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# Lanolin

## 1 Nonproprietary Names

BP: Wool Fat

JP: Purified Lanolin

PhEur: Wool Fat

USP–NF: Lanolin

## 2 Synonyms

Adeps lanae; adeps lanae rufificatus; cera lanae; *Coronet*; E913; *Lanis*; lanolina; lanolin anhydrous; *Lantrol 1650*; *Pharmalan*; *Protalan anhydrous*; purified lanolin; refined wool fat.

## 3 Chemical Name and CAS Registry Number

Anhydrous lanolin [8006-54-0]

## 4 Empirical Formula and Molecular Weight

The USP 40–NF 35 S1 describes lanolin as the purified wax-like substance obtained from the wool of the sheep, *Ovis aries* Linné (Fam. Bovidae), that has been cleaned, decolorized, and deodorized. Lanolin is a complex mixture of naturally occurring esters and polyesters of high molecular weight alcohols (principally sterols) and fatty acids, and is chemically classified as a wax. It contains no less than 98% esters, comprised approximately of a 1:1 ratio fatty alcohols to fatty acids. It also contains not more than 0.25% w/w of water and may contain up to 0.02% w/w of a suitable antioxidant; the PhEur 9.2 specifies up to 200 ppm of butylated hydroxytoluene as an antioxidant.

See also Section 18.

## 5 Structural Formula

See Section 4.

## 6 Functional Category

Emollient; emulsifying agent; ointment base.

## 7 Applications in Pharmaceutical Formulation or Technology

Lanolin is widely used in topical pharmaceutical formulations as an emulsifying agent and emollient.

Lanolin may be used as a hydrophobic vehicle and in the preparation of water-in-oil creams and ointments. When mixed with suitable vegetable oils or with soft paraffin, it produces

emollient creams that penetrate the skin and hence facilitate the absorption of drugs. Lanolin mixes with about twice its own weight of water, without separation, to produce stable emulsions that do not readily become rancid on storage. Lanolin-based topical products owe their excellent emollient properties to the unique chemical and physical resemblance of lanolin to human skin lipids. In addition to its semioclusive capabilities, it is also capable of allowing the bidirectional transportation of water.

Lanolin has also been used in pigmented medications (e.g. zinc oxide) as a dispersing agent; in topical products for cutaneous infections (e.g. acne); in burn dressings, as it supports the wound healing process and enhances dermal repair; in deodorizing toiletries as an antimicrobial;<sup>(1)</sup> in ophthalmic ointments as an emollient;<sup>(1,2)</sup> in suppositories as a carrier for active ingredients; and in surgical adhesive tapes as an impregnating agent and plasticizer.<sup>(1)</sup>

Lanolin and its many derivatives are used extensively in personal care products, such as facial cosmetics and lip products. It is also used in protective skin treatments for infants.

See also Section 18.

## 8 Description

Lanolin occurs as a pale yellow-colored, unctuous, waxy substance with a faint, characteristic odor. Melted lanolin is a clear or almost clear, yellow liquid.

## 9 Pharmacopeial Specifications

See Table I.

## 10 Typical Properties

*Autoignition temperature* 445°C

*Density* 0.95 g/cm<sup>3</sup> at 20°C

*Flash point* 238°C

*Refractive index*  $n_D^{40} = 1.478\text{--}1.482$

*Solubility* Freely soluble in chloroform, ether, tetrahydrofuran, and toluene; soluble in diethyl ether and cyclohexane; sparingly soluble in cold ethanol (95%), more soluble in boiling ethanol (95%); practically insoluble in water.

## 11 Stability and Storage Conditions

Lanolin may gradually undergo autoxidation during storage. To inhibit this process, the inclusion of butylated hydroxytoluene is permitted as an antioxidant. Exposure to excessive or prolonged