

# Lanolin

## Livestock

### Identification

**Chemical Names:** See composition information below.  
**Other Names:** wool grease, wool fat, oesipos, alapurin, agnin, Agnolin, Lanum, Lanain, Lanalin, Lanesin, Lanichol, Laniol

**CAS Numbers:** 8006-54-0  
**Other Codes:** none

### Recommendation

<b>Synthetic / Non-Synthetic:</b>	<b>National List:</b>	<b>Suggested Annotation:</b>
<i>Non-synthetic (2) Synthetic (1)</i>	<i>Allowed (3). Not within the scope of the National List.</i>	<i>USP grade, non-acetylated or non-hydrous forms, with less than 2 ppm total chlorinated hydrocarbon residues may be used topically on organic livestock.</i>

### Characterization

#### **Composition:**

A complex mixture of molecular structures containing ester, di-esters, hydroxy esters, and polyesters of high molecular weights, and about 25-30% water. Lanolin has had 33 alcohols and 36 fatty acids identified as constituents. These include aliphatic, steroid, and triterpenoid alcohols; saturated nonhydroxylated, unsaturated nonhydroxylated, and hydroxylated acids.

#### **Properties:**

Has a physical consistency of soft grease; however, lanolin is chemically a wax rather than a fat. Melting point 38-42°C.

#### **How Made:**

Lanolin originates as a secretion from a sebaceous gland in sheep skin. The lanolin is removed from the wool by scouring processes and then recovered by high speed centrifugal separators to give a product known as wool grease that, after distillation and a series of other processes, yields the finished lanolin.

#### **Specific Uses:**

Lanolin is an ingredient used in topical ointments such as in udder balms. It is a moisturizing agent and a plasticiser. It is especially useful when a lot of water is used in formulation because it forms stable water-in-oil emulsions that are readily absorbed by the skin.

#### **Action:**

Aids in absorption of water into the skin to prevent and heal chapping.

#### **Combinations:**

It may be acetylated to increase the miscibility in water. It is used widely in conjunction with a broad variety of topically applied veterinary medicines, including homeopathic remedies and herbal preparations.

### Status

#### **OFPA**

Lanolin falls under section 6517(1)(B)(i) of the OFPA code that describes livestock medicines.

#### **Regulatory**

FDA

**Status among Certifiers**

Currently lanolin must contain less than 40 ppm pesticide residue; however it is not clear who monitors for this compliance.

**Historic Use**

Not developed for use in organic livestock production.

**International**

IFOAM standards are not clear.

**OFPA 2119(m) Criteria**

- (1) The potential of such substances for detrimental chemical interactions with other materials used in organic farming systems.

Organochlorine, organophosphate and pyrethroid pesticide residues in wool grease are documented (McDougall and Heath, 1990). Sheep ingest low levels of dieldrin and that has been cited as the cause for dieldrin residue levels in lanolin to be from 0.2 mg/kg to 6mg/kg (McDouglas and Heath, 1990). Furthermore, the majority of ectoparasiticides (mainly pyrethroids and organophosphates) bind to the wool grease rather than the fiber itself .

- (2) The toxicity and mode of action of the substance and of its breakdown products or any contaminants, and their persistence and areas of concentration in the environment.

Because lanolin is a wax, it degrades slower than many other compounds. There were no studies correlating topical lanolin applications to pesticide residues in meat and dairy products.

- (3) The probability of environmental contamination during manufacture, use, misuse or disposal of such substance.

Manufacturing processes are complex. Detergents or methyl chloride (organic solvents) are used to scour the raw wool. Scour effluent is comprised of lanolin, sludge and water. The sludge goes to a landfill, the liquid effluent goes to sewage treatment, and the lanolin is distilled. Pesticide residues in the lanolin are removed to 3ppm (modified lanolin, USP grade) and 40ppm (standard lanolin USP grade).

- (4) The effect of the substance on human health.

Lanolin is recognized as a mild skin allergen. When applying lanolin, all label instructions should be followed.

- (5) The effects of the substance on biological and chemical interactions in the agroecosystem, including the physiological effects of the substance on soil organisms (including the salt index and solubility of the soil), crops and livestock.

There is no information on the effects lanolin has on organisms in the agroecosystem.

- (6) The alternatives to using the substance in terms of practices or other available materials.

Synthetic emollients such as isopropyl myristate, isopropyl palmitate, polypropylene glycol, other glycol derivatives, petroleum fractions, high molecular weight alcohol, allantoin and many others. Glycerin and vegetable oil are also alternatives as emollients in formulation.

Other milking management techniques to control mastitis that are considered alternatives to lanolin are the following (Merk Vet Manual, 1998):

- 1) Monitoring for mastitis.
- 2) Wiping or cleaning debris from teats.
- 3) Massaging each teat to loosen debris and stimulate milk letdown.
- 4) Wiping off the teat dip using individual cloth or paper towels.
- 5) Applying the milking unit without air admission and, at the end of milking, shutting off the vacuum, and removing the milking unit.
- 6) Isolate infected cows and cull cows that have repeat attacks.
- 7) Examine and test all herd additions and treat clinical infections as they occur.

- (7) Its compatibility with a system of sustainable agriculture.

Lanolin is a naturally occurring compound that appears to prevent physical damage to livestock, relieves animal suffering, and increases healing time.

### Discussion

#### *Condensed Reviewer Comments*

None of the Reviewers had a commercial or financial interest in Lanolin. As a practicing veterinarian, Reviewer 1 administers ointments that contain lanolin base as explained below.

##### Reviewer 1

Although lanolin originates from the sebaceous glands of sheep, it undergoes many processes before it is purified and isolated and as such I would consider it a semi-synthetic compound. The properties, uses and sources appear complete. I may add that it is the hydrous form of lanolin that can be used in combination with other ingredients in teat dips.

The chemical interactions (documented organo-phosphate and pyrethroid pesticide residues) are of concern to me. It is not surprising that the residues can be recovered from a fatty/oily substance. It should be noted that many certified organic dairy farmers graze their cows and feel no need to wash or wipe-off clean teats prior to milking. It would seem that the use of glycerin in teat dips would be a viable, perhaps preferable, alternative to lanolin.

Lanolin production appears to have some questionable steps and the end product itself can carry pesticides that were originally applied to the source animals. In its hydrous form, which would be the one in teat dips, lanolin does not seem compatible with sustainable agriculture. Perhaps as an ingredient as an emollient in ointments which are far less often used (relative to twice a day teat dipping), it could be acceptable.

I would suggest that lanolin teat dips not be allowed, while lanolin-containing ointments be either allowed or regulated. The only way I could see lanolin be used across the board is if the original source animals were from certified organic flocks.

I do not have a financial or commercial interest in the gathering, manufacture or sale of lanolin. I do, however, have a handful of homeopathic ointments on my truck that I dispense for damaged and scraped teat-skin on a case by case basis.

##### Reviewer 2

Lanolin, even with its iffy cleanup procedures, and the possibility of pesticide residues seems to fit into the organic system. At least it is essentially a natural product, unlike many of the alternatives. It might be worthwhile to compare manufacture of alternative products vs. lanolin cleanup procedures, and see which is the most virtuous.

##### Reviewer 3

I see no negative impact, with the exception of pesticide residue regulation, for lanolin use as a topical ointment for livestock.

### **Conclusion**

Some form of emollient is needed to help prevent teat damage, treat broken skin, and serve as an ointment base in organic livestock. Lanolin that has not been chemically modified to go into aqueous solutions appears to be a natural alternative, although not the only option. The convenience and availability of hydrous lanolin may merit consideration to be added to the National List, but appears unnecessary at this time.

### **References**

- 1) Agricultural Western Australia Wool Program web site [www.agric.wa.gov.au/wooldesk/chemresi.html](http://www.agric.wa.gov.au/wooldesk/chemresi.html)
- 2) McDougall, DW and AB Heath. Dieldrin residues in sheep following contamination by spraying or feeding. 1990. *Australian Veterinary Journal*. 67:386-388.
- 3) Merk Veterinary Manual. 1998. 8<sup>th</sup> ed. pp. 1013-1015. National Publishing, Inc., Philadelphia, PA
- 4) Pankey, J.W., Eberhart, R.J., Cuming, A.L., Daggett, R.D., Farnsworth, R.J., McDuff, C.K. 1984. Uptake on Postmilking Teat Antisepsis. *J of Dairy Sci*. 67:1336-1353.
- 5) Rolex Lanolin Products Limited web site [www.rolexlanolin.com/Lanolin.htm](http://www.rolexlanolin.com/Lanolin.htm)
- 6) Sax. 1975. Dangerous Properties of Industrial Materials. 4<sup>th</sup> ed. pp. 856. Van Nostrand Reinhold Co., NY.
- 7) United States Pharmacopoeia. Dr. Srin, personal contact.