



# ASSESSMENT OF A GENETICALLY MODIFIED LIVE VACCINE IN BROILERS CHALLENGED WITH SALMONELLA HEIDELBERG

EC Muniz<sup>\*1</sup>, R Verdi F<sup>o1</sup>, D Kuchpel F<sup>o1</sup>, TMC Barbosa<sup>1</sup>, JA Leão<sup>2</sup>, A Back<sup>2</sup>

<sup>1</sup> Zoetis Indústria de Produtos Veterinários Ltda – São Paulo/Brazil

<sup>2</sup> Mercolab Laboratórios Ltda – Cascavel/Brazil

## ABSTRACT

Salmonellosis are among the major commercial poultry diseases. They account for both economic losses in poultry flocks and public health concerns. *Salmonella* Heidelberg (SH) is one of the significant paratyphoid Salmonellae, and has been observed predominantly in the southern region of Brazil where the poultry industry is largely concentrated (2). Moreover, the most recent results from two Rapid Alerts issued by the European Union report that SH is frequently related to positive test results in Brazilian poultry products. Vaccines are an important tool in integrated programs to control against Salmonellosis. The objective of this study was to assess cross protection provided by the Poulvac<sup>®</sup> ST vaccine to control the *Salmonella* Heidelberg (SH) found in the ceca of experimentally challenged birds.

## STUDY DESIGN

Forty (40) female and male birds were housed, identified, weighed, and allocated into 2 treatment groups: (T1 – vaccination and challenge at 21 days of age, T2 – no vaccination and challenge at 21 days of age, controls). Birds from Cobb Slow lineage broiler breeders from a poultry company certified by the Brazilian Ministry of Agriculture, Livestock and Food Supply (MAPA) as *Salmonella* spp.-free were used. The bottom of each bird box was checked for the presence of *Salmonella* spp upon arrival.

Birds from T1 received the live genetically modified Poulvac<sup>®</sup> ST vaccine at one-day old via spray in hatchery and at 14 days of age by drinking water, as recommended by the manufacturer.

The inoculum used was prepared from a Brazilian field SPH strain. This strain acquired resistance against antibiotics (nalidixic acid and novobiocin) which were incorporated into brilliant green agar to inhibit gut microbiota and to facilitate counting.

All birds were weighed at 28 days of age and cecum samples were individually collected for quantitative analysis of SH. The statistical analysis followed a totally randomized model in which every bird represented a sample unit. Each hypothesis was assessed considering a significance level of  $P \leq 0.5$ . The conventional methodology established by MAPA (Ministerial Ordinance # 126 dd. 6 November 1995) was used for the laboratory analyses.

## RESULTS

The results of body weight and SH counting in the ceca are shown in Table 1. SH counts in the ceca of the experimentally challenged birds were significantly lower in the vaccinated group when compared to the positive controls (T2).

**TABLE 1 - RESULTS OF WEIGHT AND SH COUNTS IN BIRD CECA AT 28 DAYS OF AGE**

Treatment	Initial weight (g)	Final weight (g)	SH count (CFU/g)
T1	48.90	1449.00 a	1.5 X 10 <sup>3</sup> b
T2	48.77	1441.10 a	6.3 X 10 <sup>4</sup> a
P-Value		0.9321	0.0030
CV (%)		12.67	

a, b Indicate a significant difference at  $p \leq 0.05$

## DISCUSSION

This result demonstrates cross protection against SH provided by the live genetically modified vaccine. The Poulvac<sup>®</sup> ST vaccine is comprised of a strain of *Salmonella enterica* subsp. *enterica* serovar Typhimurium (1). This serovar bears antigens in its structure of lipopolysaccharides and flagella which are similar to those from group B salmonellas such as *Salmonella* Heidelberg (SH). This similarity in somatic and flagellar antigens justifies the reason for the good heterologous immune response observed in this experiment (1 and 2).

On the other hand, no statistical difference was observed in body weight in different treatment groups, even in birds challenged only with SH. These results are consistent with recent studies which have demonstrated that several serovars of paratyphoid salmonellas are extremely adapted to hosts and do not have a negative impact on zootechnical parameters (3).

The results of this assessment demonstrate that the Poulvac<sup>®</sup> ST vaccine aids in the control of SH in experimentally challenged birds.

## REFERENCES

1. Alberton MR, Fahey KJ, Coloe PJ. Avian Diseases 1991; 35:435-442
2. Borsoi A, Santos LR, Rodrigues LB, Moraes HLS, Salle CTP, Nascimento VP. Brazilian Journal of Microbiology 2011; 42: 266-273
3. Gantois I, Eeckhaut V, Pasmans F, Haesebrouck F, Ducatelle R, Van Immerseel F. Avian Pathology 2008; 37(4):399-406