weeks after vaccination (table 1). High values were noticed also in batch E1, unvaccinated but which received in its food probiotics, which proves the immunomodulating part of the probiotics.

Table 1.
The average values of the serum lysozyme

Parameter	Batch	Experimental period			
		Initially (R ₁)	After 7 days (R ₂)	After 14 days (R ₃)	After 21 days (R ₄)
Lysozyme (µg/cm ³)	M	10,65	12,30	13,55	14,95
	E ₁	12,45	19,60	25,30	25,20
	E ₂	14,05	39,70	31,90	31,40
	E ₃	22,50	41,80	47,40	54,65

The properdine concentration proved a resembling dynamics, with the mentioning that the registered values for the vaccinated batches were quite similar between them but significantly greater than in batch E1, unvaccinated batch who received in food the immunomodulating substances.

Thus, the properdine concentration increases from 18,30 mg/100 ml serum to 29,98 mg/100 ml serum, after 21 days from vaccination in the case of batch E1, while the maximal value is registered in batch E2, after 21 days from vaccination (35,93 mg/100 ml serum).

To underline that the maximal value was registered in batch E2 not in batch E3, vaccinated batch to which was administered also the immunomodulating substances which proves that the probiotic influences on a smaller scale the synthesis of properdine as compared to the lysozyme (table 2).

Table 2.
Average values of serum properdine

Parameter	Batch	Experimental period			
		Initially (R ₁)	After 7 days (R ₂)	After 14 days (R ₃)	After 21 days (R ₄)
Properdin (mg/100 ml ser)	M	17,60	17,93	16,58	19,84
	E ₁	18,30	20,67	27,65	29,98
	E ₂	22,10	23,33	32,26	35,93
	E ₃	22,05	24,61	31,37	35,03

The presence of specific antibodies, shown through the reaction of inhibition of hemagglutination is presented in table 3. The antibody concentration, expressed in hemagglutination inhibition units, increased progressively in all chicks from the vaccinated batches, but the higher values were registered after 14 days from vaccination. The highest average value (144,0) was registered in batch E3 at 21 days after vaccination, while in batch E2, vaccinated batch, which did not receive probiotic, the titre was 137,6 (UIHA).

Considering the superior results obtained in batches to which probiotic was administered, regarding both the unspecific immune effectors and specific immune effectors, we consider that the probiotic has a benefic effect on the immune reactivity in poultry.

Table 3.
The effect of the probiotic on the antibody synthesis

The collecting	Concentration of antibodies (D.O.)			
	Witness batch	Batch E ₁	Batch E ₂	Batch E ₃
R ₁	167,9	211,8	198,7	242,5
R ₂	174,6	219,3	216,3	278,2
R ₃	235,3	279,9	334,1	472,1
R ₄	258,5	332,4	355,5	401,3

4. CONCLUSIONS

The laboratory tests performed have proved a progressive increasing of all the determined immune effectors, the maximal values being registered in poultry from batch E3. Poultrzyme TM 250 stimulates especially the production of lysozyme and on a smaller scale the production of serum properdin.

The antibody titre presents a pronounced individual variability and maintains at significant values for over 21 days from vaccination.

The results obtained prove the immunomodulating effect of probiotic Poultrzyme TM 250 both on the specific immune system and unspecific one.

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