Applications of Popular Botanical Ingredients in OTC Skincare

Popular in cosmeceutical regimens, botanicals are increasingly available in OTC products to moisturize, soothe itch, and provide other benefits.

By Jeanine B. Downie, MD

Botanical extracts have been used on the skin for millennia. Contemporary written reports and accumulated evidence tell us that Cleopatra used botanical-based topical formulations for cosmetic purposes and to condition her skin. Today, the US cosmeceutical market is an estimated $10-14 billion industry, and a majority of those products are built upon botanical extracts. Botanical ingredients are also now incorporated into many mass-market skincare products developed for both adults and children. Following is a look at some of the more popular botanical ingredients used in mass-market skincare products. The emphasis is on topical application and skincare formulations, not on oral botanical-based supplements.

Feverfew
A popular topical botanical currently is feverfew (Tanacetum parthenium), a member of the sunflower family. Feverfew’s common name derives from its ancient oral use as a fever reducer. The antioxidant-rich botanical is shown to have anti-inflammatory, anti-irritant, and anti-cancer properties and is used as an oral supplement to treat migraine headaches.

One challenge associated with the topical application of feverfew derivatives is the risk of parthenium dermatitis, a common allergic reaction to plants. A novel parthenolide-free extract of feverfew (PFE-feverfew) compound has removed the parthenolide component to obviate the sensitization potential. In one study, the agent had in vitro anti-inflammatory effects, as indicated by a reduction in release of pro-inflammatory cytokines. In vivo, PFE-feverfew reduced DNA damage and hyperplasia following UV exposure. There was also a reduction in UV-induced skin erythema as a result of PFE-feverfew application.

Another trial confirmed the ability of PFE-feverfew to inhibit the activity of pro-inflammatory enzymes.

Take-Home Tips. Botanical ingredients are now incorporated into many mass-market skincare products developed for both adults and children. If patients are interested in “natural” or botanical skincare, the accumulated evidence suggests that some products may be worthwhile. For patients with “sensitive skin,” eczema, atopic dermatitis, or any acute or chronic, inflammatory, pruritic skin condition, products containing feverfew, colloidal oatmeal, or sunflower seed oil may be useful adjuncts to other therapeutic interventions. Patients with rosacea and pigmented alterations may benefit from products featuring licorice root extract.
and the release of pro-inflammatory mediators from macrophages and from human peripheral blood mononuclear cells. In vivo, PFE-feverfew inhibited dermatitis in two different murine models.5

Most feverfew-containing skincare products are intended for anti-aging use or to manage adult dermatoses, such as rosacea. However, given its efficacy in combating dermatoses in vivo, there is increasing interest in using feverfew for atopic dermatitis and “sensitive skin.” PFE-feverfew is formulated into the Aveeno Active Naturals line in their “Ultra-Calming” products. These include a facial cleanser, daily facial moisturizer with SPF, and a sunscreen, which may be suitable for use on eczema-prone skin and rosacea.

**Colloidal oatmeal**

Colloidal oatmeal is derived from dehulled oat kernels. The active components include polysaccharides, proteins, lipids, enzymes, saponins, flavonoids, vitamins, and prostaglandin synthesis inhibitors. Use of finely ground colloidal oatmeal (Avena sativa L.) to soothe the skin is an ancient practice, and the use of oatmeal baths is still common to help control pruritic, inflammatory skin manifestations like poison ivy and chicken pox. Colloidal oatmeal functions as a cleanser, moisturizer, buffer, as well as a soothing and protective anti-inflammatory agent.6 Colloidal oatmeal has been used to treat atopic dermatitis and inflammatory skin diseases and is known to repair barrier dysfunction, reduce skin inflammation and irritation.2

The anti-pruritic effects of colloidal oatmeal were demonstrated in a study of burn wounds. Patients who applied to healing burn wounds a topical moisturizer containing colloidal oatmeal reported significantly less itch and used fewer antihistamines than patients who used the vehicle moisturizer without colloidal oatmeal.7

Colloidal oatmeal also provides protective and moisturizing benefits, thought to derive from the high concentration of starches and beta-glucans that hold water.7 The botanical is high in oat phenols, some of which are strong ultraviolet absorbers and under investigation as sunscreen ingredients.7

Colloidal oatmeal is featured in Aveeno Baby Soothing Relief products, including creamy wash, bath treatment, and moisture cream, as well as Aveeno Baby Daily Care washes and moisturizer, and Aveeno Skin Relief BodyWash. Aveeno Daily moisturizing lotion and Aveeno Eczema Care also feature colloidal oatmeal. Eucerin Calming Crème Daily moisturizer is a fragrance-free formulation that also features oatmeal to moisturize the skin and soothe itch. Eucerin Calming itch treatment adds menthol for additional anti-pruritic effect.

**Sunflower seed oil**

Botanically-derived oils have been studied as possible low-cost moisturizers, but studies suggest variability in their effectiveness. For example, application of sunflower (Helianthus annuus) seed oil was shown to
accelerate epidermal barrier function repair in mouse models, while other botanical oils actually delayed repair. When sunflower seed oil was applied three-times daily to preterm infants in one study, it was shown to improve overall skin health and reduce nosocomial infections compared to controls.

Sunflower seed oil contains high levels of essential fatty acids, including linoleic acid. A novel sunflower oleodistillate (SOD) has been shown to increase epidermal lipid synthesis and to reduce inflammation in vitro and in animal models. In one study, an SOD 2% emulsion demonstrated moisturizing properties in 20 adult volunteers with atopic skin and had a strong steroid-sparing effect. Other studies in infants and babies with AD have shown a positive impact on quality-of-life parameters.

Sunflower oleodistillate is the primary component of Stelatopia products from Mustela, which include moisturizing cream, cream cleanser, and milky bath oil.

Licorice root extract
One of the more popular botanical skincare ingredients lately is “licorice root” (Glycyrrhiza glabra) or “licorice root extract.” The main components of licorice extract are triterpene saponins—glycyrrizin, flavonoids—liquiritigenin, and isoflavonoids—glabridin. In reality, at least seven constituents have been derived from the licorice root, and six of these have been shown to have significant antioxidant capacity. Glabridin was found to be the most abundant and potent antioxidant, while Formononetin was not found to have notable antioxidant effects.

Glabridin has anti-tyrosinase activity, leading to its widespread use in cosmeceutical products intended to manage dyschromia and other pigmentary alterations.

A novel constituent of licorice extract, licochalcone A appears to induce an anti-inflammatory effect through the inhibition of COX-2-dependent PGE2 production. In one trial, when patients with mild to moderate facial erythema used licochalcone-containing skincare for eight weeks, they had significant improvements in erythema scores at weeks four and eight and reported improved quality of life. The skincare products were found to be compatible with metronidazole.

Licochalcone is incorporated into the Eucerin Redness Relief System, which includes cleanser, SPF moisturizer, and a nightly serum. TNS Essential Serum has licorice in it as well as Vivite Vibrance. Both cosmeceuticals help to even out skin tone and improve texture.

Lavender and chamomile
Lavender (Lavandula angustifolia or Lavandula officinalis) takes its name from the Latin word “to wash,” presumably because it was commonly used as a fragrance in baths. Lavender oil is shown to have strong antioxidant properties. Orally, lavender oil supplementation has been associated with anti-inflammatory and analgesic effects. Topically applied lavender oil has shown antimicrobial effects and is under investigation as an anti-tick treatment.

Despite these potential uses for topical lavender oil, currently its primary use in skincare products is as an anxiolytic and sleep-promoting fragrance. Studies have shown that lavender oil aromatherapy effectively reduces anxiety in mouse models of induced anxiety with demonstrated effects on neurotransmitters such as dopamine, serotonin, and their derivatives. In various trials, lavender aromatherapy has been shown to reduce anxiety among dental patients, pre-surgical patients, and test-taking graduate nursing students.

Studies show that unstable lavender oil exposed to oxidation has the potential to induce allergic reactions, although no widespread reports of lavender allergy are in the literature. In fact, in mouse models, topical application of lavender oil was shown to inhibit immediate type allergic reactions.

Chamomile (Matricaria recutita) contains the flavonoid apigenin, which is suggested to have antitumor effects. Chamomile also has anti-inflammatory, antimicrobial, and wound-healing benefits. Aveeno Baby Calming Comfort bath and lotion contain chamomile extracts for fragrance. Avalon Organics incorporates Lavender into several facial cleansing products. Nature’s Baby Organics makes a wash with lavender and chamomile. Aquaphor Baby Gentle Wash and Shampoo contains chamomile, as does Mustela baby shampoo.
Botanical OTC Products

Tea Tree Oil: A Potential Allergen

Tea tree oil is increasingly popular as a topical antiseptic and antimicrobial. A number of washes, shampoos, and therapeutic formulations are available and marketed to reduce risks of cutaneous bacterial and fungal infections or treat acne, despite limited positive data. Due to its popularity, the agent may attract the interest of patients. Tea tree oil has been associated with high and increasing rates of allergic contact reactions. Given this rate of allergic reactions and the limited evidence to support its utility, tea tree oil should not be widely recommended for dermatologic indications at this time.

Potential Adjuncts

Patients often ask their dermatologist or office staff about skincare products, running the gamut from products featured in infomercials to high-end cosmetics, and, of course, mass-market skincare. Clinicians may lack detailed information about particular products and ingredients. In general, use of a gentle, soap-free, moisturizing cleanser is always appropriate. If parents are interested in “natural” or botanical skincare, the accumulated evidence suggests that some products may be worthwhile. For patients with “sensitive skin,” eczema, atopic dermatitis, or any acute or chronic, inflammatory, pruritic skin condition, products containing feverfew, colloidal oatmeal, or sunflower seed oil may be useful adjuncts to other therapeutic interventions. Patients with rosacea and pigmentary alterations may benefit from products featuring licorice root extracts. The listing of brands and product lines provided here is not exhaustive, and inclusion of a product is not an endorsement. What is important is that patients carefully evaluate the offerings with the guidance of their physician. Generally, consumers do best to choose established brands and/or those that provide detailed data about the performance of their specific formulations.

Lavender and chamomile-containing formulations may have less utility in terms of promoting skin health, but these products appear to do no harm to most skin and may have calming and soothing benefits for adults and children, especially babies.