

# Adju-Phos<sup>®</sup> adjuvant

Aluminium phosphate gel

Catalog code: vac-phos-250

<https://www.invivogen.com/adju-phos>

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Version 20J08-MM

## PRODUCT INFORMATION

### Contents

• 250 ml of Adju-Phos<sup>®</sup> adjuvant provided as a ready-to-use, aluminium phosphate wet gel (colloidal) suspension. It is sterilized by autoclaving and aseptically filled.

### Storage and stability

• Adju-Phos<sup>®</sup> adjuvant is shipped at room temperature and should be stored at room temperature. The expiry date is specified on the product label. The product tolerates re-autoclaving but is destroyed if frozen. **DO NOT FREEZE.**

### Quality control

• Adju-Phos<sup>®</sup> adjuvant has been tested for pyrogenicity and sterility.  
• The pH at the time of production has been confirmed.

## DESCRIPTION

Adju-Phos<sup>®</sup> adjuvant is an aluminium phosphate wet gel suspension. Aluminium adjuvants, comprising Adju-Phos<sup>®</sup> and Alhydrogel<sup>®</sup> (aluminium hydroxide), are the most commonly used class of adjuvants<sup>1</sup>. Both products increase Th2 antibodies but do not promote significant Th1 cellular responses<sup>2</sup>. These adjuvants improve attraction and uptake of antigen by antigen presenting cells (APCs)<sup>2</sup>. It has been suggested that the antigens adsorbed on the aluminum salts are presented in a particulate form, making them more efficiently internalized by APCs. The main difference between the two aluminium salts is their point of zero charge (PZC), the pH value at which the surface of the adjuvant has a net neutral charge. The PZC influences the adjuvant's ability to adsorb and release antigen. For example, when the pH is maintained at 6-8, which is normal during vaccine production, Adju-Phos<sup>®</sup> particles have a negative electrical charge and thus are well suited for adsorption of positively charged antigens (e.g. antigens with isoelectric points above the pH of formulation)<sup>1</sup>. In contrast, at neutral pH Alhydrogel<sup>®</sup> particles are positively charged and thus readily adsorb negatively charged antigens<sup>1</sup>. Several other factors significantly change the adsorption capacity of both Alhydrogel<sup>®</sup> and Adju-Phos<sup>®</sup>, including molecular weight of protein antigens, sodium chloride, phosphate buffer, denaturing agents, and size of aluminum particles<sup>3</sup>. The adsorption capacity for a model protein such as IgG or lysozyme in Adju-Phos<sup>®</sup> varies from 0.4 to 0.6 (mg/mg Al)<sup>3</sup>. Another difference between these two salts is that following injection, Adju-Phos<sup>®</sup> adjuvant dissolves more readily than Alhydrogel<sup>®</sup> adjuvant<sup>4</sup>. Adju-Phos<sup>®</sup> adjuvant is made by Croda (following its acquisition of Brenntag Biosector A/S), a leader in the global vaccine adjuvants market with a long history of producing high quality products. Aluminium phosphate adjuvants are commonly used in diphtheria, tetanus, pertussis (DTP), hepatitis B (HBV), Polio and Haemophilus influenzae type B (HIB) vaccines. Adju-Phos<sup>®</sup> adjuvant is used in multiple commercial vaccine formulations<sup>2-5</sup>.

1. Mold M. *et al.*, 2016. Insight into the cellular fate and toxicity of aluminium adjuvants used in clinically approved human vaccinations. *Sci Rep.* 6:31578. 2. Coffman R. *et al.*, 2010. Vaccine adjuvants: Putting innate immunity to work. *Immunity* 33(4):492-503. 3. Huang M. & Wang W., 2014. Factors affecting alum-protein interactions. *Int J Pharm.* 466(1-2):139-46. 4. Powell B. *et al.*, 2015. Polyionic vaccine adjuvants: another look at aluminum salts and polyelectrolytes. *Clin Exp Vaccine Res.* 4(1):23-45. 5. Lindblad EB., 2004. Aluminium compounds for use in vaccines. *Immunol Cell Biol.* 82(5):497-505.

## CHEMICAL PROPERTIES

CAS Number: 7784-30-7

**Formulation:** Al(OH)<sub>x</sub>(PO<sub>4</sub>)<sub>y</sub>, Amorphous aluminium hydroxyphosphate

**Appearance:** White gelatinous precipitate

**Aluminium content:** 0.45%-0.55% w/w

**pH:** 6.0-7.0 (at the time of production)

## METHODS

### Preparation of antigen-Adju-Phos<sup>®</sup> adjuvant mixture

Antigens are preferentially diluted in saline or phosphate buffers. The amount of protein or conjugated peptide used for the primary immunization can be adjusted depending upon availability and immunogenicity of the antigen. The adsorption capacity for a model protein such as IgG or lysozyme in Adju-Phos<sup>®</sup> varies from 0.4 to 0.6 (mg/mg Al)<sup>3</sup>.

1. **Shake vigorously before use** the capped bottle of Adju-Phos<sup>®</sup> adjuvant.
2. Add Adju-Phos<sup>®</sup> adjuvant to the antigen solution; the final volume ratio of Adju-Phos<sup>®</sup> adjuvant to antigen should range from 1:1 (100 µl Adju-Phos<sup>®</sup> adjuvant for 100 µl of antigen) to 1:9 (100 µl Adju-Phos<sup>®</sup> adjuvant for 900 µl of antigen).
3. Mix well by pipetting up and down for at least 5 minutes to allow Adju-Phos<sup>®</sup> adjuvant to effectively adsorb the antigen.

The volume of injection depends on the site of administration. For example, 100 µl can be injected subcutaneously in mice.

*Note:* To avoid lung embolism or anaphylaxis, do not use adjuvants for intravenous injection.

## RELATED PRODUCTS

Product	Description	Catalog Code
<b>Alum and emulsions</b>		
AddaVax <sup>™</sup>	Squalene-o/w	vac-adx-10
Alhydrogel <sup>®</sup> adjuvant 2% CFA	Al(OH) <sub>3</sub> gel	vac-alu-250
	Complete Freund's Adjuvant	vac-cfa-10
<b>PRR ligands</b>		
2'3'-cGAMP VacciGrade <sup>™</sup>	STING agonist	vac-nacga23
MPLA VacciGrade <sup>™</sup>	TLR4 agonist	vac-mpla
ODN 1826 VacciGrade <sup>™</sup>	Murine TLR9 agonist	vac-1826-1
Poly(I:C) VacciGrade <sup>™</sup>	TLR3 agonist	vac-pic
R848 VacciGrade <sup>™</sup>	TLR7/8 agonist	vac-r848
<b>OVA Antigens</b>		
EndoFit <sup>™</sup> Ovalbumin	For <i>in vivo</i> use	vac-pova
Ova 257-264	For detection; ELISPOT	vac-sin
Ova 323-339	For detection; ELISPOT	vac-isq

For a complete list of adjuvants provided by InvivoGen, please visit <https://www.invivogen.com/vaccine-adjuvants>.

Adju-Phos<sup>®</sup> is a trademark of Croda.

## TECHNICAL SUPPORT

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