



Review Article

“Beakers versus botanicals” – Analyzing the efficacy of homemade skincare in comparison to manufactured skincare products

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Received: 30 September 2023
Accepted: 25 October 2023
Published: 16 November 2023

DOI
10.25259/CSDM_202_2023

Quick Response Code:



ABSTRACT

In the age of urbanity where skin and hair portray one's confidence and health, it is of paramount importance to make the right choices when it comes to deciding skincare products that one should use. These days, pharmacies provide a vast array of solutions tailored to specific skin concerns, but naturopaths and practitioners of traditional skincare still admire homemade skincare remedies, frequently referred to as do-it-yourself skincare. The quest over efficacy versus sustainability is often a state of dilemma when choosing among these products. In this literature review, we will review the published articles to determine the effectiveness of both homemade skincare methods and the pharmaceutically manufactured skincare products used under dermatological surveillance, along with the comparison and benefits that they have on the skin.

Keywords: Skin care products, Homemade, Manufactured, Comparison, Efficacy, Side effects

INTRODUCTION

Do-it-yourself (DIY) skincare methods have gained popularity recently and are regarded as one of the greatest trends of the modern era. While we would consider this method of self-care to be novel, it actually has its roots starting in different countries, as in ancient Egypt, when Cleopatra, who is famed for taking donkey milk baths, first used it.^[1] A Greek doctor named Galen, who discovered “Galen's Wax”^[2] was well renowned for finding the recipe for cold cream by mixing beeswax and vegetable oil, which later on had a significant impact on improving the skin texture and reducing irritation of the skin. Advanced active ingredients such as Retinol and Vitamin C have substantial supportive evidence of reducing oxidative damage and fine lines on the skin,^[3] yet it is questionable why people prefer these DIY methods for their skincare instead of an established cure. The objective of this review is to identify DIY's impact on skincare, how effective they are compared to manufactured pharmaceutical products, and whether they have some detrimental effects despite being natural products. This literature review would be beneficial to everyone who has a passion for learning more about both of these methods and desiring enhanced skin, especially for people who are using or are going to choose a skincare method for themselves, as it provides pertinent information about certain products that are frequently used in the DIY routine and their related cautions, along with the relevant products manufactured pharmaceutically for their skin concerns.

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MATERIAL AND METHODS

Thirty-seven published articles from 2007 to 2023 were analyzed for this literature review using keywords such as “homemade skin care,” “manufactured skincare products,” “acne,” “side effects of skincare” from Google Scholar, PubMed, and various online articles sharing more information about DIY methods. Since we could not find pertinent information about the subject in the most recent papers, the search data were extended to more than 5 years’ worth of papers. Ingredients commonly used for homemade skincare, such as lemon, aloe vera gel, turmeric, egg white, and toothpaste, were mainly focused on in this review study. Using the data’s collected, the information revealed different reasons for people’s preferences on skincare methods, as well as the impact of both methods on the quality of their skin.

RESULTS

According to the published results, it was revealed that DIY products used substances that are readily available in the surroundings, making them easy and affordable, thus preferable. The ancient cultural norms, along with social media influences and less fear of chemicals causing damage to the skin, have also contributed to its significant uprising. Various known benefits of DIY skincare, such as the depigmentation effects of lemon in these preparations, have been contradicted by the more advanced side effects such as phytophotodermatitis and sunburn due to a change in pH of the skin and reactions with ultraviolet (UV) radiation. Aloe vera gel, which has antibacterial and anti-fungal properties along with the hydration it provides, also has unpleasant effects due to the presence of aloin, which mostly results from the compromised purity of the substance during manufacturing. Some techniques can never be better for the skin, such as over-exfoliating with sugar and applying toothpaste to acne, as they can deeply compromise the skin barrier, leading to scars, scabs, and inflammation. Egg white hair masks possess a moderate risk of salmonella contamination and were never proven to benefit the signs of aging when applied topically to the skin. Curcumin, one of the best substances in turmeric that fights inflammation, itself has counter effects when it comes to the purity of the substance, as it is regarded as one of the most adulterated substances available on the market today.

Why do people prefer DIY skincare

People who have the time and want to make their own beauty products can greatly profit from homemade cosmetics, which offer numerous advantages.

The most significant benefit they can offer is the affordability and simplicity of obtaining resources from your kitchen or garden. In addition, you have control over what product you

add and how much of it, which will significantly lower the likelihood that your skin may experience an unfavorable reaction.^[4] The much-increased prevalence of DIY skincare nowadays can be mainly attributed to social media platforms, given how much knowledge skin-care influencers freely share on social media.

Different types of DIY skincare and their effects

Lemon juice

Lemons are rich in antioxidants and Vitamin C and have shown effects on weight loss and the reduction of cardiovascular diseases. However, the most concerning part is a condition known as phytophotodermatitis, a skin condition caused by plants such as celery, parsley, and carrots, as well as citrus fruits.^[5] An inflammatory reaction can happen if the citrus chemical on the skin gets exposed to UV light, leading to inflammation, skin blistering, and burning. Sunburn cases have also been widely reported due to the use of lemon juice on the skin without caution in sunlight.^[5,6] It also changes the natural pH of our skin, leading to more damage to the skin barrier. Furocoumarins are naturally occurring substances in citrus fruits that can react when exposed to UV radiation, resulting in rashes, hyperpigmentation, melasma darkening, severe sunburns, and more.^[7] Data are available that suggests people who were exposed to a particular furocoumarin called psoralen, which is present in citrus fruits, had a higher risk of developing malignant melanoma.^[8,9]

Topical Vitamin C has an appealing appeal, but naturalists deem the easiest lemon home remedy can achieve the same effect on the skin. Vitamin C serums produced by pharmaceutical companies have a precise amount of L-ascorbic acid added to them, which can be used by people conveniently according to how much concentration of the product needs to be used, which definitely does not work in the case of the application of lemon juices.^[10] In addition, the active ingredients needed to make the product work efficiently will be best when it is stored in optimum conditions along with optimal preservation, which can be achieved through packaging and unattainable in-home DIY’s.^[10]

Aloe vera gel

The other wonder plant in our plain sight is aloe vera, known for its innumerable possibilities of improving both the skin and the health of the hair. Vitamins A, C, and E are the antioxidants primarily found in aloe vera, which is considered top-notch in the field of natural home remedies. From 1st and 2nd degree burn treatment to controlling dandruff and hair fall, aloe vera had a significantly positive impact on those who used it.^[11] It also has a moderate antiseptic property, protecting skin from bacteria and fungi.^[11,12] Yet, the topical or oral consumption of whole leaf extracts can cause some

adverse effects in humans if they are severely allergic to the plant family “Lilly.”^[12] Evidence of hives, diarrhea, and itching is found in people who have used aloe vera.^[12,13] After using aloe vera gel topically and orally, a male patient developed conditions such as widespread eczema and papular dermatitis.^[14] A 72-year-old woman’s eyes and legs developed pruriginous erythema after she applied her own homemade aloe vera leaf juice to the area.^[14,15] It is preferred to do a patch test before you apply aloe vera directly to your skin in a wholesome amount.

On the other hand, it has been demonstrated that pharmaceutical aloe vera gel can have certain undesirable side effects, primarily due to a purity compromise during manufacture. The anthraquinone-like aloin present in them can cause hypersensitivity reactions.^[16] Evidence suggests that the application of aloe vera gel topically can increase the absorption of hydrocortisone cream but shows delayed wound healing when applied post-surgically as compared to the others who have not applied the gel.^[17] However, the application of topical aloe vera gel was considered safe by the clinical studies.

Homemade exfoliants-face scrub

Homemade natural skin care products are a wide and varied range such as facial exfoliant scrubs, facemasks, anti-tanning, anti-aging remedies, and so on and so forth.^[18] Let us consider the case of DIY exfoliating scrubs, most of which are made with natural ingredients such as sugar and ground walnut shells.^[19] A major amount of research has shown significant damage to the skin barrier while using these substances in a harsh way, believing they might over exfoliate and do wonders for your skin. Data suggestive of skin abrasions, scabs, scars, and infections are reported if used often and non-judiciously.^[19,20] Recent advancements in the field of dermatology have shown up with soap-free face washes devoid of harsh chemicals, and the ones that contain alpha-hydroxy acids such as glycolic acid, lactic acid, and mandelic acid help in removing dead skin cells, providing exfoliation without causing physical trauma to your skin barrier, thus preserving them.^[20] Exfoliation in a mild manner is always preferable, but it will be best achieved with both physical and chemical exfoliations under the observation of a certified dermatologist.^[20]

Eggs

Eggs are the best-known ingredient in our old grandma’s kit of herbals. Rich in protein, they provide wonderful benefits when consumed orally. Yet, application to the skin surface has always been a debate. As every natural product gloats about how it promotes anti-aging, shrinks pores on the face, gives your hair a silky texture, and prevents hair fall, it also causes a disaster to the skin when applied directly. These

homemade products with eggs have no preservatives added to them, making them closer to heart for nature lovers, but in fact, they can be a hub for bacteria to survive, gaining easier access to your skin.^[21] Interestingly, studies have been updated on the matter of whether using raw eggs on the face for a long time can put a person at risk of bacterial infections such as *Salmonella* or *Campylobacter*, as they can be carriers and whoever encounters them has a moderate chance of getting infected.^[21,22] The albumin in the egg white has a sticky texture, when applied to the skin can have a sticky appearance, making a faux effect like it tightens the skin. This is the only scientific explanation of the youthfulness it provides.^[22] Egg white applied to hair can also make the hair very hard, exposing it to physical trauma during a difficult hair wash and leading to more breakages.

Toothpaste as acne medication

The home remedy followed, which is a complete “No-gainer,” is the use of toothpaste on acne. It does not entirely count into the section of homemade skincare ingredients but was easily accessible from our pantry, which is one of the qualities of it being involved in the study. It has been observed that using toothpaste to treat acne is a prevalent misunderstanding among people and has to be addressed before it causes additional skin problems.

Some toothpastes that contained triclosan (to kill acne-causing bacteria and fungi) as well as baking soda and alcohol (for a drying effect) were successful in treating individual pimples and, thus, have been a renowned home remedy for active acne.^[23] This bactericidal property of toothpaste has been falsely compared with the similar action of acne medications, leading to widespread use of this DIY, especially among the teenagers.^[24] Toothpaste contains a lot of strong chemicals that are meant to protect the enamel from carries and tartar deposits, and such a harsh composition of chemicals on the skin can cause redness, stinging, and inflammation, sometimes making the acne worse.^[25] After the application of toothpaste, evidence of contact dermatitis was found, along with skin burns and scars.^[26] Salicylate-containing face wash and primary treatment with topical retinoids and benzoyl peroxide have proven to be the gold standard in the management of acne.^[26,27] These treatments sometimes do not show the expected results in a very short time, making people switch gears to natural home remedies. Medications, especially the ones used for acne, take longer to show changes in the skin. Using retinoid acid might first show a flare-up of acne, which most people mistake for an allergy or the ineffectiveness of the medication; in fact, it is a natural process of the effectiveness of this medication by creating a “Retinoid flare” in the beginning, which gradually decreases the acne and brings back energetic skin.^[28]

Turmeric

Among the top ones when it comes to anti-inflammatory properties, turmeric is the go-to for DIY's. Strong antioxidant, antibacterial, and anti-inflammatory properties are shared by turmeric's active curcumin components.^[29] The combination of these qualities makes it an appealing option for use in cosmetics, such as a cream created especially for skin wound healing. Curcumin is being investigated as a potential anti-carcinogenic, anti-proliferative, anti-inflammatory, and chemopreventive drug by inhibiting or boosting these molecular targets.^[30] It has widely been accepted in dermatology to treat conditions such as skin cancer, psoriasis, acne, wound healing, and keloids with a remarkable effect.^[30,31] Evidence suggests that the use of organic turmeric, one plucked directly from the soil without any adulteration, is the most effective for its benefits.^[32] The ones sold in packets readily available in the store have a high chance of being adulterated. Due to their ability to resemble the unique yellow color of turmeric, synthetic dyes such as metanil yellow and lead chromate are also being scrutinized for counterfeiting.^[33] Bulletins issued also claim that adding certain colorants may be unsafe and that international regulatory bodies do not recognize these chemicals as acceptable food coloring agents.^[33] Turmeric, taken all together, has the best anti-inflammatory properties, but when taken orally, it can have some effects, like excessive curcumin, can cause kidney stones if one is genetically predisposed.^[34] Furthermore, the lesser bioavailability of curcumin can make it less effective, along with its breakdown by gastric acids when taken orally.^[32-34]

DISCUSSION

After an in-depth analysis of the published literature, we could find satisfactory evidence indicating the visible changes in hair and skin conditions while consumers were using manufactured pharmaceuticals. The effectiveness of any product, either natural or pharmaceutical, might drastically differ depending on the skin type of the user. Even when they might not experience any noticeable changes in their skin, naturopaths who desire a more sustainable environment continue to favor natural remedies. The changes to our skin can also be attributed to psychological factors, such as our belief that a product will always have a beneficial effect on our skin, which does not happen sometimes in real life. Most indicators of aging skin, including skin darkening, elasticity, radiance, smoothness, scaliness, and wrinkles, have been shown in trials to be improved by an encapsulated serum comprising Vitamins C, E, and raspberry leaf cell culture extract.^[35] *In vitro* research has clearly shown that Vitamin C lotion can suppress tyrosinase activity and lower melanin levels, and this has been supported by subsequent clinical studies.^[35,36]

Substituting lemon for Vitamin C to achieve the same purpose can result in adverse effects like phytophotodermatitis when the person is exposed to sunlight.

Despite this, some people prefer natural skincare methods since they are unsure of which pharmaceutical ingredients would work best for their skin and believe that herbal remedies will be less likely to create negative effects than pharmaceuticals. However, these pharmaceutical products are now created under tight safety restrictions, which appear to reduce the adverse effects and aforementioned problems. Some individuals favor both natural skincare products and pharmaceutical skincare items, which leads them to take a combination of methods for their skin. Aloe vera is one of the study's ingredients that are frequently used by even those who use pharmaceutical skincare products. A detailed analysis of people's reviews reveals that even though natural products have a low to moderate chance of being effective, they are still safe for the human body because they have been used since the days of our ancestors. Folklore, social media, as well as the rituals and customs that date back to ancient times, are the main sources of this hybrid mentality. There is no scientific evidence that lemon can brighten the skin and is an effective DIY for blemishes. Standard treatment for acne with topical retinoids and benzoyl peroxide has been stated to be the most effective, again backsliding the DIY game.^[37] Although manufactured products contain herbal extracts in some instances, DIY methods using the same material are not effective due to the improper mixing of components, not using a carrier oil, or not knowing the correct order of application of substances, which is less of a dilemma in a manufactured product, stating the superior efficacy of pharmaceutical products once again.

CONCLUSION

Our study from the review of published literature highlights the various DIY methods, the benefits they have, and the cautions to be followed. Most people preferred a self-made skincare treatment due to the easy availability of products, low cost, and following the cultural norms of ancient beauty secrets, which they found would be effective. Furthermore, improper adherence to cosmetic treatments has made people jump from one treatment to another without consistency, landing on DIY treatments. The ingredients in home-made skincare bear resemblance to the vitamins present in the beauty products manufactured, but the lack of preservatives and unknown quantity of effective ingredients applied to the skin may make them less potent. Common allergies are often avoided in medical-grade skincare products, which are also suitable for a range of skin types. The substances easily accessible at home, on the other hand, have not been clinically tested for topical usage, which could result in a rash or acne breakouts. However, the pros and cons of both methods are still a dilemma, and the only conclusion in the end is the decision of the person on how their skin should look. If they prefer to do their skincare in a natural way without sticking to the ideal potential, DIY will be the best, considering all the factors and side effects. If

they need a consistent and safer effect, supported by scientific evidence, pharmaceutical methods under the surveillance of a dermatologist will be the better choice.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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How to cite this article: Chettyparambil Lalchand T, Joseph J. “Beakers versus botanicals” – Analyzing the efficacy of homemade skincare in comparison to manufactured skincare products. CosmoDerma 2023;3:164.