



## Product Specification Sheet

### Squalene (oil-in-water nano emulsion);Vaccine adjuvant

□ Cat. # AV-3020-10

Squalene (oil-in-water nano emulsion);Vaccine adjuvant

SIZE:10 ml

**General Information:** The word 'adjuvant' is derived from the Latin word 'adjuvare' which means 'to help'. Therefore, Immunologic Adjuvants are added to vaccines to stimulate the immune system's response to the target antigen, but do not in themselves confer immunity. Adjuvants act in various ways in presenting an antigen to the immune system. Adjuvants can act as a depot for the antigen, presenting the antigen over a long period of time, thus maximizing the immune response before the body clears the antigen. Examples of depot type adjuvants are oil emulsions. Adjuvants can also act as an irritant which causes the body to recruit and amplify its immune response. A tetanus, diphtheria, and pertussis vaccine, for example, contains minute quantities of toxins/toxoids produced by each of the target bacteria. The body's immune system develops an antitoxin to the bacteria's toxins, not to the aluminum, but would not respond enough without the help of the aluminum adjuvant. Adjuvants have also evolved as substances that can aid in stabilizing formulations of antigens, especially for vaccines administered for animal health.

**Adjuvants** augment the effects of a vaccine by stimulating the immune system to respond to the vaccine more vigorously, and thus providing increased immunity to a particular disease. Adjuvants accomplish this task by mimicking specific sets of evolutionarily conserved molecules, so called PAMPs, which include liposomes, lipopolysaccharide (LPS), molecular cages for antigen, components of bacterial cell walls (e.g., flagellins), and endocytosed nucleic acids such as double-stranded RNA (dsRNA), single-stranded DNA (ssDNA), and unmethylated CpG dinucleotide-containing DNA (ODNs). Natural proteins such as ovalbumin or OVA-peptides and key hole limpet hemocyanins (KLH) are also being explored not only serve as carrier protein but also as adjuvants. Because immune systems have evolved to recognize these specific antigenic moieties, the presence of an adjuvant in conjunction with the vaccine can greatly increase the innate immune response to the antigen by augmenting the activities of dendritic cells (DCs), lymphocytes, and macrophages by mimicking a natural infection. Furthermore, because adjuvants are attenuated beyond any function of virulence, they pose little or no independent threat to a host organism.

For human vaccines, aluminum hydroxide (Alum) based adjuvants (Aluminum hydroxide or Alhydrogel; Aluminum phosphate or Adjuvax) are the only **FDA-approved adjuvants**. Vaccine components that are formulated in Alum are called "Adsorbed Vaccines". The effectiveness of each salt as an adjuvant depends on the characteristics of the specific vaccine and how the manufacturer prepares the vaccine

**Not all vaccines contain Alum** because an adjuvant may not have been needed, was not expected to increase the desired immune response, or was going to cause an imbalance in the immune response. For example, **inactivated Polio Virus** (IPV/IPOL) vaccine, measles, mumps and rubella vaccine (MMR/MMRI/MMRV), **Varicella or chickenpox vaccine** (Varivax/Proquad/MMRV), **Meningococcal conjugate** (MCV4/Menomune/Menactra) vaccine, and **influenza vaccines** (Fluzone/Flulaval/Flumist/Fluvirin etc) do not contain aluminum salts.

#### Product Information

Squalene is a natural 30-carbon organic compound originally obtained for commercial purposes primarily from shark liver oil (hence its name), although plant sources (primarily vegetable oils) are now used as well, including amaranth seed, rice bran, wheat germ, and olives. It is also found in high concentrations in the stomach oil of birds in the order Procellariiformes. All plants and animals produce squalene as a biochemical intermediate, including humans. Squalene as an adjuvant is manufactured by Novartis. Squalene is a hydrocarbon and a triterpene, and is a natural and vital part of the synthesis of all plant and animal sterols, including cholesterol, steroid hormones, and vitamin D in the human body. Squalene or squalane emulsions have been administered in human cancer vaccines, with mild side effects and evidence of efficacy, in terms of both immune responses and antitumor activity.

Currently, squalene is used in: Anthrax vaccine adsorbed with Squalene adjuvant (Bacillus anthracis)

**CAS Number:** 111-02-4

**Formulation:** C30H50

**Mol.wt:** 410.72

**Appearance:** White gelatinous precipitate

**Binding capacity:** 1-10 ug albumin. Note: Protein binding will vary with protein concentration, buffer and incubation conditions.

For in vitro research purpose only

**Storage and Stability:** Shipped at room temperature and it should be stored at room temp. DO NOT FREEZE. Stable for 6 months.

**References:** Bassaganya-Riera et al., (2001) The Journal of nutrition. 2001; 131(9); 2370-2377. Coffman RL (2010) Immunity 33(4):492-503. Allison(1999) Methods (San Diego, Calif.). 1999; 19(1); 87-93

#### Related items:

Catalog#	ProdDescription
AV-3010-10	Complete Freund's Adjuvant (CFA) vaccine adjuvant
AV-3010-100	Complete Freund's Adjuvant (CFA) vaccine adjuvant
AV-3015-10	Incomplete Freund's Adjuvant (IFA) vaccine adjuvant
AV-3015-100	Incomplete Freund's Adjuvant (IFA) vaccine adjuvant
AV-3020-10	Squalene (oil-in-water nano emulsion) vaccine adjuvant

Complete list is available at:

[http://4adi.com/objects/catalog/product/extras/Vaccine\\_Adjuvants\\_flr.pdf](http://4adi.com/objects/catalog/product/extras/Vaccine_Adjuvants_flr.pdf)

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