Role of Oils in the Topical Treatment of Acne

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Oil-free products are not always the best to use when treating acne. Patients with acne have been shown to have inadequate levels of essential fatty acids in their skin, which contribute to the severity of the condition. Topical supplementation with botanical sources of omega-3 and omega-6 essential fatty acids can dramatically improve the skin of your patients with acne without causing breakouts. Not all oils are comedogenic or pore clogging.

One long-accepted idea for the effective treatment of acne is the total avoidance of topically applied oils. The assumption that the patient with acne would not need any oil supplementation is reasonable because the majority of patients with acne have a marked increase of sebum production. Understandably, there is also the belief that the addition of oils to daily-use products would exacerbate this condition, clogging pores and leading to increased comedonal activity. Certainly, there are oils that can irritate skin, create impaction, and cause problems in multiple skin types, but many others provide important benefits. In addition to fighting inflammation and bacteria, specific oils work as humectants to bind moisture to the skin, whereas others are gently occlusive, trapping this moisture within the stratum corneum. This is very important, especially to those with acne, because dehydration can often stimulate an increase in sebum production. Oils to consider for addressing the acne disease pathway are those high in omega-3 and omega-6 essential fatty acids (EFAs) (Table) and particular botanically derived oils that have been shown to be beneficial in the treatment of the underlying causes of acne.

THE ACNE DISEASE PATHWAY

Four commonly recognized causes of acne include increased keratinization within the follicle, increased sebum production, proliferation of *Propionibacterium acnes*, and inflammation. A successful acne-treatment plan should include professional treatment protocols and a daily-care regimen that includes ingredients to address all 4 of these causes of acne simultaneously. Many oils rich in omega-3 and omega-6 EFAs provide just this type of action. EFAs are polyunsaturated fatty acids necessary for human health that can be obtained only from dietary sources because the body is unable to produce EFAs on its own, making internal and topical supplements necessary. Common EFAs include linoleic acid and arachidonic acid, which are omega-6 fatty acids, and linoleic acid, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA), which are omega-3 fatty acids.[1]

Interestingly, patients with acne have been shown to exhibit inadequate levels of EFAs such as gamma-linoleic acid in their skin surface lipids, thus contributing to the severity of the condition. These low levels are also thought to contribute to the formation of comedonal impactions.[2] Topical supplementation with botanical sources of omega-3 and omega-6 EFAs can dramatically improve the skin of your acne patients without causing breakouts. The Figure shows an example of the beneficial use of traditional acne ingredients combined with moisturizers containing botanically derived EFAs and oils.

LINOLEIC ACID AND SEBUM

Wheat germ oil is both a source of omega-3 fatty acids and very rich in omega-6 EFAs, making it an excellent choice for acne treatment. One study evaluated the effects of topically applied linoleic acid on the size of microcomedones in patients with mild acne and found that it may be

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Effective Essential Fatty Acid Options for Acne Treatment

Omega-3 Fatty Acids*	Omega-6 Fatty Acids†
Borage oil	Apricot seed oil
Canola oil	Borage oil
Fish oils	Evening primrose oil
Flaxseed/linseed oil	Grape seed oil
Hemp seed oil	Pumpkin seed oil
Red and brown algae	Rose hip seed oil
Rose hip seed oil	Soybean oil
Soybean oil	Sunflower oil
Walnut seed oil	Wheat germ oil and wheat protein
Wheat germ oil and wheat protein	

*Alpha-linoleic acid, docosahexaenoic acid, and eicosapentaenoic acid.
†Arachidonic acid, gamma-linoleic acid, and linoleic acid.

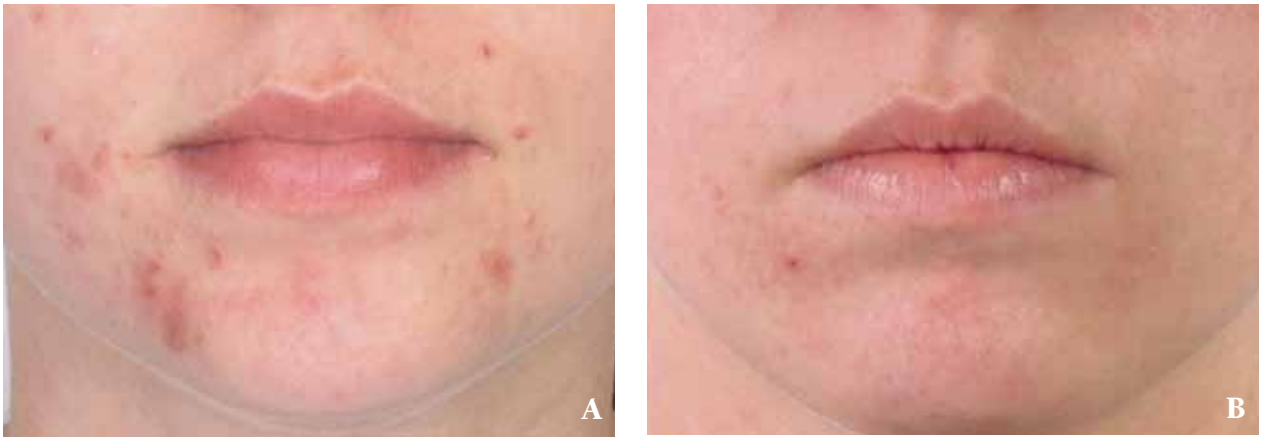
comedolytic for small, presumably incipient comedones.[2] A high source of linoleic acid is *Borago officinalis* (borage) seed oil, which also contains lower concentrations of DHA and EPA (also omega-3). *Vitis vinifera* (grape) seed oil is a beneficial source of linoleic acid. This EFA is an important ingredient to supplement in those with acne. When linoleic acid is present in human sebum, it is more liquid and soothing to the skin. Linoleic acid is cleared more easily from the follicles and also reduces follicular inflammation. Conversely, when linoleic acid is not present or is present at much-reduced levels, sebum is produced with oleic acid, which is denser, more likely to cause follicular blockage, and irritating to the skin.[3,4] This distinction makes the addition of oils rich in linoleic acid a clear choice for the improvement of acne. Many skin care companies distribute products containing one or more of these topically beneficial oils. B Kamins Redness Defying Lotion contains wheat germ and sunflower seed oil to provide omega-3 and omega-6 fatty acids. PCA Skin Purifying Mask combines clay to detoxify the skin along with the omega-6–rich grape seed and soybean oils. Pond's Mend & Defend Intensive Protection SPF 15 Moisturizer provides nongreasy hydration with sunflower, borage, grape seed, and rose hip seed oils as well as broad-spectrum UV protection.

BENEFITS OF ORAL ESSENTIAL FATTY ACID SUPPLEMENTATION

Multiple studies have also been performed to evaluate the efficacy of oral EFA supplementation on various skin disorders. Although the antiacne benefits will require more research before any conclusions are made, many inflammatory skin conditions have shown oral supplementation to be a favorable treatment option. Orally administrated gamma-linoleic acid–rich evening primrose oil at 2 g/d for 6 weeks showed reduced inflammation, pruritus, and other skin problems in patients undergoing hemodialysis.[5] Another study using oral evening primrose oil supplementation in patients with atopic dermatitis demonstrated that moderate and favorable fatty acid changes can be obtained in the epidermis of patients with atopic dermatitis who were given 6 g/d of oils rich in omega-6 fatty acids.[6] Patients with psoriasis have also seen lessening of itching, erythema, and scaling, with an overall decrease in body surface area affected, when orally administered 10 fish oil capsules daily (estimated 1200 mg DPA and 1800 mg EPA) for 8 weeks.[7] These studies suggest that orally induced omega-3 and omega-6 fatty acids improve skin condition and decrease inflammation, both of which are concerns in the treatment of acne.

CONTROLLING INFLAMMATION

Pure forms of the omega-3 fatty acids EPA and DHA have been shown in dozens of studies to reduce inflammation.[8-10] An in vitro study found that numerous fish oil extracts presented significant amounts of the omega-3 fatty acids EPA and DHA and demonstrated anti-inflammatory properties.[8] Although fish oil extracts have not been extensively studied in acne or skin



Representative patient with acne before (A) and after (B) 18 weeks of a daily care regimen consisting of traditional antiacne ingredients plus the inclusion of moisturizers containing grapefruit peel oil, jojoba seed oil, and borage seed oil.

inflammation, the demonstrated ability of fish oil to reduce inflammation in the aforementioned in vitro study suggests a potentially useful role in the successful treatment of acne. Additionally, several studies have found that pure omega-3 fatty acids are absorbed through the skin and can reduce inflammation in the area of treatment.[8] Further research is needed on finished products to substantiate their efficacy.

Inflammation is both a cause and a result of acne. When the number of *P acnes* bacteria increases, sebum is broken down into irritating free fatty acids, which stimulate an immune response. White blood cells weaken the follicular wall, resulting in rupture and increased inflammation. In acne-prone skin, increased amounts of sebum and *P acnes* bacteria build up behind the impaction and trigger an additional inflammatory response. Using anti-inflammatory topical ingredients both soothes current irritation and helps avoid undue inflammation in the future. Several botanically derived oils with demonstrated anti-inflammatory action can play this role in effective acne treatment plans. *Calendula officinalis* (marigold) flower oil displays anti-inflammatory properties while also fighting bacteria when applied topically, thus addressing 2 of the causes of acne simultaneously.[11,12] Studies have shown that marigold oil stimulates cell regeneration and epithelialization, making it important in the clearing of acne lesions as well.[13]

BALANCING SEBUM PRODUCTION AND DESQUAMATION WITH BOTANICAL OILS

It is imperative to recognize that aggressively drying a patient's skin, even if it is oily, may cause the sebaceous glands to overcompensate by producing an excessive amount of sebum, which can induce further breakouts. As one of the causes of acne, this increase in sebum will likely exacerbate the acneic condition rather than improve the problem. The use of humectant and occlusive oils can help avoid dryness and unnecessary dehydration. An example of an ingredient that can also be useful to avoid an increase in sebum production triggered by dehydration is *Simmondsia chinensis* (jojoba) seed oil, which is composed of liquid wax esters. The structure of jojoba oil closely resembles that of natural sebum, and its application can assist in reducing oil production in the skin. This reduction in sebum production is also important to an overall acne treatment plan because sebum, unlike jojoba, can clog pores. If there is a buildup of natural oils present in the skin, jojoba oil has the additional ability to dissolve and remove this excess.[14] The traditional antiacne ingredient benzoyl peroxide (BPO), along with jojoba and grapefruit oil, are used in PCA Skin 5% BPO Cleanser, providing the potent antibacterial benefits of BPO without the commonly associated inflammation. Zia Skin Basics Everyday Moisture is formulated using organic jojoba along with EFA-rich oils such as soybean and sunflower.

The previously discussed escalation in sebum production in conjunction with increased adherence of keratinocytes to the follicular wall represents the portion of the acne disease pathway that results in a plugged pore and the beginnings of comedone formation. Skin cells in patients with acne often do not desquamate properly on their own, creating a buildup of surface cell debris that traps oil and *P acnes* in a deoxygenated environment, causing these anaerobic bacteria to proliferate. Providing your acne patients with gentle superficial chemical peels and at-home use of exfoliants can help reduce excess cell accumulation that can support *P acnes* proliferation. Chemical and mechanical exfoliation should be performed very gently to avoid causing additional inflammation and potentially exacerbating the acne condition.

ANTIBACTERIAL OILS

Using antibacterial and antimicrobial topical agents and oral or topical antibiotics (when applicable) are suitable ways to control the bacteria population. One botanical oil that can accomplish this for your patients with acne is *Melaleuca alternifolia* (tea tree) leaf oil. In well-balanced topical formulations, it is extremely beneficial because it acts as an antifungal, antibacterial, and astringent agent. It has also been shown to help bring oxygen into the follicles, reducing the *P acnes* population. A comparative study of tea tree oil versus BPO in the treatment of acne found that both 5% tea tree oil and 5% BPO had a significant effect in ameliorating the patients' acne by reducing the number of inflamed and noninflamed lesions.[15] Fewer side effects were experienced by patients treated with tea tree oil. In a subsequent study, researchers determined that the major components of tea tree oil are active against *P acnes*, lending further support to its use in the treatment of acne.[16] Another beneficial topical oil with antibacterial properties is *Eucalyptus globulus* (blue gum) leaf oil, which is made up predominantly of eucalyptol, a very potent antibacterial and astringent agent. It also provides anti-inflammatory benefits when applied topically, addressing 2 of the causes of acne.[17] *Citrus grandis* (grapefruit) peel oil is antiseptic and a detoxifying agent. This oil's antibacterial and astringent properties make it a suitable addition to an antiacne formulation as well.[18] ARCONA AM Acne Lotion combines the α-hydroxy acid lactic acid with tea tree oil and eucalyptus oil for multiple benefits in the treatment of acneic skin. The PCA Skin Blemish Control Bar provides a convenient application method for larger areas of acne, such as the chest and back, and is formulated using sulfur, eucalyptus oil, and salicylic acid.

SUMMARY

There are certainly many other well-known substances that are extremely important to an effective treatment plan for acne, such as salicylic acid, BPO, retinoic acid, and α-hydroxy acids, to name just a few. The purpose of this discussion is not to discount these long-standing treatment options but to demonstrate the important impact that appropriately selected oils in daily care products can have by fighting inflammation and bacterial proliferation and increasing moisture content to create a comprehensive and well-tolerated approach to the treatment of acne.

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