# SEROLOGICAL CONTROL ON *SALMONELLA* IN SOME POULTRY FLOCKS IN VOJVODINA REGION

**DUBRAVKA POTKONJAK, MAJA VELHNER, D. ORLIC, M. KAPETANOV, MILICA ZIVKOV BALOŠ, DRAGICA STOJANOVIC**

Scientific Veterinary Institute „Novi Sad“, Novi Sad, Rumenacki put 20, Serbia

**Summary**

In our study we conducted the serology control in several broiler breeder and commercial layer flocks, using ELISA test. Our goal was to determine Salmonella status in selected poultry flocks and to emphasise its potential to serve as a source of infection for poultry and poultry products.

In spite of the vaccination, breeder flocks were negative 4 weeks after the first vaccination, while during the production there was a strong immunological response in all tested farms. Layer flocks tested at the end of the rearing period showed low level of antibody titre that is considered negative. On contrary, during the production layer flocks tested positive. Our results showed that it would be very helpful to perform serology testing especially at the end of the rear and after the peak of production in breeder and layer flocks. Nevertheless applying serology monitoring it was possible to estimate the seriousness of the problem and ELISA test should be taken into consideration in the future.

Bacteriology means of Salmonella detection is still the golden standard because of the antibiotic resistance evaluation and because of the possibilities to characterize strains at the molecular level. All three aspects of Salmonella control are now days unavoidable and have to be considered as a comprehensive and useful tools to detect and recognize contaminants in poultry industry.

**Key words:** *Salmonella*, broiler breeders, layer flocks, ELISA, control.

Because of high demands for the production of safe food, a great effort is being made to reduce the presence of pathogenic microorganisms harmful to public health. According to epidemiologic reports Salmonella spp. remains the leading agent acused for alimentary toxoinfections in humans. Salmonella Enterica serotype Enteritidis is the most frequently isolated from poultry and enviromental samples. Subsequently, table eggs, and poultry products are the leading cause of sporadical infections, and epidemics in human population.

In countries, members of the EU, introduction of vaccination against Salmonella spp. in breeder and commercial layer flocks, applying live and/or inactivated vaccines, contributed to the decrease of prevalence and consequent excretion and spread of field isolates. Although not obligatory, the vaccination of breeder flocks against salmonellas is conducted for several years in Serbia with inactivated commercial vaccines. In this paper we present the results of serology control in some poultry flocks, using ELISA test. Our goal was to determine Salmonella status in selected poultry flocks and to emphasise its potential to serve as a source of infection for poultry and poultry products.

## Materials and methods

*Poultry flocks*

Our investigation was conducted in broiler breeder flocks and commercial layer flocks during the rearing and the production period. All flocks were reared according to technological requirements. All tested breeder flocks were vaccinated against Salmonella three times during rear with the inactivated commercial vaccine (Salenvac T®, Intervet, Netherlands) at 6, 12 and 16 weeks of age. The system „all in – all out" was not fulfilled on all breeder farms, but other safety measures like farm isolation, hygiene, vermin control, disinfection etc. were carried out on regular basis. Similar conditions were provided to the commercial layer flocks, too, with the exception of vaccination – layers remained unvaccinated against Salmonella during the rearing period.

*Sera samples and ELISA test*

Sera from 12 broiler breeder flocks during the rear (at ten weeks of age), at the peak of production and 7 broiler breeder flocks at the end of the production period, all vaccinated against Salmonella, were taken for the serology testing. As for the layers, sera from 13 flocks at the end of the rear (at the age of 14 to16 weeks), and sera from 4 commercial layer flocks at the peak and from 2 flocks at the end of the production period were included in the study.

ELISA was performed with a commercial kit purchased from Guildhay (Biomedica Gruppe). The plates were coated with the SE lipopolysaccharide (LPS) antigen. The test was performed according to the instructions of the manufacturer. The number of sera per flock tested was 10 or 15.

## Results and discussions

The results of serological tests for the broiler breeder and commercial layer flocks are presented in Table 1 and Table 2, respectively.

**Table 1.**

**Salmonella serology from broiler breeder flocks.**

| The sampling time | Number of flocks tested | Number of positive flocks | Percent of positive flocks (%) |
|---|---|---|---|
| 10 weeks of age | 10 | 0 | 0 |
| Peak of production | 12 | 10 | 83 |
| End of production | 7 | 5 | 71 |

**Table 2.**

**Salmonella serology from commercial layers flocks.**

| The sampling time | Number of flocks tested | Number of positive flocks | Percent of positive flocks (%) |
|---|---|---|---|
| End of the rearing | 13 | 0 | 0 |
| Peak of production | 4 | 2 | 50 |
| End of production | 2 | 1 | 50 |

In spite of the vaccination, breeder flocks were negative 4 weeks after the first vaccination, while during the production there was a strong immunological response in all tested farms. However, the level of specific antibodies showed high differences among flocks and in the same flock (data not shown). Layer flocks tested at the end of the rearing period showed low level of antibody titre, that is considered negative. On contrary, during the production layer flocks tested positive, indicating that SE infection probably occured during the rear. Most likely broiler breeders experience infection during the rear, and serology responce cannot be attributed to vaccination only. We are not able to explain why the immunological response, in most of the vaccinated flocks, was poor during the rear. Some data indicate that better immune response could be achieved when inactivated vaccine is primed with live antigens. There is a substantial amount of evidence that vaccination *per se* does lower the SE shedding when challenge with homologous strain occurs. In fact, vaccination with live vaccines provides some cross protection to some of the other Salmonella serovars. In such circumstances, it is reasonable to apply vaccination strategy and to expect that, with good farm management, cleaning and disinfection, there will be improvement in Salmonella spp. contamination.

Serology monitoring that we pursue also reveal that sampling strategy in our region is not proper i.e. small number of sera per flock tested, many producers do not test their flocks at all. Also, negative serology results at the end of the rear in layer flocks might mislead farmers to state that there is no need for repeated testing or antibiotic treatment. Therefore, it would be very helpful to perform serology testing at the end of the rear and after the peak of production. Presently and according to our serology results it would be desirable to advise antibiotic treatment even in cases where flocks test negative at the end of the rear because of the substantial risk of infection. On the other hand, positive serology at any time in unvaccinated flocks points to significant infection and presents hazard for Salmonella shedding in the enviroment through eggs or meat. In every case, serology monitoring was helpfuf to estimate the seriousness of the problem and ELISA test should be taken into consideration in the future.

Bacteriology means of Salmonella detection is still the golden standard because of the antibiotic resistance evaluation and because of the possibilities to

characterize strains at the molecular level. All three aspects of Salmonella control are now days unavoidable and have to be considered as a comprehensive and useful tools to detect and recognize contaminants in poultry industry.

## Conclusions

Our results showed that it would be very helpful to perform serology testing at the end of the rear and after the peak of production in breeder and layer flocks. Serology monitoring was helpful to estimate the seriousness of the problem and ELISA test should be taken into consideration in the future. However, increased number of sera samples per flock taken and frequent sampling would perhaps provide better understanding of Salmonella status of the flock and give some answers concerning poor responce to vaccination during the rear that we observed and differences in the level of antibody titre among and within flocks.

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