COMPARISON OF ADJUVANT TECHNOLOGIES FOR POULTRY VACCINES

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Water-in-oil adjuvants induce a strong long-term humoral immune response and are widely used for the formulation of inactivated poultry vaccines globally, for broiler, layer and breeder chickens. Other technologies such as double emulsion and aluminium hydroxide adjuvants are also available for poultry vaccination. In this study we compared water in mineral oil (W/O), water in mineral oil in water (W/O/W) and aluminium hydroxide adjuvant technologies for avian influenza (AI) vaccination. We demonstrate that selection of adapted water-in-oil adjuvants improve vaccine efficacy in poultry compared to other technologies.

In a first study, the safety profile of water in oil adjuvant Montanide™ ISA 71 VG (ISA 71) was assessed in 5 chickens by 2 injections of 0.5ml of H9N2 inactivated AI vaccine at D0 and D21 in each breast. Local reactions were assessed by necropsy of the injection sites at D42. In a second trial, ISA 71, standard W/O, standard W/O/W and aluminium hydroxide adjuvants efficacy profiles were compared in an inactivated H5N1 AI vaccine model. All vaccines contained the same antigenic load. Efficacy profile of the adjuvants was assessed in SPF chickens (10/group) and in 7 days old broiler chickens (30/group). Chickens were injected at D0 with 0.5ml of experimental AI vaccines. Blood samples were taken from non-challenged chickens at weeks 1, 2, 3, 4, 5, 6 post vaccination for antibody titration by haemagglutination inhibition assay. For broiler chickens, 10 chickens of each group were also challenged with AI virus subtype H5at 2 weeks post vaccination.

Chicken safety trial showed that ISA 71 is safe for poultry vaccination. Both water in oil based vaccines induced significantly higher antibody levels than other formulations in SPF and broiler chickens. After H5N1 challenge in broiler chickens, the ISA 71 formulation was the only vaccine able to reach 100% protective levels at D14.

We could demonstrate in an avian influenza vaccine model that water in oil technology induces higher protection and longer-lasting antibody titers in chicken than other adjuvant technologies. These results also indicate that Montanide™ ISA 71 VG is an efficient and safe adjuvant for poultry vaccine formulation.