



Mineral Oil Myths and Cosmetic Formulation



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How do you perceive the status of mineral oil and its use in cosmetics?

Despite its usefulness in many cosmetics, white mineral oil is frequently thought of as an undesirable ingredient. This perception often continues by word-of-mouth, without any real basis in fact. Actually, white mineral oil is a safe, effective, time-proven ingredient, preferred by many formulators.

When mineral oil is used in a formulation, does it give an oily-feeling cosmetic product? Will mineral oil substitutes perform better than mineral oil itself?

The feel of a particular formulation (especially emulsions) depends on the entire formulation, not just one ingredient. We know, for instance, that an emulsifier which is quite irritating alone can be safely and effectively used in a non-irritating emulsion. Similarly, light dry, silky-feeling products can be (and are) commonly prepared using mineral oil. The molecular structures of hydrocarbons promoted as mineral oil substitutes are no different than the compound classes that make up mineral oil. White mineral oil consists of complex mixtures of branched alkanes ("paraffinics") and alkylated saturated ring compounds ("naphthenics"). Squalane, hydrogenated polyisobutene and hydrogenated polydecene are sometimes heralded as superior to mineral oil, but these compounds are branched alkanes, just like the paraffinics in mineral oil. Dioctyl cyclohexane may be offered as a mineral oil replacement, but its structure fits neatly into the naphthenic class of mineral oil compounds.

Current trends are toward natural cosmetics. Many people don't think mineral oil is natural, so where does it fit in with these trends?

The "natural" debate has not truly resolved what is and what isn't natural. Unlike many cosmetic ingredients, white mineral oil is not synthesized. It occurs naturally in the earth, and it is simply purified to its final state. This could cause many people to re-think mineral oil's place in the "natural" debate. In fact, a recent consumer survey concerning personal-care ingredients found that 60% of consumers recognized mineral oil as natural.¹ It also is known that hydrocarbons of paraffinic structure exist naturally in human skin.² So, mineral oil is indeed a natural ingredient.

With so many new skin-care ingredients on the market, has the importance of mineral oil as a moisturizer been diminished?

Today, cosmetic formulators are able to choose from many new ingredients, and the products they develop are more beneficial than ever before. However, skin moisturization is still one of the most important characteristics desired by the cosmetic-buying consumer. Mineral oil remains a key moisturizing ingredient due to (1) its well-documented reduction of transepidermal water loss,³⁻⁸ and (2) its greater barrier to water vapor transmission than that of many other commonly used emollients.⁷⁻⁸

There is a belief that mineral oil is comedogenic or acneogenic. Are these valid concerns?

The scientific literature has shown that mineral oil has no comedogenic potential in the rabbit ear assay.⁹⁻¹¹ Of even greater importance is the fact that when mineral oil was tested on humans, it was found to be completely non-comedogenic.¹¹ Mineral oil's safety and negative response on human skin also is reflected by its frequent use as a carrier for anhydrous ingredients or products which undergo evaluation in human skin patch tests.

It also has been reported¹² that if the test of human comedogenicity is negative (true for mineral oil), then the tested material is non-acneogenic. Mineral oil has even been recommended as a moisturizer for acne-prone skin.⁹ Regarding cosmetics, attendees at a symposium on comedogenicity concluded that "neither the consumer nor the physician can assess whether the formulation will be acneogenic by simple inspection of the product or by examining the list of ingredients. Furthermore, the product's physical characteristics, such as oiliness or viscosity, are not in themselves predictors of an acneogenic response."¹²

Can you comment on the safety of mineral oil?

The safety and efficacy of mineral oil in a multitude of products from baby oil to creams and lotions to lip products has been demonstrated by decades of human use. Very few cosmetic ingredients can claim such extensive in-use testing, by likely millions of people. In addition, a 1994 white paper published by the CTFA regarding topical exposure to white mineral oils stated that "topical use of white mineral oils does not represent a local or systemic toxicity risk to humans."

Year after year, mineral oil remains an essential ingredient on the cosmetic formulator's shelf. What is the reason for this?

Almost no other ingredient is more cost-effective than mineral oil. A recent publication¹³ described mineral oil's excellence as a cosmetic ingredient by stating that it is "a very desirable ingredient in view of its stability, touch, barrier function, and

cost. It is practically impossible to obtain another comparable ingredient superior to it."

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