

Title: Salmonella control in layer chickens

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Summary

Salmonella is a major causative agent of food borne human disease and poultry products (eggs and meat) are often incriminated as sources for human infection. *Salmonella* vaccines are becoming available in Australia for use in poultry and their value in decreasing the ability of *Salmonella* serovars in colonising the digestive tracts of layer hens needs to be evaluated.

Phase 1 of this study evaluated nine different vaccination regimes against challenge at various ages in a commercial layer breed (Rhode Island Red x Rhode Island White Brown egg layers). The results demonstrated that long lasting protection against *S. Typhimurium* colonisation was achieved at about 16-17 weeks but some protection was afforded up to 34 weeks of age (using two injections of the live attenuated vaccine).

In Phase 2 of this study, five vaccination programs were selected based on the outcome of work conducted in Phase 1 with the aim of evaluating the efficacy of each against infection by *S. Typhimurium* (serogroup B1), *S. Infantis* (serogroup C1) and *S. Virchow* (serogroup C1). The most effective result was obtained with a combination of live (injected) followed by inactivated vaccines. An adverse reaction was detected following subcutaneous injection of the live vaccine and this needs further research before strong recommendations for its use in this manner can be made.

The most effective regime used the live vaccine by subcutaneous injection followed by the inactivated vaccine by intramuscular injection. This also provided the best cross-protection against a serovar not included in either of the vaccines. The injectible use of the live vaccine is an off-label procedure and was also associated with an adverse reaction in at least one breed of layer chicken. This finding needs further investigation.

The maintenance of a presence of *Salmonella* enterica serovars in chicken flocks relies on continual cyclic infection of susceptible chickens within the flock, as individual birds will rid themselves of an infection over time vaccines will usually prevent a disease but not infection and it is the latter that is desirable to protect public health.

By providing a level of immunological protection to the whole flock by vaccination, as represented by a desired level of humoral antibody, the likelihood of spread of *salmonellae* between susceptible birds is reduced and the long term result will be to assist in reduction, and possibly the eventual elimination, of *salmonellae* from the flock. Vaccination shows promise for the reduction of potential food borne infection from egg-producing flocks.

Further work to understand the observed adverse reaction and to establish the use of the live vaccine by a parenteral route, including dose rate, needs to be performed to determine the most efficacious use of these vaccines. Some preliminary work in this area is underway and will be reported in the near future.