wjpmr, 2025, 11(1), 338-344

SJIF Impact Factor: 6.842

WORLD JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.wjpmr.com

Review Article

ISSN 2455-3301

WJPMR

"REVIEW OF FORMULATION OF HERBAL SKINCARE CREAM"

Shubhangi Rashinkar*

India.

***Corresponding Author: Shubhangi Rashinkar**

India.

Article Received on 19/11/2024 **Article Revised on 09/12/2024** **Article Accepted on 29/12/2024**

ABSTRACT

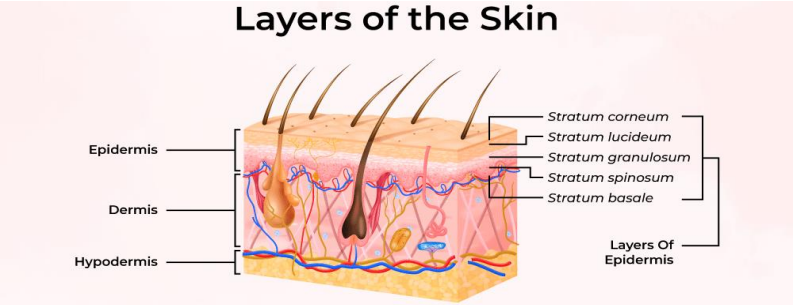
The human skin is the biggest organ in the body and is known to perform over 20 essential physiological tasks. Skin serves as a barrier that protects the body from pressure and harm. It also acts as a barrier to external environments including pollution, sunlight, radiation, harmful bacteria, and chemicals. Skincare products are pharmaceutical formulations that are ready to be applied to the body's exterior to protect the deteriorating skin and provide therapeutic topical effects. For millennia, people have been using herbal skincare treatments on a large scale for cosmetic purposes. These days, individuals are using more and more herbal skincare creams because of their changing perceptions and worries about synthetic or chemical ingredients that could have negative effects. Herbal components are commonly used in skincare creams due to their exceptional antioxidant, antibacterial, and tyrosinase-inhibitory qualities. The significance of the herbs for skincare creams that may be pharmacologically active is made clear by the research on these plants. Several instances of herbs that are being utilized and are now undergoing clinical investigations were identified in this review based on various skin disorders, such as acne, skin aging, and hyperpigmentation. The completion of this thorough work may help meet consumer demand.

KEYWORDS: Herbal, Acne, Hyperpigmentation, Skin Aging.

INTRODUCTION

A semi-solid emulsion with water and oil combinations that can be used to moisturize the skin on the face and other parts of the body is called a skincare cream. The human skin is the organ with the largest surface area. It is composed of two primary layers: the dermis, which contains different glands, blood vessels, and receptors, and the epidermis, which protects the body and keeps it from losing water.[1] The integrity of the skin can be damaged by many things, including as growing older, leading a stressful lifestyle, being in the sun, using the wrong cleansers for your skin, experiencing hormone fluctuations, and more. Because of this, a lot of people have moderate signs and symptoms of deteriorating skin, like wrinkles and dry skin. It takes regular skin care to avoid infections and inflammations such as ulcerations and acne vulgaris.[2,3]

In addition to improving the skin's ability to protect itself, good skincare practices have positive effects on our appearance. The global aging population and the cosmetic industry's aggressive marketing caused a boom in the demand for skincare products. It has also been proposed that skin health and beauty have a significant role in how well people evaluate their health.[4] Furthermore, the rate at which skin degeneration occurs may be accelerated by increasing exposure to UV light and environmental pollutants. Thus, finding novel and highly effective skincare products continues to be a profitable business. Skincare products typically have a localized effect on the area of our skin that is infected. Although the epidermis serves to block the entry of foreign elements, not all substances can pass through it.



What is Skin?
The skin is the outermost layer that covers the body's whole exterior. The skin is the source of numerous glands and structures. It controls body temperature and shields us from environmental factors and microorganisms.

The skin is one of our body's most active organs, carrying out a variety of functions beyond being just an only covering. It is a part of our body's integumentary systems. The hair follicles in it serve to secure the hair strands to the skin.

Layers of Skin
The structure of the human skin consists of **three layers:**
1. Epidermis
2. Dermis
3. Hypodermis

1. Epidermis
The skin's outermost layer is called the epidermis. The skin thickens and hardens in certain areas, such as the palms, soles, and particularly the heels. There are no blood vessels anywhere in it.

Our skin serves as a barrier against bacteria and other pathogens that may infect our inside organs. It produces fresh skin cells. It has melanin, which gives the skin its color.

The epidermis is sub-divided into the following layers:
- Basal cell layer
- Spinous cell layer
- Granular cell layer
- Stratum Corneum

Basal cell Layer
It is the epidermis' deepest layer and is made up of tiny, spherical cells known as basal cells. Here, active cell division constantly creates new cells, pushing older ones toward the skin's surface where they ultimately shed. The abundance of blood arteries in the basal cell layer encourages the active development of cells.

Spinous and Granular Layer
Older cells begin to change in size and shape as they are forced closer to the surface, forming the spinous layer, which is the next layer. There is a granular layer above this one. As the cells migrated away from the blood supply, they began to die, which is how keratin, a protein, formed.

Stratum Corneum
This is made up of the epidermis' outermost layer. Because the dead cells that make up the stratum corneum are hardened like an animal's horn, it is also known as the "horny layer." These cells give the skin its stiffness and are rich in keratin.

Epidermal Cells Types
The Epidermis cell contains 3 main cell types:
Keratinocytes
These are the primary cell types found in the basal layer of the epidermis. They secrete lipids to establish a water barrier and make keratin.

Melanocytes
The melanin pigment that these cells generate shields the skin from the sun's damaging rays. The basal layer is the habitat of melanocytes.

Langerhans:
These specialized cells serve as a defense against foreign particles and are a component of the immune system.

2. Dermis
The thick inner layer of connective tissue is called the dermis. It is both resilient and adaptable. In certain areas of our skin, such as the eyelids, the dermis is quite thin, whereas it is extremely thick on the palms and soles. Other structures, such as sweat glands, blood arteries, and sensory organs, are found in the skin's dermis layer.

The feelings of pressure, pain, and temperature are all sensed by additional receptors located in the deeper regions. Blood arteries in the dermis supply the epidermis with nutrients, maintaining the health of the skin's layers. Sweat is expelled through skin pores by dermal sweat glands. Consequently, controlling body temperature.

3. Hypodermis
The skin's deepest layer is called the hypodermis. When we fall, the muscles and bones are shielded from harm by the lipids in the hypodermis. It is composed of nerve cells, tissues, blood vessels, and subcutaneous fats.

The hypodermis's fat serves as a cushion or shock absorber, shielding the body's muscles from injury, heat, and cold. It is also crucial for controlling body temperature. As we age, the layer gets thinner. Certain drugs can also be injected into this layer.

Functions of Human Skin
Skin performs numerous vital roles, including the following:
1. Protection from microorganisms: The skin keeps pathogens out of our bodies and keeps illnesses at bay.
2. Prevents dehydration: Water loss is decreased by thick skin, which hence prevents dehydration.
3. Sensation: Pain, touch, pressure, heat, and other senses are all sensed by our skin.
4. Temperature regulation: In cold weather and hot weather, the skin stops heat loss.
5. Storage: The major cells of the skin contain a layer of fat that serves as the skin's reserve nourishment.
6. Excretion: The skin helps the body expel minerals, water, and, to a very small degree, urea. We cannot see the skin as an excretory organ because sweating from the skin is primarily used to regulate body temperature.

7. Vitamin D Synthesis: When exposed to sunshine, vitamin D can be synthesized by the skin. Its mechanism is still unclear, and this is a modest function. Excessive exposure to sunlight can result in tanning and other negative consequences, such as skin cancer.[5]

MOA of Cream

Topical skincare solutions need to be able to pass through the stratum corneum and reach below because the majority of their target sites are found in the lower layers of skin. The hydrophilic nature of the remaining layers of the epidermis further complicates this. Because of this, if a material is very lipophilic, it may stay at the stratum corneum and not be able to penetrate the skin's deeper layers.[6] Drug molecules can potentially penetrate the skin through hair follicles, which naturally create a gap at the stratum corneum layer.

The follicular route was not previously thought to be the primary absorption mechanism for transdermal medications because of its small surface area on the skin.

However, more recent research is currently being done to examine the importance and possibilities of this pathway.[7]

The consistency of the epidermal barrier, the substance's polarity and molecular weight, and the temperature at the penetration site are the main variables influencing the substance's penetration. The transdermal route of medication penetration is further enhanced by increased skin moisture from perspiration or increased humidity.[8] The application of permeation enhancers may compromise the integrity of the skin barrier or cause the skin to become more hydrated, which would boost transdermal absorption.[6,9]

Natural Ingredients In Skincare Products

Skincare products are pharmaceutical preparations to be applied topically to the body's exterior surfaces to exhibit positive topical effects and defense against aging skin diseases.[10] For thousands of years, skin care has been achieved through natural component mixtures. Clinical investigations have revealed herbal ingredients' anti-inflammatory, anti-allergy, moisturizing, pro-collagen, anti-aging, anti-hyperpigmentation, wound-healing, and free radical scavenging properties.[11] When compared to a placebo, the majority of the herb-based lotions showed better therapeutic efficacy. These preparations are becoming more and more common in modern formulations as a result of consumers' worries about artificial components and chemical compounds such as alcohol, sodium lauryl sulfate (SLS), paraben, and sulfide. Customers also choose natural or herbal items over synthetic ones because of the long history of community use of herbs without significant harmful consequences.

Skin-lightening creams are among the most popular skincare items. Natural skin-lightening treatments derived from plant extracts are safer, more effective, less expensive, and more effective than chemical agents like hydroquinone and mercury, which can have unfavorable side effects.[12] Since mercury can be absorbed through unbroken skin, it may have negative effects resulting in adverse systemic consequences. The adverse effects of mercury on brain and kidney functioning have been thoroughly documented in earlier research.[13,14]

Natural skin care products provide nutrients that are necessary for healthy skin, which improves skin tone, texture, and look. Moreover, it has been discovered that phytochemicals hinder or stop the physiological processes that cause several common skin disorders, such as acne, hyperpigmentation, and aging of the skin.

Due to many related qualities, including antioxidant capacity, pigmentation inhibition, and antibacterial activity, these herbal extracts are mostly used in skincare formulations. These features can also be helpful for the prevention and attenuation of certain skin disorders.[10,15]

Nonetheless, very few creams on the market today are made with organic, natural, protected, and herbal components. The majority of creams on the market today include a base made up of synthetic polymers, thickeners, emulsifiers, pigments, surfactants, and fragrance ingredients. The need to replace these harmful synthetic chemicals with natural alternatives is great and essential.

Pharmacological herbs with potential for action in skincare products

To better understand the potential benefits of herbs for skin care, we have determined and concentrated on three major skin conditions that the general population faces:

1. Skin aging
2. Acne
3. Hyperpigmentation

1. Skin Aging

As time goes on, the telltale indications of aging become more apparent. One of the earliest signs of the aging process is a change in the texture and look of the skin. A mix of endogenous (genetic changes, cellular metabolism, and hormonal environment) and exogenous (chemicals, poisons, pollution, UV radiation, and ionizing radiation) variables leads to aging. For instance, UV light increases the elastin gene's transcriptional activity by fourfold, increasing the elastin promoter activity, while decreasing the expression of fibrillin-1, increasing the elasticity of the elastic fibers.[18]

These aging processes are associated with phenotypic changes in cutaneous cells as well as systematic and functional changes in the extracellular matrix components—collagen, elastin, and proteoglycans, for example—that are necessary to give the skin the bare minimum of elasticity, strength, and moisture.[19]

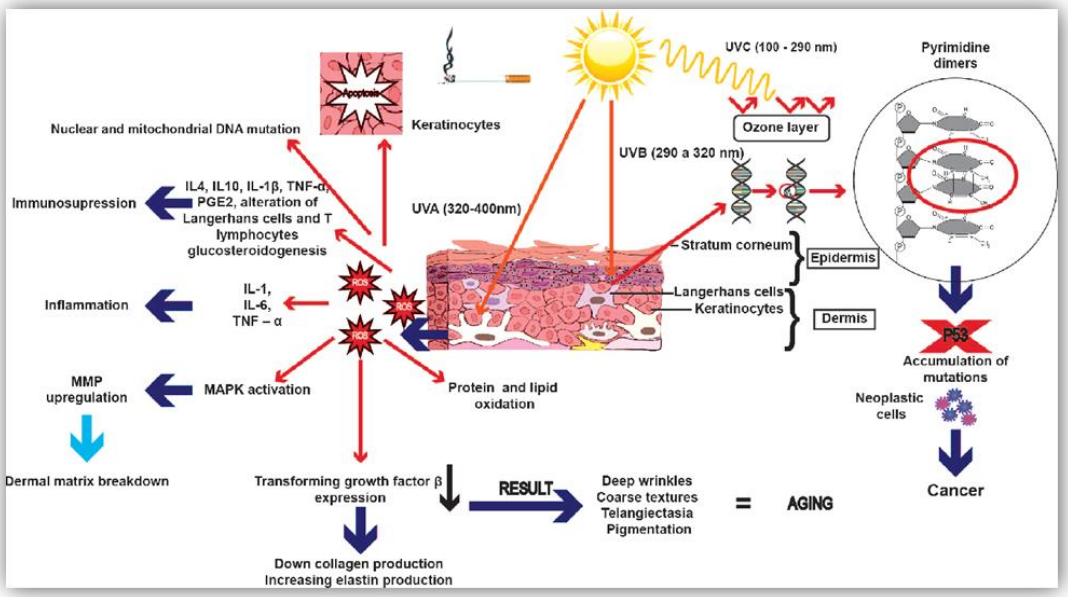


Fig. 1: Skin Aging Process.

One way to fight against aging and wrinkles is to lower the activity of enzymes such as collagenase, hyaluronidase, or elastase. A few naturally occurring photo-protective substances can also help in reducing the effects of radiation, which would slow down the aging process. Numerous studies have successfully generated creams containing plant extracts that have been shown to have anti-aging properties.[18,19]

2. Acne

One of the most prevalent skin conditions is acne, which is strongly correlated with many variables such as hormone levels, sebum excretion, bacterial infection, and inflammatory responses. Follicle obstruction, hyperkeratinization, keratin plug formation, and sebum production are the main causes of acne. One common form of aerotolerant, anaerobic, Gram-positive bacteria found in the cutaneous flora is Propionibacterium acnes. It can proliferate in the context of increased sebum production, which triggers complement activation and the release of metabolic byproducts, proteases, and neutrophil-attracting chemotactic factors. It can also infiltrate the pilosebaceous unit by exploiting lipid-rich sebum as a nutrition source.[20] Pilosebaceous unit contents leak into the surrounding dermis when comedones burst, causing inflammatory acne vulgaris lesions such as cysts, nodules, papules, and pustules to appear. Another possible cause of acne is a fungal infection of the skin.[21]

3. Hyperpigmentation

The pigment molecule called melanin is what gives skin its color. Through a complicated process known as melanogenesis, melanocytes create melanin, which shields the tissues and organs from infections and outside forces like UV radiation. However, hyperpigmentation only happens when too much melanin is made. Therefore, regulating melanin production is crucial for treating illnesses associated with pigmentation.[19]

Tyrosinase is an enzyme that is essential to melanogenesis because it converts L-dopa into melanin through tyrosinase activity. This process, which controls the rate at which melanin is produced, is rate-limiting. Skin-whitening effects can be produced by phytochemicals that inhibit tyrosinase, hence lowering the rate of melanin synthesis.[17]

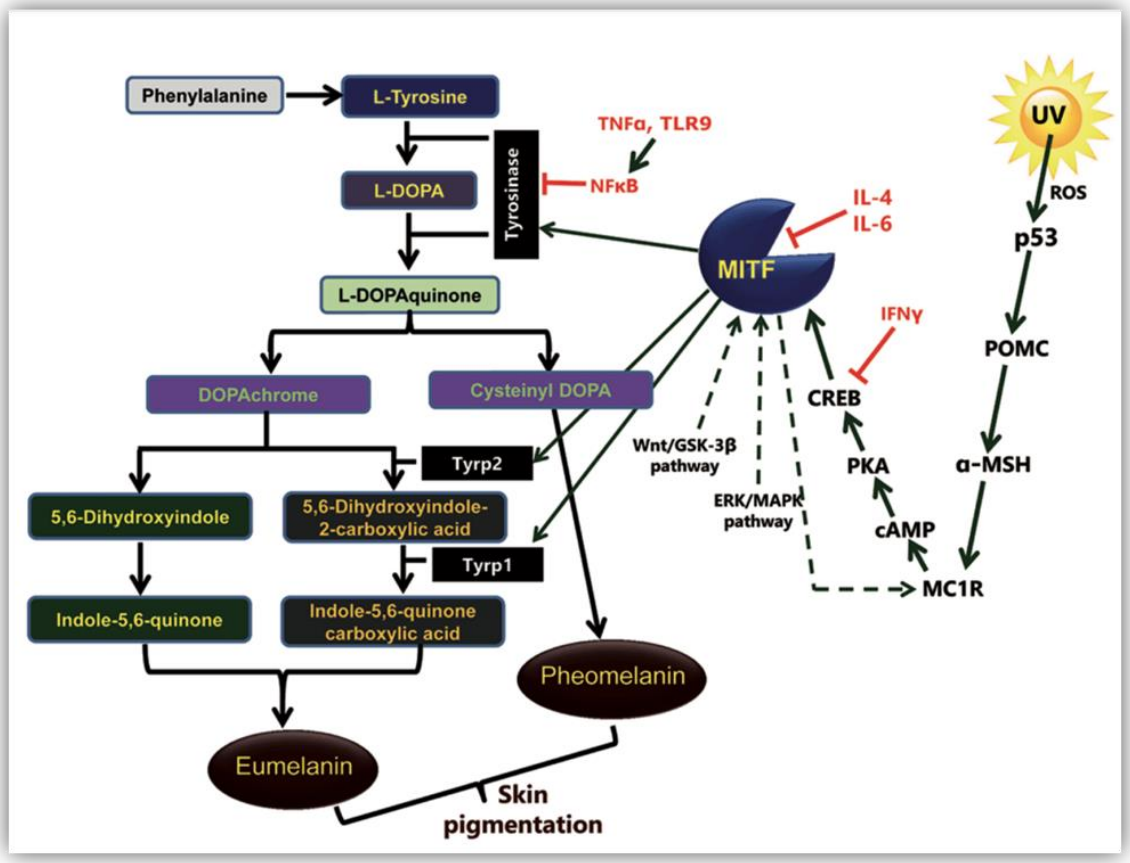


Fig. 2: Mechanism of hyperpigmentation.

Herbal products with clinical trial evidence

1. Pigmentation Control / Skin Whitening

In the past, whitening products including hydroquinone and mercury were frequently used to treat melasma and hyperpigmentation. On the other hand, they have negative effects on human health, including ochronosis, renal impairment, and contact dermatitis. Thus, researchers focused a great deal of study on the creation of herbal face creams with anti-tyrosinase and whitening properties. Mexameter was used to determine the amount of melanin in the skin and track any improvement in skin tone following the administration of herbal cream.[22]

2. Anti-aging / Anti-wrinkles

Several topical herbal creams have been the subject of randomized controlled trials (RCT) on human volunteers to determine their efficacy in reducing wrinkles. The skin roughness (Rt), maximum roughness (Rm), average roughness (Rz), smoothness depth (Rp), and arithmetic average roughness (Ra) are the five wrinkle metrics that are typically used to analyze skin wrinkles.[23] A product that is sold in the UK and includes numerous functional peptides and plant extracts with anti-aging qualities (Panax ginseng, Morus alba, Lupinus alba, and Medicago sativa) was tested on people who had wrinkles on their faces.[24]

3. Anti-acne

All of the herbal cream formulations that were evaluated worked well to relieve acne by reducing comedones and accelerating the skin's healing process.

Three of the nine formulations that were assessed contained tea oil. Topical tea tree oil gel, which contained 5% of the oil, showed outstanding efficacy in treating acne when compared to a placebo, but it also showed a slower onset when compared to traditional treatment (5% benzoyl peroxide lotion).[25,26]

Advantages of herbal skin care creams

- **Safe**
  Herbal creams are natural and do not contain harmful synthetic chemicals. Herbal skincare products are nowadays more preferred and chosen by people because of their fewer side effects and cost-effectiveness. (27,28) Herbal creams are made from natural ingredients and are hypoallergenic, so they are less likely to cause side effects like rashes, allergies, or skin irritation.
- **Anti-aging**
  Herbal creams can help delay the signs of aging, such as sagging skin, wrinkles, and age spots.
- **Antioxidant**
  Herbal creams contain antioxidants that can help protect the skin from free radicals, which are linked to aging.

- **Skin-friendly**
  Herbal creams can help reduce skin damage and dryness, and are suitable for all skin types.
- **Environmentally friendly**
  Herbal creams are more environmentally responsible than synthetic beauty products.
- **Effective**
  Herbal creams are more effective than other products because they are made with pure ingredients and penetrate deep into the skin.
- **Natural**
  Herbal creams are natural and do not contain harmful synthetic chemicals.

Herbal skincare products are nowadays more preferred and chosen by people because of their fewer side effects and cost-effectiveness.[27,28]

Because herbal cosmetic creams contain a variety of phytochemicals that function in concert, they are typically more bearable and have numerous positive effects on the skin. The cost of the finished product will also be lower if the herb's source is widely available.

Limitations of Herbal skin care creams

- **Skin irritation**: Even natural ingredients can cause skin irritation, redness, and discomfort.
- **Contact dermatitis**: Herbal extracts and essential oils can trigger contact dermatitis.[29]
- **Limited bioavailability**: Natural antioxidants are prone to degradation and have low absorption.[30]
- **Sensitivity to light and heat**: Polyphenols in herbs are sensitive to light and heat, which limits their use in cosmetics.
- **Adverse effects**: Antioxidants in cosmetics can cause skin and eye irritation, acute toxicity, skin sensitization, and photosensitization.
- **Inconsistent quality**: It can be difficult to find high-quality raw materials in large quantities.[31]
- **Inconsistent potency**: Raw materials from different locations and climates can have different herbal potencies.
- **Ineffective treatment**: Some natural skincare products may not be as effective as synthetic products for treating certain conditions.

CONCLUSION

High-quality skincare products are becoming more and more in demand. Even if there weren't many drawbacks found, the benefits and features of herbal skin care creams outweighed those made of chemicals.

Furthermore, there is now more interest in natural and herbal skincare products due to their potential benefits for anti-aging, whitening, and acne treatment, as well as the growing number of reports of negative side effects from synthetic components in skincare products. The advantages of specific bioactive phytochemicals have been studied for a long time, and this review found that a wide range of natural ingredients have been used to create cream formulations. Many of these combinations, though, were never tested in clinical settings. This could be brought on by the resource-intensive nature of clinical studies and the lax laws governing cosmetics. To protect the interests and well-being of consumers, proper clinical trials are essential.

REFERENCES

1. Venus, M., Waterman, J., and McNab, I. Basic physiology of the skin. Surgery (Oxford), 2011; 29(10): 471–474.
2. Holloway, S., and Jones, V. The importance of skincare and assessment. British Journal of Nursing, 2005; 14(22): 1172–1176.
3. Farage, M. A., Miller, K. W., Elsner, P., and Maibach, H. I. Intrinsic and extrinsic factors in skin aging: A review. International Journal of Cosmetic Science, 2008; 30(2): 87–95.
4. Ganceviciene, R., Liakou, A. I., Theodoridis, A., Makrantonaki, E., and Zouboulis, C. C. Skin anti-aging strategies. Dermato-Endocrinology, 2012; 4(3).
5. https://www.geeksforgeeks.org/human-skin-structure-function/
6. Bolzinger, M.-A., Briançon, S., Pelletier, J., and Chevalier, Y. Penetration of drugs through the skin, a complex rate-controlling membrane. Current Opinion in Colloid & Interface Science, 2012; 17(3): 156– 165.
7. Mohd, F., Todo, H., Yoshimoto, M., Yusuf, E., and Sugibayashi, K. Contribution of the hair follicular pathway to total skin permeation of topically applied and exposed chemicals. Pharmaceutics, 2016.
8. Poet, T. S., and McDougal, J. N. Skin absorption and human risk assessment. Chemico Biological Interactions, 2002; 140(1): 19–34.
9. Sinha, V. R., and Pal Kaur, M. Permeation enhancers for transdermal drug delivery. Drug Development and Industrial Pharmacy, 2000; 26(11): 1131–1140.
10. Ribeiro, A. S., Estanqueiro, M., Oliveira, M. B., and Lobo, J. M. S. Main benefits and applicability of plant extracts in skin care products. Cosmetics, 2015; 2(2): 48–65.
11. Charles Dorni, A. I., Amalraj, A., Gopi, S., Varma, K., and Anjana, S. N. Novel cosmeceuticals from plants—An industry guided review. Journal of Applied Research on Medicinal and Aromatic Plants, 2017; 7: 1–26.
12. Shalini, B. ., Jennifer, C., Stephie, C. M., and Abhishri, S. B. A review on skin whitening property of plant extracts. International Journal of Pharma and Bio Sciences, 2012; 3(4): 332–347.
13. Silberberg, I., Prutkin, L., and Leider, M. Electron Microscopic Studies of Transepidermal Absorption of Mercury. Archives of Environmental Health, 1969; 19(1): 7–14.
14. Kern, F., Roberts, N., Ostlere, L., Langtry, J., and Staughton, R. C. D. Ammoniated mercury ointment

as a cause of peripheral neuropathy. Dermatology, 1991; 183(4): 280–282.
15. Fowler, J. F., Woolery-Lloyd, H., Waldorf, H., and Saini, R. Innovations in natural ingredients and their use in skin care. Journal of Drugs in Dermatology, 2010; 9(6).
16. Pillaiyar, T., Namasivayam, V., Manickam, M., and Jung, S. H. Inhibitors of Melanogenesis: An Updated Review. Journal of Medicinal Chemistry, 2018; 61(17): 7395–7418.
17. Leyden, J., and Wallo, W. The mechanism of action and clinical benefits of soy for the treatment of hyperpigmentation. International Journal of Dermatology, 2011; 50(4): 470–477.
18. Makrantonaki, E., and Zouboulis, C. C. Molecular mechanisms of skin aging: State of the art. Annals of the New York Academy of Sciences, 2007; 1119(1): 40–50.
19. Mora Huertas, A. C., Schmelzer, C. E. H., Hoehenwarter, W., Heyroth, F., and Heinz, A. Molecular-level insights into aging processes of skin elastin. Biochimie, 2016; 128–129: 163–173.
20. Brown, S. K., and Shalita, A. R. Acne vulgaris. Lancet, 1998; 351(9119): 1871–1876.
21. Suva, M. A., Patel, A. M., and Sharma, N. A Brief Review on Acne Vulgaris: Pathogenesis, Diagnosis and Treatment A Brief Review on Acne Vulgaris: Pathogenesis, Diagnosis and Treatment. Research & Reviews: Journal of Pharmacology, 2014; 4(3): 0–12.
22. Mauricio, T., Karmon, Y., and Khaiat, A. A randomized and placebo-controlled study to compare the skin-lightening efficacy and safety of lignin peroxidase cream vs. 2% hydroquinone cream. Journal of Cosmetic Dermatology, 2011; 10(4): 253–259.
23. Im, A. R., Nam, J., Ji, K. Y., Cha, S., Yoon, J., Seo, Y. K., Chae, S., and Kim, J. Y. Wrinkle reduction using a topical herbal cream in subjects classified by Sasang constitutional medicine as Soyang type: A randomized double-blind placebo-controlled study. European Journal of Integrative Medicine, 2020; 35.
24. Watson, R. E. B., Ogden, S., Cotterell, L. F., Bowden, J. J., Bastrilles, J. Y., Long, S. P., and Griffiths, C. E. M. A cosmetic 'anti-aging' product improves photoaged skin: A double-blind, randomized controlled trial. British Journal of Dermatology, 2009.
25. Bassett, I. B., Barnetson, R. S. C., and Pannowitz, D. L. A comparative study of tea-tree oil versus benzoyl peroxide in the treatment of acne. Medical Journal of Australia, 1990; 153(8): 455–458.
26. Enshaieh, S., Jooya, A., Siadat, A. H., and Iraji, F. (2007) The efficacy of 5% topical tea tree oil gel in mild to moderate acne vulgaris: A randomized, double-blind placebo-controlled study. Indian Journal of Dermatology, Venereology, and Leprology.
27. Mukherjee P.K., Maity N., Nema N.K., Sarkar B.K. Bioactive compounds from natural resources against skin aging. Phytomedicine, 2011; 19(1): 64–73.
28. Raghu Rai Sharma, Aakash Deep , and Sheikh Tasduq Abdullah Herbal products as skincare therapeutic agents against ultraviolet radiation-induced skin disorders
29. https://www.orogoldcosmetics.com/the-pros-and-cons-of-natural-skincare/#:~:text=However%2C%20don't%20automatically%20assume,with%20any%20of%20the%20downsides.
30. Natural Antioxidants from Plant Extracts in Skincare Cosmetics: Recent Applications, Challenges and Perspectives by Hien Thi Hoang 1, Ju-Young Moon 2,* and young-Chul Lee 1,3, https://doi.org/10.3390/cosmetics8040106.
31. https://www.foodresearchlab.com/blog/nutraceutical-product/prospective-issues-and-solutions-in-herbal-cosmetic-formulations/#:~:text=Only%20a%20few%20natural%20preservatives,a%20short%20period%20of%20time.