

COSMECEUTICAL CRITIQUE

Oils and Mineral Oil

Oil is a substance that is liquid at room temperature and insoluble in water. It is both hydrophobic and lipophilic. In fact, dietary and topical oils contain copious lipids, which the skin requires for the proper formation and function of cell membranes. Significantly, oils have the capacity to deliver hydrating lipids to the skin to help prevent transepidermal water loss. In addition, they can work as skin cleansers by surrounding dirt and lifting it above the stratum corneum, from which it can be easily washed away.

Various oils can be used for cutaneous purposes. Safflower oil contains oleic and linoleic acids, fatty acids that are particularly beneficial to the skin. Olive oil is an effective hydrating agent and has been shown to confer anti-inflammatory and anticarcinogenic activity (Phytother. Res. 2003;17:987-1000; Inflamm. Res. 2001;50:102-6; Carcinogenesis 2000;21:2085-90; J. Dermatol. Sci. 2000;23 [Suppl 1]:S45-50). In fact, topically applied olive oil has been used successfully to treat xerosis, rosacea, psoriasis, seborrhea, burns, atopic dermatitis, contact dermatitis (particularly in the diaper area), eczema (including severe cases on the hands and feet), and various kinds of inflammation and skin damage (Phytother. Res. 2003;17:987-1000).

Rosemary oil has been shown to exhibit potent antioxidant activity (Phytother. Res. 2004;18:343-57; Biosci. Biotechnol. Biochem. 2004;68:781-6; Phytother. Res. 2003;17:987-1000; Br. J. Dermatol. 2003;149:681-91; J. Med. Food 2003;6:267-70; Free Radic. Biol. Med. 2002;32:1293-303; Cancer Lett. 2002;177:145-53; Nutr. Cancer 2001;41:135-44; Int. J. Tissue React. 2000;22:5-13; J. Agric. Food Chem. 2000;48:5548-56; Food Chem. Toxicol. 1996;34:449-56; Planta Med. 1995;61:333-6; Xenobiotica 1992;22:257-68).

Relaxing, antispasmodic, and tranquilizing effects have been associated with lavender oil, which explains its frequent inclusion in aromatherapy (Phytother. Res. 1999;13:540-2).

It is important to note that oils are not suitable for all skin types, particularly oily skin. People with dry or sensitive skin, however, are good candidates for using skin products with essential oils.

The primary benefit of including oils in cosmetic formulations is the hydrating activity they confer. Oils also retain sunscreens and other products. In addition, various oils are recommended to pregnant women to prevent striae alba, because the lubrication provided by the oils prevents the breakage of collagen, rendering the skin more flexible. Coating the body in oil before bathing—which dehydrates the skin by stripping water and lipids—prevents transepidermal water loss. For individuals with dry skin, bath oils are essential.

Mineral Oil

One of the most frequently used oils in skin care products is mineral oil, also called liquid petrolatum. It has been incorporated in cosmetic agents for more than a century (J. Cosmet. Dermatol. 2005;4:2-3). A by-product of the distillation of petroleum to produce gasoline, mineral oil is a transparent, colorless substance primarily composed of alkanes and cyclic paraffins.

Mineral oil is a frequently used occlusive ingredient. Occlusives, which dissolve fats and coat the stratum corneum to inhibit transepidermal water loss, yield an emollient effect that is well suited to treating dry skin. Petrolatum, lanolin, mineral oil, and silicones are the most effective occlusive ingredients (Skin Therapy Lett. 2005;10:1-8).

It is important to note that the use of occlusive products does not achieve long-lasting results—transepidermal water loss re-

turns to its previous level after the agent is cleaned from the skin. Occlusive agents are generally used in combination with humectants (water-soluble, hygroscopic substances), because reducing transepidermal water loss by more than 40% risks maceration with elevated bacteria levels (Cutis 1987;39:512-5).

Almost 20 years ago, a mineral oil emulsion was found to be more effective than various linoleic acid emulsions in reducing skin vapor loss in volunteers who received topical applications of sodium lauryl sulfate solution (Contact Dermatitis 1989;20:93-7). Recently, in a randomized, double-blind controlled trial comparing mineral oil with extra-virgin coconut oil as a moisturizer to treat mild to moderate xerosis in 34 patients, both groups showed significant improvement in skin hydration and surface lipid levels. Both products were deemed to be efficacious and safe (Dermatitis 2004;15:109-16). Mineral oil also is effective as an adjuvant therapy for wound healing (Cosmetics & Toiletries 1998;113:33-40).

The various oils used in dermatology offer a range of benefits. It is important to communicate information about these benefits to patients, who may also be interested in knowing more about the origins of such products and their differences. Notably, vegetable oils are pressed from seeds, whereas essential oils are steamed from several plant parts, including stems, leaves, and roots.

Many consumers who favor organic products may eschew mineral oil because of the effects of its production process on the environment. Some critics have also simply cited the origin of mineral oil and its use in industrial processes as damning evidence. However, the mineral oil used in cosmetic products, USP or BP grade, is highly refined and purified, and is not an industrial-grade petroleum, which contains benzene.

Safety

A decade ago, an epidemiologic review revealed several associations between min-

eral oil exposure and cancer (Cancer Causes Control 1997;8:386-405). However, it is important to note, particularly in the face of lingering myths about the effects of mineral oil, that any evidence of an association between mineral oil exposure (dermal or through inhalation) and certain types of cancer is found only in cases of prolonged exposure to industrial-grade mineral oil. There is no such evidence regarding cosmetic-grade mineral oil.

A recent study reported that although industrial-grade mineral oil may be comedogenic, cosmetic-grade mineral oil clearly is not, and therefore should not be omitted from certain cosmetic formulations because of reputed comedogenicity (J. Cosmet. Dermatol. 2005;4:2-3).

Industrial-grade mineral oil has been used in metal cutting, printing press operating, and cotton and jute spinning, as well as to lubricate machinery. Cutaneous effects such as rashes and acne have been reported in people exposed for prolonged periods to this much less refined form of mineral oil.

Conclusions

Several versatile oils are available for the treatment of different skin conditions. Most of the oils are used in moisturizers. Mineral oil is one of the most effective of the occlusive ingredients in moisturizers, and is used to prevent transepidermal water loss in people with dry skin. It also is an effective ingredient for those with sensitive skin. Significantly, mineral oil does not clog pores or cause acne, despite claims to the contrary.

Like most topical products, oils cannot exert long-lasting effects on the skin. Repeated application is necessary to provide cutaneous benefits. ■

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BY LESLIE S. BAUMANN, M.D.

Green Tea May Complement Retinoids, Evidence Suggests

BY TIMOTHY F. KIRN
Sacramento Bureau

LAS VEGAS — Beware the cosmeceutical claims about green tea and its antiaging properties.

Although there is strong evidence that green tea contains substances that may ward off UVA-related skin damage, it is all from in vitro experiments, Dr. Cherie Ditre said at the annual meeting of the American Society of Cosmetic Dermatology and Aesthetic Surgery.

None of it comes from actual patient trials.

"This is all done with artificial skin and artificial-skin substrates. More work needs to be done," said Dr. Ditre, director of the University of Pennsylvania Health System's Cosmetic Dermatology and Skin Enhancement Center in Radnor.

With that caveat, Dr. Ditre said that green tea has been shown to have strong antioncogenic properties and may work in a complementary fashion to retinoids.

The most important, active component of green tea is

considered to be epigallocatechin-3-gallate, or ECGC, which is a polyphenolic compound. It appears to inhibit the generation of intracellular hydrogen peroxide, one of the most active DNA-damaging oxygen species, and the formation of cyclobutane pyrimidine dimer, another source of DNA damage.

In experiments with hairless mice prone to squamous cell carcinoma, application of green tea reduced the development of tumors by 60%, relative to controls (Neoplasia 2003;5:555-65), she said.

In the skin culture systems, topical application of green tea extract of ECGC, at practical doses, has been shown to increase the expression of tissue inhibitors of matrix metalloproteinases (TIMPs). Matrix metalloproteinases contribute to the degradation of collagen, and their levels increase after UV exposure, so they may be an important pathway for sun-induced aging, Dr. Ditre said.

In particular, ECGC was shown to increase production of TIMPs in dermal fibroblasts in response to UVA exposure (J. Dermatol. Sci. 2005;40:195-204).

This is different from how retinoids work, she added.

'Perhaps the combination of retinoids with green tea could give us the maximum benefit for collagen preservation and perhaps collagen upregulation.'

Retinoids upregulate collagen synthesis and downregulate matrix metalloproteinase expression. Matrix metalloproteinase expression is mostly increased as a result of UVB exposure.

These differences suggest that using green tea and a retinoid together could be advantageous.

"There is some harmony between these agents," Dr. Ditre said. "Perhaps the combination of retinoids with green tea could give us the maximum benefit for collagen preservation and perhaps collagen upregulation."

Dr. Ditre disclosed that she serves on the speakers' bureau and is an adviser for Topix Pharmaceuticals Inc., maker of Replenix, a skin-care line containing green tea. ■