

Adjuvants – A Critical Issue for Vaccine Success

The adjuvant is critical to the success of any vaccine. Our goal is to find an adjuvant that offers good and appropriate immunostimulation and yet is not hard on the animal. This is a process that can be guided by the needs of the producer, balancing withdrawal time limitations with duration of protection issues.

A variety of adjuvants are available, the basic classes are water-in-oil (W/O), water-in-oil-in-water (W/O/W), oil-in-water (O/W) and aluminium based adjuvants. They are listed in order of most immunostimulating to least and similarly, most reactive to least. W/O adjuvants are often chosen for use in poultry and may be used for most other species with the exception of swine where they are often considered to be too reactive. O/W are less reactive, yet still result in an effective immunostimulation and are often the adjuvant of choice for swine applications. W/O/W may provide an excellent balance between immunostimulation and reactivity and are an alternative for most applications, including poultry. Aluminium based adjuvants are very safe with minimal reactivity seen and are often sufficient for use with the highly immunostimulating whole cultures used to create our autogenous bacterins.

We presently offer the choice between Emulsigen™ and Alhydrogel™ adjuvants for all species.

Emulsigen™

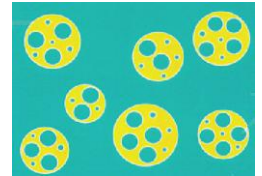
Emulsigen™ is an emulsified oil-in-water (O/W) adjuvant, which eliminates many of the undesirable effects associated with oil adjuvants while still eliciting a rapid and strong immune response. In O/W emulsions oil droplets are dispersed in a continuous aqueous phase, such formulations are well known for their strong potency, their fluidity and generally, for their safety. They are particularly efficient with bacterial antigens and mostly used when relatively short-term immunity is needed. The oil phase of Emulsigen™ is broken into small globules (2 microns or less) to absorb antigens and disperse them in a stable emulsion, resulting in minimal injection site irritation. O/W adjuvants act by forming a mobile depot of antigen that can target immune effector cells. The depot effect slows the release of the antigen, improving presentation of the antigen and the duration of immunostimulation.

Alhydrogel™

Alhydrogel™ is a gelled aluminium hydroxide adjuvant. The gelled formulation is used to enhance the gradual release of the antigen at the injection site. Of the aluminium salts, aluminium hydroxide is by far the most commonly used and is approved for both veterinary and human vaccines. Aluminium salts are generally considered to be weaker adjuvants than emulsion adjuvants; however, because of their generally mild inflammatory reactions resulting in reduced granulomas and abscesses, safety and efficacy for generating memory, they may be a preferred option. Aluminum based adjuvants also have the advantage of a shorter withdrawal time – 21 days versus the 60 days required for most oil based adjuvants. However, their more rapid dispersion may increase the need for booster vaccinations.

W/O/W – Stay Tuned

A third option is currently available at Gallants for turkeys – water-in-oil-in-water (W/O/W) adjuvant. In some situations more potency from the adjuvant may be required; in this case W/O (water in oil) formulations, may induce stronger and longer immunity. Unfortunately, W/O adjuvants often cause local reactions. A W/O/W adjuvant may solve these problems through the formation of a multi-phasic emulsion. They have been shown to induce a strong short term response elicited by the antigen located in the external aqueous phase, and also a long term immune response induced by the antigen in the internal aqueous phase entrapped in oil droplets.



W/O/W adjuvants may be an excellent option for our poultry clients as well as those looking for a stronger immune response in other species.

Booster Timing

The timing of booster inoculations is an important consideration in efforts to maximize the protection given by immunization. If a booster dose is given too soon, suppression rather than enhancement of the immune response may result. A booster dose given 3 to 6 weeks after the first vaccination will usually increase the serum antibody titre. This may be a challenge, particularly in today's intensively managed farming operations but is worthy of consideration if your bacterin is not providing the protection expected.