International Pig Topics

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Vaccinology XI

Adjuvants, diluents and emulsions

An adjuvant is a substance that helps in building up the desired immunity. The adjuvant can be present as a diluent in the case of freeze dried vaccine, or as an emulsion when ready to use products are considered. A vaccine cannot exist without any of these and they are always present when the product is administered. Of course there is always an antigen in a vaccine.

The antigen is either the total (killed or live-) micro-organism or just a part (often a sub-unit) of a micro-organism that is responsible for the immune reaction in the body of the pigs after the administration of the vaccine. It is the right combination of antigen and adjuvant that make vaccines so potent. It is also the main reason for the observed side effects like fever, tissue reactions, abortions etc. These side effects are not only common in the veterinary field but also in the human health field. A vaccine always has a balance between efficacy and safety.

The more efficacious a vaccine, the more chance there is of observed side effects. In our field, M hyo and APP vaccines had a record of serious side effects. The adjuvant part of these vaccines was therefore also reformulated to reduce this incidence of side effects.

There are cases where the immunity against a certain pathogen depends more on the cellular component (for example white blood cells) of the immune system than on the humoral (antibody) component. In such cases the chemical composition of the adjuvant plays a crucial role. In the field of human vaccinology and when a new adjuvant is developed, the way the adjuvant works has to be investigated. Only when there is a beneficial effect of the adjuvant compared to the immunity induced by the antigen without an adjuvant, and the new adjuvant proves to be safe, may this new adjuvant be used.

These studies are interesting. They prove the added value of an adjuvant and they unravel the mechanism about how this chemical ingredient manipulates the different parts of the immune system. There are stronger antigens and weaker antigens. When weaker antigens have to be used, the vaccine cannot do without a potent adjuvant.

Adjuvants can be stand-alone and are used to dissolve the freeze dried antigen into a ready-to-use product. In such cases both antigen and adjuvant can have different storage conditions. When the adjuvant and antigen are combined in a ready-to-use vaccine, we always address such products as an emulsion vaccine. Emulsion vaccines are much more sensitive to storage conditions. Too hot and too cold, or even when frozen cool elements are just touching the side of the vaccine bottle, will all have a detrimental effect on the product. The efficacy goes down and the incidence of side effects increases. Read the leaflet on how to properly handle the vaccines that are present on your farm.