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Mini-Review

FIELD EVALUATION OF A VACCINATION SCHEME AGAINST SALMONELLA ENTERITIDIS CONCERNING BROILER BREEDING HEN FLOCKS

V. Rousy¹, A. R. Burriel^{2*}

¹Laboratory of Poultry Diseases, Institute of Infectious and Parasitic Diseases, Center of Athens Veterinary Institutions, Greece

²Laboratory of Microbiology and Parasitology, Faculty of Veterinary Medicine, University of Thessali, Karditsa, Greece

ABSTRACT

PURPOSE: Salmonella infection of poultry is a continuous food born hazard for man, thus has always been a target for control all across the world. Vaccination of chicks is one way of controlling infection, especially for very virulent species such as *Salmonella Enteritidis*. A recently produced commercial vaccine is now recommended in many countries as a measure of preventing or minimizing the chance of infection, thus has here been evaluated for commercial use in Greece. METHOD: For this purpose 18.000 one day old chicks of a laying broiler facility were vaccinated following the instructions of the vaccine producer. The laying birds were investigated for the duration of their producing life. RESULTS: None of the 910 samples examined was found infected with salmonella or had antibodies to salmonella (480 blood samples). CONCLUSION: Vaccine conferred satisfactory protection under good management conditions.

Key words: Poultry, Vaccine, food born Disease

INTRODUCTION

Mass production and distribution of foods of animal origin has increased the risk of foodborne infections, and meat is the most probable source, especially for very virulent microorganisms such as Salmonella spp. (1,2). Poultry has traditionally been considered as the most important source of Salmonella spp. and specifically the very virulent species Salmonella Enteritidis (3). Various measures are taken to produce, at flock level, poultry meat free of salmonellas. Producers protect consumers by vaccinating against Salmonella spp. breeding or egg producing hens, thus eliminating or minimizing the risk of food born infection from virulent species or serotypes of salmonella (4, 5). For this purpose the Tad Salmonella vac E and T attenuated life vaccines have been successfully used under experimental infections and are recommended

for field use (6). In Greece recent epidemiological studies (to be published) have showed a rising problem of salmonellosis between broiler and laying birds, which for some research workers (7) it affects between 5.9 and 20% (asyptomatic and clinically) broiler flocks respectively, and for others (8) up to 65% of egg producing flocks. The officially reported to the EU total is giving a prevalence of somewhere close to 3% (9). Considering that poultry salmonellosis appears to be a serious health hazard for consumers in Greece, this brief study aimed in investigating the protection conferred by the Tad vac E to breeding hens during their life span and in an environment previously considered by state agencies as infected.

MATERIALS AND METHODS

Housing of breeders and Vaccine evaluation: The poultry farm had a capacity of about 60.000 broiler breeders, spread in three different locations of about 20.000 birds in each. In a previous voluntary examination, *S. Enteritidis* had been isolated in one of five pooled fecal samples of one house, thus the

^{*}Correspondence to: A. R. Burriel DVM, MSc, MSc, PhD, MRCVS, Mavromihali 154, Athens 11472, GR, Tel. +30-210-6459964, aburriel@vet.uth.gr

trial was experimentally held in this location. The producer was aiming in using the vaccine routinely, if the results were satisfactory. For this purpose 18.000 one day old chicks were imported from Germany to Greece to form a salmonella free flock of broiler breeders. The chicks were housed in houses holding 3000 adults each and having straw litters. Each house had controlled air and temperature environment. The attenuated live vaccine Tad Vac E (LAH, Lohman Animal Health Co, Cuxhaven, Germany) was added in the drinking water following the instructions of the producer. Three administrations were performed. The first was on the day of arrival, the second 35 days later and the 3rd 155 days after the first vaccination. First and 2nd administrations were made through 12 drinking troughs per 1000 chicks, while the 3rd in one trough per 80 birds. The vaccine trial was performed during 2005. After the end of the trial, the farmer decided to use the vaccine as means to remain salmonella free, thus, vaccinating to date all birds on the farm with the Tad Vac E. The farm is examined regularly for salmonellas and four years later continuous to be found salmonella free.

Sample collection: Isolation of salmonella was attempted before vaccination, one and two days after each vaccination and once a month thereafter to the end of the breeders' productive life (18 months of age). The samples examined before and after each vaccination were about 60 feces samples per house and pooled drinking water from all water sources per house. Liver tissue from initially 10 freshly euthanatized chicks per house before and after vaccination and 20 dead birds thereafter in total. In addition, and to the end of the trial, 250 meconium samples, 150 dead in shell embryos and 60 eggs per house and sampling pooled together into groups of 10 eggs were also examined for the presence of salmonella. Furthermore, 60 blood serum samples collected at the 11th day of age (10 days after first vaccination) and a similar number of samples after each vaccination were examined for antibodies to S. Enteriditis and Tiphymurium using the SE ELISA kit (IDEXX Lab, USA). Thereafter, 10 serum samples from each house and to the end of the birds' life were tested for antibodies to salmonella.

Isolation of Salmonella spp.: The isolation of **Salmonella spp**. was attempted following the working protocol recommended by the ISO

6579 (2000). Briefly, the pre-enrichment media was peptone water; the enrichment media modified Ruppaport (MSRV) and the isolation media Tetrathionate Brilliant Green Bile Broth (TBGBB) and XLD (Merck, Athens, GR) solid culture media. Any suspect colonies isolated on XLD were speciated by the standard methods used in the reference Poultry Laboratory of Chalkida (Greek Ministry of Agriculture)

RESULTS

In total 910 samples were examined for the presence of salmonella among vaccinated birds. **Salmonella spp**. was isolated only from the drinking water the day of vaccination and was found to be the vaccinal strain. Isolation was possible on both media used. Water samples collected 24 and 48 hours after each administration of the vaccine were found negative. No antibodies were present in any of the 480 blood samples examined. The farm has since routinely used the vaccine and has remained salmonella free by isolation and blood serum testing.

DISCUSSION

The Tad salmonella E attenuated live vaccine has showed that it is a good protection to laying hens experimentally infected with either S. Gallinarum or S. Enteriditidis (4,5,10). However it does not fully eliminate the possibility of infection (5), because it appears that the time of vaccination, as compared to the time of infection, is very important (4). It is actually recommended that hens should be vaccinated orally every 3 months for a better protection (4). The present study investigated the protection conferred by the vaccine under field conditions and the possibility of naturally occurring infection among hens vaccinated with the Tad VAC E. This poultry facility is for four years using the vaccine and found salmonella free. Recently Chacana and Terzolo HR (2006) found, under experimental conditions, that challenge of vaccinated hens 36 weeks after last vaccination did not confer protection, thus they suggest that vaccination should be repeated every 3 months. This has not been the case in this farm to date. Considering the high risk for salomonellosis in Greece, due to the very high prevalence of various salmonella species among Greek poultry (7.8) of which S. Enteritidis is the most prevalent, the protection of this farm is, perhaps, the result of both the vaccine and the farm management conditions.

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