Review Article

From the Kitchen to Your Skin: A Review of Nontraditional Moisturizers

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In recent years, consumers have become more aware of the ingredients used in their daily personal care products. Added colorants, fragrances, and preservatives have raised concerns about safety. Due to this, there has been increased interest online to identify integrative moisturizers for use in consumers' routines. This review investigates nontraditional moisturizers studied in the literature and reports on their proposed mechanism of action, clinical efficacy, and potential side effects. Studies were identified through searches on PubMed, Google, and Google Scholar using a broad range of search terms. Findings show many of these agents can decrease transepidermal water loss, support skin barrier function, and deliver essential nutrients to skin. Future studies are needed to investigate these products for specific use as skin moisturizers in a wide range of skin types to evaluate their application in clinical practice. By synthesizing the current data, consumers can make well-informed decisions, and these products can help diversify skincare ingredients, offering more easily accessible and cost-effective options.

INTRODUCTION

In the last decade, cosmetics has taken off as one of the fastest-growing industries, with a 7% yearly growth rate.[1] With the rise of social media, consumers are more aware of the ingredients used in their daily personal care products, including hair care, makeup, and skincare. Given this, there is increased interest in using natural products derived from plants or other resources as replacements for personal care items.[1] Nevertheless, integrative skincare is not a novel idea. Ancient Egyptian women would bathe in sour milk, which contains lactic acid. Indian women would mix pumice, an abrasive, and urine, rich in urea, for facial scrubs.[1] Similarly, consumers today are searching for alternatives to skincare items that can be easily found in their kitchen or household.

The skin serves as a chemical and physical barrier against environmental irritants, water loss, and microbial pathogens. It is rich in cholesterol, free fatty acids, and ceramides. However, the body can only produce a limited amount of each, so one may supplement with external nutrients, often through skincare products.[2] Moisturizers are popular, as they nourish the skin, increase hydration, and improve overall skin appearance.[3] They function as humectants, emollients, occlusives, or a combination of these. Humectants increase hydration by attracting water from the dermis or environment to the stratum corneum.[3] Emollients are often lipid-based and fill the gaps between corneocytes to improve the skin's smoothness and hydration.[3] Occlusives are usually lipid-based compounds—such as petrolatum or waxes—that form a hydrophobic film on the skin, thereby limiting transepidermal water loss.[3] Regardless of skin type or pathology, frequent moisturization improves skin sensation, psychological satisfaction, and quality of life, as well as barrier function.[3]

Although moisturizers are widely used and generally beneficial, concerns have been raised about their safety, particularly regarding ingredients such as added fragrances, colorants, and preservatives. Some adverse reactions to these ingredients include photosensitivity, contact urticaria, and/or contact dermatitis.[4] Patients with existing skin pathologies are more likely to react adversely to these ingredients.[4] As such, consumers are looking for integrative moisturizers to use in their skincare routine. This review investigates non-traditional moisturizers studied in the literature and reports on their proposed therapeutic properties, effectiveness, and side effects.

MATERIALS AND METHODS

We conducted a comprehensive literature search using Google Scholar, Google, and PubMed. Google was beneficial for identifying online forum discussions after searching for "natural moisturizer." Detailed search strings were not systematically recorded, but common search terms included "plant oils," "dermatologic conditions," "integrative skincare," "beef tallow," "honey," "vegetable shortening," and more. We reviewed the titles and abstracts of papers for relevance. Studies were chosen for inclusion based on their relevance, with particular interest in the effects of hydration or barrier repair on the skin. After screening articles, 68 were included in this review.

Table 1. Summary of products mentioned with proposed mechanism of action, active ingredients, and safety profile.

Product	Mechanism of Action	Properties	Safety
Tallow	Occlusive Emollient	Saturated and unsaturated fatty acids, antioxidants, and vitamins	High concentrations can be irritating to the skin, eyes, and oral cavity
Vegetable Shortening	Occlusive	Soybean oil	Potential for cross-contamination
Beeswax	Occlusive Humectant Emollient	Alkanes, alkenes, free fatty acids,	Possible allergen
Honey	Humectant Exfoliative Occlusive	Sugar hydroxyl groups and fruit acids	Possible allergen Sticky texture
Colostrum	Antimicrobial Anti-inflammatory	Growth factors, immunoglobulins, lactoferrin, and polypeptides	To be investigated
Snail Mucin	Antimicrobial Humectant	Growth factors, antioxidants, hyaluronic acid, glycosaminoglycans,	Risk for irritation, especially in seafood allergy patients Ethical considerations
Yogurt	Antibacterial Anti-inflammatory	Vitamin A, B2, and B12, essential fatty acids, probiotics	To be investigated
Emu Oil	Wound healing	Omega fatty acids, oleic acid, linoleic acid, and saturated fatty acids	To be investigated
Coconut Oil	Anti-inflammatory Antibacterial	Phenolic acids, triglycerides, medium chain fatty acids	Comedogenic Potential allergen
Olive Oil	Occlusive	Polyunsaturated acids, monounsaturated fatty acids, vitamin K, vitamin E	Can worsen atopic dermatitis Comedogenic
Shea Butter	Occlusive	Triglycerides, oleic acid, stearic acid, linoleic acid, fatty acids, vitamin E	Comedogenic Potential allergen
Cocoa Butter	Occlusive	Triglycerides, alpha-linolenic acid, palmitoleic acid, oleic acid, fatty acids, vitamin E	Comedogenic
Oatmeal	Anti-inflammatory	Antioxidants, polysaccharides	Possible irritant
Jojoba Oil	Emollient Occlusive Anti-inflammatory	Esters, free fatty acids, hydrocarbons, and alcohol	Possible allergen
Avocado Oil	Wound healing Anti-inflammatory Antibacterial	Linoleic acid, linolenic acid, oleic acid, vitamins A, C, D, and E	To be investigated
Grapeseed Oil	Occlusive Wound healing	Phenolic compounds, vitamin E, free fatty acids, and flavonoids	To be investigated
Sunflower Seed Oil	Anti-inflammatory	Oleic acid and linoleic acid	Possible allergen
Squalane	Antioxidant Emollient Wound healing	Triterpene	Peroxide derivative may be comedogenic

RESULTS AND DISCUSSION

TALLOW

Tallow is extracted from animal fat by rendering animal carcasses and fat waste.[5] It has diverse uses, including for cooking oil, soap making, and biofuel production.[2] Tallow is composed mainly of saturated and unsaturated fatty acids, including oleic, palmitic, stearic, and linoleic acids. These can be externally applied to the skin, protecting it from water loss and helping to regenerate a damaged skin barrier.[2] Specifically, oleic acid is a penetration enhancer, while linoleic and linolenic acids have emollient properties.[5] Tallow is also rich in vitamins A, D, K, E, and B12, as well as antioxidants.[2] These vitamins provide the skin with necessary and healthy nutrients, while antioxidants are beneficial in preventing the aging process by reducing oxidative stress.[5] Overall, tallow has many valuable ingredients, showing promise in its ability to hydrate the skin.

Previous studies have investigated the use of tallow as a skin moisturizer. One study showed that herbal soap made with tallow was more efficacious than non-tallow-based soap for hydration and antimicrobial properties in wound healing.[2] Expanding on these findings, Kowalska et al found that tallow and walnut oil emulsions provided a natural barrier and improved skin hydration through a humectant mechanism in 78 patients with AD or psoriasis.[6] Other studies have also demonstrated that tallow has a positive effect on the skin barrier. Lee et al found that a mixture containing beef tallow, butter, and lard oil improved pruritus and skin barrier function in rats with AD. They also found a decrease in mast cells, neutrophils, and IgE levels in these rats.[7] These studies demonstrate tallow's potential

to hydrate, reduce inflammation, and provide anti-microbial properties when applied topically to the skin.

There is mixed data on the safety of using tallow on the skin. Some studies have shown that 70% concentrated tallow mixtures can be irritating and toxic in rabbits, guinea pigs, dogs, and rats, affecting the oral, skin, eye, and reproductive systems. However, the irritation diminished with the dilution of tallow products.[2] Overall, animal tallow displays potential therapeutic properties for the skin. However, patients should be aware of side effects, including the risk of possible irritation.

VEGETABLE SHORTENING

Vegetable shortening—best known by the brand name Crisco®—is commonly used in cooking and baking, particularly for frying or making pastries. However, it is also reported online to be helpful as a skin moisturizer. No formal studies have shown effectiveness, but some patients have reported benefits to skin hydration after incorporating shortening into their skincare routine.[8] Shortening acts as an occlusive agent, similar to silicones or cocoa butter.[9] This creates a hydrophobic barrier on the skin, reducing transepidermal water loss and increasing skin hydration.

Some dermatologists have recommended vegetable shortening as an alternative, low-cost option for treating AD alongside other moisturizers.[10] Johnson et al reported a case study in which Crisco® was used for symptomatic relief in vulvar skin atrophy secondary to glucocorticoid use. The vegetable shortening was applied to the vulvar area to lubricate it and prevent further irritation. The patient noted symptom relief with this regimen at her follow-up appointment, showcasing the success of using vegetable shortenings as an occlusive.[10]

Potential concerns about using vegetable shortening on the skin include cross-contamination if the same container is also used for other purposes, such as cooking, which could lead to bacterial infections. Therefore, it is essential to maintain sanitation. When used topically, vegetable oils do not penetrate the stratum corneum, leading to minimal systemic absorption.[11] Therefore, there is low concern that topical use of vegetable oils, including vegetable shortening, would contribute to systemic adverse effects. Overall, vegetable shortening may serve as an alternative moisturizer, but more studies are needed to formally assess its effectiveness and safety.

BEESWAX

Beeswax is formed from the wax-producing glands of worker bees.[12] It is used in soaps, cosmetics, and other household products. The wax is hydrophobic and full of alkanes, alkenes, free fatty acids, monoesters, diesters, and hydroxy-monoesters.[12] The hydrophobic composition allows it to function as an occlusive barrier on the skin, thus retaining moisture and decreasing transepidermal water loss while protecting the skin from external irritants. Beeswax is also a humectant, drawing water into the epidermis, and an emollient, smoothing the skin and improving its texture.[12]

A study on dental laboratory technicians compared barrier creams to beeswax for treating irritant dermatitis. It was found that 98% of patients who used beeswax moisturizer had a very good or good response to treatment. In the other barrier cream group, 77% had a very good or good response to treatment. The beeswax group also noted improved hand appearance with decreased scaling and fissuring.[12] This showed beeswax to be comparable to, or even superior to, other barrier creams in terms of consumer satisfaction. Park et al studied cera flava, a natural extract from beeswax, and its effect on topical use in mouse models with AD. They found a decrease in histamine, mast cells, and epidermal thickening in mice treated with cera flava for six weeks.[13] Histamine and mast cells are known to cause discomforting sensations, including itch and irritation. This study proposed that beeswax contains beneficial extracts for reducing these irritants, thus soothing inflamed and damaged skin.

There have been few reports of allergic reactions to products containing beeswax, which is generally considered the least allergenic bee product. Beeswax has also been shown to be non-comedogenic, making it safe for use on acne-prone skin.[12] Overall, beeswax has many beneficial properties that suggest its use as a topical moisturizer.

HONEY

Honey has been used for centuries in food and medicine and is known for its healing properties.[14] In history, Greeks and Egyptians would topically apply honey to treat burns or skin wounds.[14] Made up of simple sugars, honey acts as a humectant, using the sugar hydroxyl groups to attract water into the stratum corneum.[15] Fruit acids in honey provide an exfoliating effect, improving the skin's overall texture and smoothness.[16]

Numerous studies have investigated the effect of honey on dermatologic conditions. Naidoo et al examined manuka honey for prophylaxis against radiation-induced dermatitis in patients undergoing radiation treatment due to breast cancer. It was found that the manuka honey group had a lower incidence of dermatitis when compared to an aqueous cream group. Researchers proposed that the high amounts of antioxidants in the honey helped decrease inflammation.[17] These anti-inflammatory effects could be beneficial for daily use, providing a calming and soothing effect on the skin. *In vitro* studies have shown that honey can modulate the immune system, decreasing TNF-α, TGF-β, and other proteins related to inflammation.[14] These studies collectively support honey's ability to decrease inflammation and skin irritation.

Honey can be easily found in many stores, and its low cost makes it a more attainable option for many patients. However, honey is very sticky and tends to crystallize under certain conditions. This change in consistency can complicate product application and absorption.[15] Nonetheless, honey has been shown to reduce skin inflammation while increasing hydration, making it a plausible option as a skin moisturizer.

COLOSTRUM

Colostrum is the first milk produced by lactating mammals and is full of growth factors, hormones, immunoglobulins, cytokines, and enzymes.[18] It contains the protein lactoferrin, which has antibacterial, antiviral, and anti-inflammatory effects.[18] Colostrum also contains proline-rich polypeptides, which can improve the skin barrier's function.[18] With a favorable ingredient list, the connection between colostrum and skincare can be seen.

Previous research has studied the effects of colostrum on the skin. Kazimierska et al performed a randomized, placebo-controlled, double-blind study comparing sheep colostrum cream to a placebo cream in older women. After eight weeks of use, the experimental group showed increased skin hydration, skin elasticity, and decreased transepidermal water loss compared to the placebo group.[18] This showed colostrum's benefits not only for skin hydration but also for possible anti-aging effects. Another study explored the use of horse colostrum in treating AD. Seven patients used 20% horse colostrum cream for 30 days and were found to have increased skin softening and hydration, as well as decreased pruritus, compared to commonly available emulsions.[18] These studies show that colostrum may have hydrating, anti-aging, and soothing effects when used in skincare products.

No formal research has been conducted on the safety profile of topical colostrum. However, due to its previously identified dermatologic benefits, colostrum may become a potential intervention once a safety profile is investigated.

SNAIL MUCIN

Curiosity surrounding snail mucin has been around for centuries. Mucin is made by snails for microbial protection, adhesion, and lubrication.[19] Recently, snail mucins have been appearing in skincare products, with claims of anti-aging, anti-acne, and hydrating effects on the skin.[19] Snail mucin is composed of a unique combination of ingredients, including growth factors, antioxidants, hyaluronic acid, glycosaminoglycans, glycoproteins, lactic acid, and others.[20] The high amounts of hyaluronic acid in mucin give it humectant properties, contributing to its moisturizing effect.[20] Snail mucin is composed of many ingredients commonly used in skincare products, which may explain the growing interest surrounding it.

Studies have investigated the potential dermatologic benefits of snail mucin. The *Achatina fulica* snail species has been shown to inhibit the growth of *Staphylococcus aureus,* while *Helix aspera* has inhibited the growth of *Pseudomonas aeruginosa.*[20] These findings support the anti-bacterial claims of snail mucin. Mucin contains positively charged proteins and polyanionic glycosaminoglycans, which have been combined to form a wound adhesive. This adhesive has been shown to accelerate wound repair in diabetic and nondiabetic mice.[20] The anti-aging claims have also been studied. One study investigated the effects of 80% snail mucin when applied to the lateral epicanthal and left cheek twice daily for four weeks in 10 human subjects. Self-reported surveys showed changes in dermal density, elasticity, and wrinkles.[20]

With the increased interest in snail mucin, concerns about rising demand are developing. Harvesting snail mucin is a slow process, and acquiring it through the natural method does not cause harm or stress to snails.[20] Other methods, including low-voltage electrical stimulation, have been shown to increase the rate of mucin production but do cause stress to snails.[20] Thus, there are some ethical concerns regarding the selection process of mucin. Additionally, patients with seafood allergies are more likely to develop mucin irritation.[20] All users have a small risk of allergic contact dermatitis due to the proteins in snail mucin.[20] Despite safety and ethical concerns, the proven properties of snail mucin provide rationale for continued exploration of its use.

YOGURT

Yogurt is a fermented dairy product where milk is acidified through the addition of bacteria. The most common bacterial strains in yogurt are *Lactobacillus bulgaricus* and *Streptococcus thermophilus.*[21] Yogurt is a good source of nutrients, including calcium, phosphorus, vitamin A, vitamin B2, vitamin B12, and essential fatty acids.[21] The consumption of yogurt has been linked to positive health effects for various diseases, including osteoporosis, cardiovascular disease, and diabetes. Additionally, yogurt promotes gut health and can increase immune function.[21] Many of these health benefits arise because of the numerous probiotics in yogurt. Oral probiotics can help treat diverse pathologies, including some skin diseases. Although online discussions exist about using yogurt as a facial moisturizer, there has been little investigation into its direct topical use.

Like in the gut, the cutaneous microbiome is important in overall health and function, and dysbiosis of the cutaneous microbiome has been linked to different skin pathologies.[22] It is currently unclear how topical probiotics impact the skin. Researchers have hypothesized that probiotics may inhibit regulatory T cells and inflammatory cytokines, such as IL-10, thereby decreasing inflammation.[22] Lactobacilli in yogurt have been shown to have antibacterial activity against microbes such as *Enterococcus coli* and *Pseudomonas aeruginosa*, among others.[22] Di Marzio et al provided a cream containing *Streptococcus thermophilis* to patients with AD for two weeks. At the end of the study, they found an increased level of ceramides, a key protein that helps maintain the skin barrier, in the stratum corneum.[23,24] Another study investigating topical probiotics in patients with AD found that a 5% *Vitreoscilla filiformis* cream improved the skin overall compared to a standard cream.[24] These studies further support the potential of topical probiotics to help maintain a healthy skin barrier. However, there have not been formal therapeutic or safety studies on directly applying yogurt to the skin. Although yogurt contains many beneficial components, further research is needed to fully understand its role in skin moisturization.

EMU OIL

The emu is a bird species native to Australia and other countries, with many similarities to the ostrich.[25] In history, Native Aboriginal settlers in Australia would use emu oil for wound healing and musculoskeletal pathologies.[26] Emu oil is made by liquefying emu fat and is commercially available in the United States.[25] The oil is composed of omega fatty acids, oleic acid, linoleic acid, and saturated fatty acids.[25] Omega fatty acids and linolenic acid, a precursor of fatty acids, are thought to play a role in reducing inflammation.[25] The favorable chemical composition of emu oil raises further questions about its role as a possible skin moisturizer.

Zemtov et al investigated the efficacy of emu oil on healthy human subjects compared to mineral oil. Subjects used emu or mineral oil on their face and body for two weeks. At the end of the study, it was found that emu oil had both better penetration and moisturizing properties, as judged by the participants.[27] Although subjective, this data shows that emu oil is soothing to the skin and provides a hydrating sensation to consumers. Along with hydration, emu oil has been shown to increase epithelialization, granulation, and contraction when applied 48 hours after a wound is created in mouse models.[26] Overall, these studies suggest that emu oil has moisturizing and reparative effects on the skin.

The potential risk of emu oil has not been fully evaluated. Zemtov et al found that emu oil has low comedogenicity, making it safe for use in individuals with acne-prone skin.[27] While there have been no reports of adverse reactions to emu oil, further studies are needed to properly assess its safety.

VIRGIN COCONUT OIL

Coconut oil is derived from the kernel of mature coconuts. Tropical countries, such as Indonesia and the Philippines, are major producers of coconuts.[28] Specifically, virgin coconut oil is unbleached and unrefined, made by cold-pressing coconut meat.[28] The composition of the oil is rich in triglycerides and medium-chain fatty acids. The phenolic acids, including vanillic, ferulic, and caffeic acids, contribute to the anti-inflammatory, antibacterial, and wound-healing effects of coconut oil.[28] Further antibacterial effects are attributed to high amounts of monolaurin, a monoglyceride, present in coconut oil, which has strong antimicrobial properties against gram-positive bacteria, especially *Staphylococcus aureus*.[29] These findings showcase the potential of virgin coconut oil in the skincare industry.

Numerous studies have evaluated the use of coconut oil for dermatologic conditions. A randomized controlled trial of patients with AD investigated treatment with virgin coconut oil versus mineral oil. The virgin coconut oil group showed increased skin capacitance and decreased transepidermal water loss.[28] These findings suggest that coconut oil may have hydrating properties beneficial for the skin. Furthermore, studies have shown that rats treated with virgin coconut oil have a decrease in wound-healing time.[28] The available literature presents the mixed mechanisms of action of virgin coconut oil on the skin, promoting both hydration and barrier restoration.

The safety of coconut oil has also been investigated. Coconut oil is highly comedogenic, which can lead to clogged pores and worsened acne in some individuals.[28] Additionally, it solidifies at low temperatures, which can reduce its absorption into the skin if applied in this form.[28] There is a potential for allergic reactions to topical coconut oil, so consumers should be cautious.[28] There is encouraging evidence that supports using coconut oil on the skin. However, vigilance of side effects is necessary, particularly for acne-prone skin.

OLIVE OIL

Olive oil is produced from the fruit of olive trees. The fruit is traditionally ground and pressed in stone mills, creating oil commonly used in cooking.[28] The ancient Romans and Egyptians used olive oil in salves to treat wounds and as a cosmetic product. The ancient Greeks would put olive oil in their baths.[28] Olive oil has high amounts of polyunsaturated acids, monounsaturated fatty acids, saturated fatty acids, vitamin K, vitamin E, calcium, potassium, and iron.[28] It is therapeutic for pruritus, burns, AD, psoriasis, and seborrheic dermatitis.[28] With a wide range of established dermatologic uses mentioned above, research has dug deeper into olive oil's hydrating properties.

Specifically, there have been studies on the effect of topical olive oil on the skin's biophysical properties. Danby et al studied nineteen adults with no history of skin pathology who applied six drops of olive oil to one forearm twice a day for a total of 4 weeks. At the end of the study, there was a reduction in stratum corneum integrity and mild erythema to the application site.[30] In contrast, other researchers have found that olive oil is soothing to the skin. Reports have shown that olive oil is occlusive, creating a barrier on the skin against environmental irritants.[28] Triterpenes in olive oil have been shown to have anti-inflammatory components and have been found to accelerate wound healing by increasing collagen formation.[28] Given the inconsistency in research findings, no definitive conclusions can be drawn.

As with any topical agent, evaluation of its safety on the skin is critical. Researchers have found that olive oil may worsen AD, as it can disrupt the stratum corneum and allow allergens to penetrate more deeply into the skin.[31] Additionally, olive oil is comedogenic, which can increase the risk of clogged pores and lead to acne in some individuals.[28] Olive oil is highly susceptible to oxidation, which requires careful storage to maintain its quality.[28] Overall, the safety profile of olive oil is concerning, especially for those with sensitive or acne-prone skin.

SHEA BUTTER

Shea butter is a vegetable fat made from the kernels of shea trees, or *Vitellaria paradoxa,* commonly found in Africa.[32] It is often used as an alternative to cocoa butter and has also become a popular ingredient in cosmetics.[32] Shea butter is made of triglycerides along with oleic acid, stearic acid, linoleic acid, and palmitic fatty acids.[33] It is a good

source of vitamin E, mainly in the form of alpha-tocopherol, which has the highest antioxidant activity among all tocopherols.[32] These qualities have prompted growing interest in the dermatologic applications of shea butter.

Multiple researchers have further investigated the effects of shea butter. Hon et al found no statistical significance in the acceptability or efficacy of shea butter extract cream versus a ceramide cream in 34 patients with AD.[34] Similarly, a randomized controlled study on diaper dermatitis in infants performed by O'Connor et al found that diapers containing shea butter reduced erythema and provided similar protection to those made of petrolatum.[35] Shea butter is found in products that treat numerous skin disorders, including acne, psoriasis, and AD.[36] Evidence shows that it has similar protective effects on the skin barrier when compared to commonly used occlusives.

However, some research suggests that shea butter extracts may be comedogenic.[34] Thus, shea butter should be used cautiously as a moisturizer for individuals with acne-prone skin. In addition, although rare, contact allergies to shea butter have been reported.[35] These findings suggest that shea butter seems to be well tolerated, but can present some safety concerns in certain populations.

COCOA BUTTER

Cocoa butter is a vegetable fat derived from cocoa beans and harvested from the cocoa plant. The beans are roasted and pressed to extract the fat, creating cocoa butter.[37] Cocoa butter is rich in triglycerides and fatty acids, including alpha-linolenic acid, palmitoleic acid, and oleic acid, as well as vitamin E.[38] Cocoa butter has been used in medicine for centuries, and is commonly found in many topical skincare products today.

Despite this, there is little research on topical cocoa butter's use for dermatologic conditions. One study did show that topical cocoa butter combined with cumin, olive oil, tea tree oil, vitamin A, and vitamin B12 lead to improved Psoriasis Area and Severity Index (PASI) scores after twelve weeks of treatment in 12 patients.[39] It is postulated that like other vegetable oils, the unsaturated fatty acids present in cocoa butter activate PPARα, playing a role in improving skin barrier function.[40] Along with this, the lipophilic nature of cocoa butter functions as an occlusive agent, reducing transepidermal water loss and contributing to its moisturizing properties.[38,41] These characteristics suggest cocoa butter may play a meaningful role in supporting skin hydration, but further confirmatory studies must be done.

Cocoa butter is generally well tolerated. In a patch test study involving 21 participants, topical cocoa butter was found to be non-irritating.[42] However, it demonstrated comedogenicity when tested in mouse models.[43] Therefore, patients should use caution and remain mindful of possible adverse effects, especially if acne-prone.

OATMEAL

The use of oatmeal dates back to 2000 BC.[44] It was recognized in Roman times for its use as a skin cleanser and skin treatment.[44] Colloidal oatmeal is the powder formed after grinding the entire oat grain.[44] It is rich in proteins that promote hydration and act as emulsifiers.[36] Colloidal oatmeal is rich in polysaccharides, specifically high amounts of beta-glucan, which are immunomodulatory and decrease inflammation.[36] The rich lipids reduce the rate of transepidermal water loss and contain antioxidant enzymes.[36] Colloidal oatmeal is one ingredient on the FDA Skin Protectant Monograph, and any product containing it can claim to help reduce itch and irritation associated with eczema. Therefore, it can be found in many skincare products, highlighting the importance of understanding its properties and effects.[45]

Several researchers have investigated the use of colloidal oatmeal for dermatological purposes. Capone et al found that using 1% colloidal oat eczema cream for 14 days improved skin pH, barrier function, and hydration compared to standard eczema cream from baseline.[46] Moreover, Lisante et al found improvements in itch and a decrease in transepidermal water loss in patients with AD who were treated with 1% colloidal oatmeal cream.[47] Sobhan et al further extended these findings, noting a reduction in baseline eczema symptoms and an improvement in quality of life when patients with chronic hand dermatitis were treated with 1% colloidal oatmeal cream as an added therapy.[48] Together, these studies show the hydrating and soothing effects of colloidal oatmeal.

Further studies have been conducted to showcase the safety of colloidal oatmeal. It is well tolerated but can cause itching or burning in a small number of patients.[48] The low incidence of adverse events supports the safety of colloidal oatmeal. However, patients with sensitive skin should be mindful of the possibility of irritation.

JOJOBA OIL

Jojoba oil, made by smashing the bean of a jojoba plant shrub, has many applications, including liver function improvement, hair growth, and even weight loss.[28] Although commonly referred to as an oil, jojoba is actually a liquid wax composed of esters, free fatty acids, hydrocarbons, and alcohols.[28] Its composition provides the skin with lubrication without a sticky sensation.[49] Jojoba oil is known for its emollient properties, which increase the suppleness of the skin's surface, improving its appearance and texture.[49] The oil can also be hydrogenated, which increases penetration rate and provides an occlusive barrier.[49] These properties support jojoba oil as an effective option for moisturizing the skin.

Recent studies have highlighted the range of benefits jojoba oil provides to the skin. Miwa et al showed improvement in acne with the use of jojoba wax. They found that the liquid wax dissolves sebum deposits in hair follicles, thereby removing the blockage and decreasing the number of comedones.[28] Along with anti-acne effects, Misovich et al noted keratoplastic and keratolytic effects in patients with psoriasis treated with jojoba oil.[49] These keratolytic effects provide light exfoliation and are beneficial for treating excessive skin scaling in all patients, not just those with psoriasis. Further expanding on the wide range of jojoba oil properties, Habashy et al found that the oil is also anti-in-

flammatory, as it inhibits cyclooxygenase II and lipoxygenase enzymes, which are known to play a significant role in inflammation.[50] Together, these studies demonstrate jojoba oil's diverse range of effects on the skin.

There has been an investigation into the safety profile of jojoba oils. In rats, ingested jojoba oil showed no toxicity, but it did show reversible conjunctival irritation when applied to the eyes.[49] Patch testing has also been performed, showing no allergic reactions except in highly allergenic individuals.[49] Overall, jojoba oil has a wide range of dermatological effects with minimal and reversible adverse reactions.

AVOCADO OIL

Avocado oil is made from the pulp of the avocado fruit, grown on avocado trees in tropical climates.[51] It is commonly found in the food and skincare industry. The oil is rich in linoleic acid, linolenic acid, oleic acid, and vitamins A, C, D, and E.[33] Fatty acids and vitamin E have been used to repair skin damage caused by acne, eczema, and wounds.[51]

There have been many studies on the benefits of avocado oil. Supporting the claim that avocado oil improves wound healing, De Oliveira et al showed increased collagen synthesis and a decrease in inflammatory cells during wound healing in rats.[52] This study also showcases the potential for reducing inflammation, thus soothing and calming the skin barrier. Avocado oil has also been praised for its antibacterial activity. Ferreira et al found activity against *Staphylococcus epidermidis* and *Staphylococcus aureus*.[53] This same study found that avocado peels were rich in antioxidants, showing similar results to butylated hydroxytoluene, a commonly used synthetic antioxidant.[53] As mentioned previously, antioxidants help protect the skin from oxidation and aging. Collectively, these studies highlight the therapeutic potential of avocado oil as a skin moisturizer.

In addition to efficacy, the safety of avocado oil warrants careful examination. Stucker et al studied B12 and avocado oil cream for patients with psoriasis. They found these creams to be well-tolerated after 12 weeks of treatment.[54] Other studies agree with these conclusions, citing that avocado oil provides little irritation to the skin.[55] In rats, subcutaneous administration of avocado oil had no adverse events.[55] Both the efficacy and safety profile of avocado oil show promise for its use in the skincare industry.

GRAPESEED OIL

Grapeseed oil comes from the *Vitis vinifera* plant, which is found in the Mediterranean, Morocco, Portugal, Iran, and other countries.[56] The oil is a byproduct of the winemaking process and is extracted using cold-pressing or solvent extraction methods.[57] Although commonly used in cooking, grapeseed oil also has a place in personal care products. For example, it is often used as a main ingredient in aromatherapy oils.[56] The oil is full of phenolic compounds, vitamin E, and free fatty acids.[33] Large amounts of flavonoids, phenolic acid, and tannins give the oil rich antioxidant properties.[57] The ingredient profile of grapeseed oil exhibits helpful hydrating properties, deserving of exploration for potential use in skincare.

Studies on grapeseed oil have shown a variety of findings. Schliemann-Willers et al investigated the use of multiple oils in preventing irritant contact dermatitis caused by sodium lauryl sulfate. Grapeseed oil had significant protective effects. The researchers hypothesized that the high ratio of linoleic acid to oleic acid in the oil decreased disruption and disorganization of the stratum corneum, thus reducing transepidermal water loss and increasing hydration.[56] In addition to hydration, other research has shown that grapeseed oil benefits wound healing. Specifically, grapeseed proanthocyanidin extract has shown increased wound contraction, an increase in VEGF, and increased connective tissue deposition in rats.[33] The positive effects of wound healing show that grapeseed oil has potential for promoting skin integrity and barrier function.

Although dietary seed oils, including grapeseed oil, are sometimes believed to contribute to increase in systemic inflammation, topical grapeseed oil has demonstrated local protective effects on the skin. Currently, the dermal absorption of topical grapeseed oil is unknown.[58] Despite this, grapeseed oil has been approved for use in cosmetics, with low concerns of systemic toxicity, particularly due to its low concentrations in formulations.[58]

SUNFLOWER SEED OIL

Sunflower seed oil is derived from the seeds of *H. annuus* plants, which are found in the Southwest United States, and is commonly used in cooking.[56] It has high amounts of oleic and linoleic acids. Sunflower seed oil has been shown to have higher amounts of linoleic acid than olive oil.[33] High amounts of linoleic acid activate PPARα, which leads to keratinocyte proliferation and lipid synthesis, ultimately enhancing skin barrier homeostasis.[33] These findings have led researchers to explore sunflower seed oil for use as a moisturizer.

Research has indicated that sunflower seed oil may be equally as effective as traditional treatment options in AD. De Belilovsky et al studied 2% sunflower oil distillate versus hydrocortisone butyrate 0.1%, a steroid, in 40 children with AD. After three weeks of use, both treatment groups had an increase in quality of life score, with no significant difference between the groups.[59] Msika et al expanded on these findings. While investigating 2% sunflower oil distillate versus topical steroids in 86 children with AD, they found that topical steroids plus sunflower seed oil every other day were just as effective as daily steroid use.[56] These studies showcase sunflower seed oil's ability to improve skin barrier function, thus emphasizing its potential in skincare.

Along with its therapeutic properties, the safety of sunflower oil has been investigated. Danby et al found that sunflower oil, when applied to the forearm for four weeks, preserved the stratum corneum and did not cause erythema or irritation to healthy volunteers.[30] Other studies further demonstrate the safety of sunflower oils. Halsey et al found that sunflower oil is not allergenic to patients who have

anaphylactic responses to sunflower seeds.[60] As discussed above, it is debated that dietary seed oils lead to increased inflammation. Despite this, topical sunflower oil has demonstrated local anti-inflammatory effects on the skin. Further, its systemic absorption and metabolism after topical use is negligible, making it unlikely to influence systemic processes.[61] These studies suggest that sunflower seed oil is well-tolerated, but caution should still be exercised in high-risk groups, like those with sunflower seed allergies.

SQUALANE

Squalene is a natural compound found in humans, plants, and animals.[62] It was originally discovered in shark liver, but has also been found in many oils, including olive oil, palm oil, amaranth oil, and rice bran oil.[62,63] Squalene makes up 13% of the skin's naturally produced oil, known as sebum.[63] It has been shown to have antioxidant, emollient, wound-healing, and hydrating properties. Squalene is unstable. Therefore, it is hydrogenated to squalane in skincare products for increased stability.[64] These findings have prompted investigations into the efficacy of squalane as a skin moisturizer.

Numerous studies have been performed to explore these properties. Okuda et al studied the effect that multiple lipid supplements have on detergent-induced skin barrier dysfunction. They found that there was a decrease in transepidermal water loss after irritated skin was supplemented with topical squalene.[65] Another study showed that topical squalene application reduced erythema in male rats. The rat keratinocytes were cultured and found to have decreased amounts of superoxide. Researchers attributed the reduction in irritation to the decrease in oxidants.[63,66] Topical squalene and squalane have both demonstrated beneficial effects in studies, including reducing transepidermal water loss and skin irritation, supporting their role in skin moisturization. However, squalane is more frequently used in products due to its superior stability.

Squalane has demonstrated a favorable safety profile. It is non-comedogenic. However, some studies noted that squalane peroxide derivatives can be highly comedogenic.[67] Squalane is also non-irritating to the skin. Studies on rabbit skin and eyes showed no irritation, even at a 100% concentration.[68] The efficacy and safety profile of squalane shows potential for its use in skincare products.

CONCLUSION

This review evaluated the therapeutic mechanism, previous dermatological research, and safety of integrative skin moisturizers commonly found in households. Most studies report promising mechanisms of action for skincare products. Although these mechanisms differ slightly depending on the product, many ingredients have been shown to decrease transepidermal water loss, promote a healthy skin barrier, and provide the skin with the necessary nutrients. However, conclusions cannot yet be drawn as limited research on safety profiles exists. Future studies should investigate these products and their specific use as skin moisturizers in a wide range of skin types to accurately assess their clinical use. These studies could benefit consumers by increasing the diversity of skincare ingredients and offering easily accessible and affordable options.

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