

## Product safety summary

### Vitamin A

#### CAS number

127-47-9 (Vitamin A Acetate)

#### Chemical formula

C<sub>22</sub>H<sub>32</sub>O<sub>2</sub> (Vitamin A Acetate)

#### Introduction

DSM Nutrition Products, a Business Group of Royal DSM N.V., is a global leader in producing Vitamin A, its derivatives and various formulations thereof.

#### What is Vitamin A?

Vitamins are naturally occurring compounds present in most foods and feedstuffs. The human body and most animal species cannot produce vitamins and therefore has to acquire them from external sources through the diet. Vitamins are essential for all body functions including growth, repair of tissues.

Vitamin A (synonym: Retinol) is one of the best known and most important Vitamins. As pure Vitamin A (Retinol) is too sensitive to air, temperature, light and humidity to allow practical use, it is always used as a protected derivative. These derivatives are then converted in the bodies of humans and animals into Vitamin A.

Commercially used derivatives are Vitamin A Acetate (Retinyl Acetate), Vitamin A Palmitate (Retinyl Acetate) and Vitamin A Propionate (Retinyl Propionate).

To enrich food and feed with Vitamin A these derivatives are usually employed as formulations. Formulations are mixtures of one of the three Vitamin A derivatives with auxiliary materials like a.o. starch (to give dry powders), gelatin (to give dry powders), edible oils (to give oily liquids) or water and emulsifiers (to give aqueous emulsions). These formulations are made to enhance the stability and ease of handling of Vitamin A and to allow incorporation into water based mixtures.

#### Use, storage and transport of Vitamin

Vitamin A is nearly exclusively used as formulations. These formulations could be dry powders, oily liquids or aqueous emulsions. Vitamin A formulations are added to many kinds of food stuffs and beverages (cereal bars, energy drinks and fortified foods) to fortify food for human consumption with Vitamin A. Also dietary supplement tablets and effervescent tablets are made using Vitamin A formulations. For fortifying animal feed, Vitamin A formulations are incorporated into animal feed.

#### *Storage:*

Pure Vitamin A derivatives need to be stored under an inert gas (nitrogen) and kept cool. Formulations of Vitamin A derivatives produced by DSM Nutritional Products have different sensitivities to air, heat, light and humidity. Some (esp. oily liquids) are as sensitive as pure Vitamin A derivatives, others (esp. dry powders) are more stable.

Shelf life and required storage conditions are therefore very different over the range of products with shelf life ranging from 12-24 months. DSM Nutritional Products supplies detailed storage condition requirements and shelf life information on the product labels and on the product documentation.

*Transportation:*

Vitamin A is not regulated as a hazardous material by any of the global transportation regulations.

**Physical/chemical properties**

Pure Vitamin A derivatives are a light yellow powder (Acetate) or oily liquids, which might solidify at cool temperatures to yield waxy solids (Palmitate, Propionate). Vitamin A formulations are powders, oily liquids or aqueous emulsions.

Pure Vitamin A derivatives are insoluble in water. Vitamin A formulations disperse in water (dry powders, aqueous emulsions) or are immiscible with water (oily liquids) or can be mixed with water (aqueous emulsions).

**Health information**

Our bodies use vitamins every day during the normal biochemical processes that maintain life. Vitamins help release energy from our food, and support growth, healing, and repair. An ongoing shortage of vitamins in our diet will lead to failed health, weakness, susceptibility to disease. Vitamin A has a role in a variety of functions throughout the human body such as:

- Vision – prevent night blindness
- Gene transcription
- Immune function
- Embryonic development and reproduction
- Bone metabolism - bone development and strength
- Skin health
- Antioxidant Activity

For pure Vitamin A the main safety concern effect is reproductive toxicity. Over exposure to Vitamin A via inhalation may affect developing fetus. Females planning to have a child and pregnant women should exercise controls regarding exposure. Acute affects include skin irritation, gastrointestinal affects, and liver function.

**Environmental information**

Vitamin A is not readily degradable and it is barely toxic to algae and fish. See MSDS for additional information.

**Exposure potential****- Workplace exposure**

Workplace exposure to pure Vitamin A is limited. Vitamin A is used in closed systems blended with other raw materials. When exposure is possible e.g. when dumping pure material in a blender, workers use personal protective equipment (PPE) such as dust masks.

**- Consumer exposure**

Consumers are not exposed to Vitamin A in significant levels. Pure Vitamin A derivatives are not commercially available products. As noted earlier, Vitamin A is an ingredient to produce formulations of Vitamin A. These formulations are typically 5-20% Vitamin A. These forms are sold to feed and food processors or Vitamin supplement companies who in turn use these forms to fortify feed and food or make dietary supplements.

**- Environmental Releases**

Every effort is made to prevent a release of Vitamin A to the waterways. Clean up of Vitamin A is through normal disposal routes in compliance with local, state and federal regulations.

**Risk management**

Worker exposure risks are either designed out such as using a closed system or if exposure is present the workers wear correct PPE, e.g. dust masks, chemical goggles, gloves. Some formulations of Vitamin A are powders and as such present a combustible dust explosion hazard. This is controlled by detailed evaluation of explosion potential and design of equipment to ensure a safe system of work.

Consumer products contain trace levels of Vitamin A. However consumers are not generally exposed to significant amounts of pure Vitamin A. Exposure to the general public is only through a transportation incident involving pure Vitamin A. This is controlled via emergency response procedures for transportation incidents.

Vitamin A should only be handled by knowledgeable, well-trained personnel who thoroughly understand the hazards associated with the transportation, storage and use of the chemical.

**Contact information**

For further information on Vitamin A or product safety summaries in general, please contact: [info.gps@dsm.com](mailto:info.gps@dsm.com)

**Revision) date**

Date of issue : March 11, 2010

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This product safety summary is intended to give general information about the chemical or categories of chemical addressed. It is not intended to provide an in-depth analysis of health and safety information. Additional information is available through the chemical's applicable Material Safety Data Sheet, which should be consulted before use of the chemical. This product safety summary does not supply or replace required regulatory and/or legal communication documents. All information contained herein is presented on an 'as is' basis and state of technology as per the issue date. The internet disclaimer is applicable ([http://en.dsm.mobi/pda\\_terms\\_eng.html](http://en.dsm.mobi/pda_terms_eng.html)).