



IJPPR

INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals

ISSN 2349-7203



Human Journals

Review Article

November 2023 Vol.:28, Issue:4

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A Review on Innovative Concept of Cosmeceuticals



IJPPR
INTERNATIONAL JOURNAL OF PHARMACY & PHARMACEUTICAL RESEARCH
An official Publication of Human Journals



ISSN 2349-7203

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Submitted: 22 October 2023
Accepted: 27 October 2023
Published: 30 November 2023

Keywords: Cosmeceuticals, cosmetics chemistry, Skin Cosmeceuticals, Skin cosmeceuticals classification, Sunscreens

ABSTRACT

'Cosmeceuticals', which is the fastest growing segment of the natural personal care industry. Cosmeceuticals are the future generation of skin care. They are the advances made within the world of dermatological products and the new backbone in skincare. All cosmeceuticals claim to contain functional ingredients with either therapeutic, disease-fighting or healing properties. The term Cosmeceutical was coined by Raymond Reed but the concept was further popularized by Dr. Albert Kligman in the late 1970's. Cosmeceuticals are topically applied as cosmetic-pharmaceutical hybrids, intended to enhance beauty through ingredients that provide additional health-related functions or benefit. That means they are applied topically as cosmetics, but contain ingredients that influence the skin's biological function. Today's Cosmeceuticals are serving as a bridge between personal care products and pharmaceuticals; also Cosmeceuticals are the fastest-growing segment in skin care market. This review paper is to give knowledge about the Innovative concept of cosmetic industry-Cosmeceuticals.



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INTRODUCTION:-

Cosmeceuticals are future generation of skin care. They are the advances made within the world of dermatological products and the new backbone in skincare. Cosmeceuticals are typically cosmetic-pharmaceutical hybrids intended to enhance the health and beauty of skin. Some cosmeceuticals are naturally derived while others are synthetic, but all contain functional ingredients with either therapeutic, disease-fighting or healing properties. Raymond Reed, Founder of U.S. Society of cosmetic chemist, created the concept of “cosmeceutical” which was popularized by American dermatologist. Albert Kligman in the late 1970’s.(1)Cosmeceuticals are intended to carry out their functions as protection, whitening, tanning, anti-wrinkling, deodorants, antiaging, and nail and hair care. Cosmeceuticals may, however, cause some unwanted problems. The common ones are irritability to the skin, contact dermatitis, photosensitivity, comedogenicity, hair and nail damage, hyper- or hypopigmentation, infectivity, carcinogenicity, and even systemic adverse effects. The research and development of cosmeceuticals, especially the composite active ingredients, should be based on their clarified sources, structures, interactive mechanisms with the skin, and, most importantly, their efficacy and safety on the targeted components of skin. Here we review some of the cosmeceuticals with different categories of functions, with special focuses on their biologically active ingredients.(2)

CLASSIFICATION OF COSMECEUTICALS:

The term Cosmeceuticals can be used with different terms. For all the terms the definition remains the same i.e. Cosmeceuticals formulations which are neither pure cosmetics, like lipsticks, nor pure drug, like corticosteroids. It is a hybrid category of products lying on the spectrum between drugs and cosmetics. The various terms by which Cosmeceuticals can be substituted are active cosmetics, nutricosmetics, performance cosmetics, functional cosmetics, and dermaceuticals. Cosmeceuticals basically can be classified into following categories:

- 1) Skin cosmeceutical product- Antiaging creams, Moisturizers, Facial products and Lotions.
- 2) Hair cosmeceutical product- Gel and creams, Hair colorants and Dyes, Shampoos, Growth Stimulators and Conditioners.
- 3) Others- Lipstick, Nail polish, Toothpaste and Powders.(3)

EFFICACY OF COSMECEUTICALS

The term 'cosmeceutical' has been heavily criticized because it connotes that rigorous efficacy studies have been done as it would be for pharmaceuticals. Veterinary cosmeceuticals are virtually all sold as animal treats, probably to avoid rigorous requirements for proof of efficacy. Various studies on cosmeceutical peptides have not demonstrated clinically significant differences from placebo. Botanical cosmeceuticals are probably at a similar level of development with oral herbal remedies. Extensive studies in animals have demonstrated effects like anti-inflammatory, anti-tumorigenic, anti-microbial, antiperoxidation and free radical scavenging activities in a wide range of models using mice, rats and guinea pigs (Thornfeldt, 2005). Most have neither undergone phase 2 or 3 clinical trials nor randomized studies and their efficacy remain unproven. The so called better cosmeceuticals have fared worse on rigorous testing.(4)

This innovative reference highlights the uses of delivery systems in cosmetics, analyzing new approaches for obtaining sophisticated cosmetic products and examining the most common methods for enhancing the skin's penetration properties. More and more developments in delivery systems are being integrated to optimize the efficacy and cost-effectiveness of the therapy. In cosmetics, the main concern is to reach cutaneous cell while limiting the passage into the blood circulation.

The objectives of topical therapy can therefore be classified into two major areas:

1. To modulate or assist the barrier function of the skin.
2. To administer an active ingredient to one or more skin layers or compartments while minimizing systemic involvement.(5)

SKINCARE COSMECEUTICALS

Cosmetics and skin care products are the part of everyday grooming. Protecting and preserving the skin is essential to good health. Our skin, the largest organ in the body, separates, and protects the internal environment from the external one. Environmental elements, air pollution, exposure to solar radiation as well as normal aging process cause cumulative damage to building blocks of skin – DNA, collagen, and cell membranes. Use of cosmetics or beauty products will not cause the skin to change or heal; these products are just meant to cover and beautify.

Cosmeceuticals being cosmetic products having medicinal or drug-like benefits are able to affect the biological functioning of skin owing to the type of functional ingredients they contain. There are skin-care products that go beyond coloring and adorning the skin. These products improve the functioning/texture of the skin by encouraging collagen growth by combating harmful effects of free radicals, thus maintaining keratin structure in good condition and making the skin healthier. OLAY vitamin line, which includes vitamins A, C, D, E, selenium, and lycopene, pycnogenol plus zinc and copper, is a well-known skin care line¹².⁽⁶⁾

SUNSCREEN AGENTS

Use of sunscreen agents and limiting the exposure to sun prevent early wrinkling and skin cancer. Sunscreen agents are used to prevent sunburns. Regular use of an effective sunscreen is the single most important step to maintain healthy, youthful-looking skin. Mainly, it is the effect of ultraviolet (UV) light from the sun that causes most of the visible effects of aging of the skin. Types of sun screen agents: There are two kinds of sunscreen agents:

- Chemical sunscreen agent
- Physical sunscreen agent.⁽⁷⁾

SKIN LIGHTENING AGENTS

The most commonly used pigment lightening agent is hydroquinone, which works by inhibiting tyrosinase activity. Tyrosinase is the rate-limiting, essential enzyme in the biosynthesis of melanin. It is available both in over-the-counter and in prescription strengths, and it is often combined with other agents such as retinol, AHAs, vitamin C, and topical steroids. Side effects include an irritant contact dermatitis and, more rarely, exogenous ochronosis. Glabridin is the main active ingredient in licorice extract and can inhibit tyrosinase activity. In addition, glabridin has anti-inflammatory properties attributed to cyclooxygenase inhibition. Ellagic acid is a polyphenol widely found in plants such as pomegranates, which inhibits tyrosinase by chelating copper at the active center of this enzyme.⁽⁸⁾

It may selectively inhibit melanin synthesis only in UV-activated melanocytes. Fatty acids such as linoleic acid act by tyrosinase degradation without toxic effects on melanocytes. Many of the cosmeceuticals already described also have pigment-lightening effects. Vitamins

C and E decrease tyrosinase activity. Pycnogenol decreases UV-induced pigmentation. Niacinamide (B3) inhibits the transfer of melanosomes to epidermal keratinocytes. Finally, the 2 serine protease inhibitors found in soy, BBI and STI, can reduce melanin transfer.

MOISTURIZERS

Moisturizers incorporated with emollients help smoothen age lines, brighten and tone skin surface by filling space between the non-living outer layer of the skin and lubricating while promoting the retention of moisture in these layers. Ingredients such as black cohosh, soy extract and vitamins A, and E found in healthy remedies balancing lotion for menopausal women help in diminishing the appearance of fine lines and wrinkles while uplifting the neck area and promoting moisture retention. Stratum corneum is the primary barrier of the skin whose main purpose is to keep inside in and outside out. This barrier is rich in cholesterol, free fatty acids, and cetramides. Many oily preparations have been used to maintain the fluidity of the skin (Mineral oil, Lanolin, Cyclomethicone, etc.). Water from the stratum corneum gets evaporated very quickly leading to dehydration. This dehydration of skin can be averted by using moisturizers which provide flexibility to the skin. When moisturizers are applied to the skin, a thin film of humectants is formed which retains moisture and imparts better appearance to the skin. Cetramide-containing moisturizers are very popular as these contain the same balance of lipids as our skin. Fluocinolide containing cetramides formulation has been found to reduce eczema.⁽⁹⁾ Moisturizers restore water content to the epidermis and provide a soothing protective film. They improve the appearance and tackle properties of dry and aging skin, restore the normal barrier function of the skin, and reduce the release of inflammatory cytokines. Moisturizers comprise an important therapeutic component in the management of various skin conditions (e.g. eczema, psoriasis, pruritus, and aged skin).

Common Ingredients Used In Skin Care Cosmetics

Hydroxy Acid

Hydroxy acids also referred to as fruit acids are a common ingredient found in many cosmeceutical products. Examples include citric acid, malic acid, and lactic acid. It improves the skin texture and reduces the signs of aging by promoting cell seeding in the outer layers of the epidermis and by restoring hydration.

Ferulic Acid

This compound, which is derived from plants, is considered to be a potent antioxidant and has been shown to provide photoprotection to skin. Depigmenting Agent: Skin-lightening agents. Common Depigmenting ingredients include hydroquinone, ascorbic acid (vitamin C), kojic acid, and licorice extract (glabridin). Hydroquinone: Hydroquinone is the skin lighting agent, conc. between 1.5% and 2%. The study based on animal model utilizing long-term exposure at high dosages at carcinogenic.

Boswellic Acid

It is obtained from *Boswellia serrata*. The main function is to inhibit the enzymes responsible for Inflammation (5-lipoxygenase) and damage of the skin.²⁹ Tetrahydrocurcuminoids It is obtained from white (colour free) curcuminoids of turmeric (*curcuma longa*) carnosic acid, cosmarinic acid, ursolic acid from rosemary extract *Rosemarinus officinalis* as antioxidants are the other compounds which are used to facilitate the tissue damage and restoring the healthy status of skin.

Retinoids

A great amount of research has concentrated on its use as an antiaging compound as well as its use for other cutaneous disorders. Vitamin A and its derivatives have 2 main functions: they act as antioxidants, and they activate specific genes and proteins. Structural changes underlying the cosmetic benefits include correction of epidermal atrophy, deposition of new collagen, generation of new vessels, and enhancement of mitogenesis. This enhanced mitogenesis promotes the shedding of melanin-laden keratinocytes, resulting in bleaching and subsequent depigmentation. (10) The ability of topical tretinoin to improve the appearance of aged and photo-damaged skin by reducing wrinkles, decreasing laxity, bleaching hyperpigmented spots, and bringing about a smoother surface have been well studied and documented.

Antioxidants

In addition to these external insults like UV radiation, drugs, air pollutants, and heat and/or cold, the skin also has to cope with endogenous mitogens, most importantly reactive oxygen species (ROS) and other free radicals. These species are continuously produced during

physiological cellular metabolism. To counteract the harmful effects of ROS, the skin is equipped with an antioxidant system to maintain equilibrium between the pro-oxidants, or damaging agents, and the antioxidants, or protective agents; these antioxidants intervene at different levels in the protective process. Here some of the antioxidants are listed below,

Vitamin C

Vitamin C is necessary for the hydroxylation of procollagen, proline, and lysine. Vitamin C improves and normalizes the changes caused by photo damage. Vitamin C has been used effectively to stimulate collagen repair, thus diminishing some of the effects of photoaging on skin. However, vitamin C is easily degraded by heat and light, which along with its high acidity, presents certain challenges for use in a multipurpose skin care formulation.⁽¹¹⁾ A recently introduced synthetic collagen fraction offers greater stability and compatibility, along with improved efficacy.

Vitamin E

Vitamin E (alpha-tocopherol) is the major lipophilic antioxidant in plasma, membranes, and tissues. The term vitamin E collectively refers to 30 naturally occurring molecules, all of which exhibit vitamin E activity. Its major role is generally considered to be the arrest of chain propagation in lipid peroxidation by scavenging lipid peroxyl radicals, hence protecting the cell membrane from destruction.⁽¹²⁾ Vitamin E topically applied before UV irradiation has been shown to reduce erythema, edema, sunburn cells, immune suppression caused by sunlight, and DNA adduct formation.

Lipoic acid

Lipoic acid is a unique free radical protector. It is fat and water soluble. Once lipoic acid crosses the cell membrane, it is broken down into dihydro lipoic acid, which is also an antioxidant. Alpha lipoic acid also recycles other key antioxidants, such as vitamin C.

Niacinamide

Niacinamide is stable in the presence of oxygen, acid, and high temperatures, and it is inexpensive to formulate. Most of its known effects are the result of increased epidermal turnover and exfoliation.

Dimethylaminoethanol

Topical preparations containing dimethylamino ethanol (DMAE) have been touted for their ability to improve skin firmness and lift sagging skin. DMAE is able to diminish the cross-linking of proteins that occurs during aging, probably acting as a free radical scavenger.(13)

HAIR COSMECEUTICAL

The appearance of the hair is a feature of the body over which humans, unlike all other land mammals, have direct control. One can modify the length; color and style of hair according to how one wish to appear. Hair care, color, and style play an important role in people's physical appearance and self-perception. Among the earliest forms of hair cosmetic procedures in ancient Egypt were hair setting by the use of mud and hair coloring with henna. In ancient Greece and Rome, countless ointments and tonics were recommended for the beautification of the hair, as well as remedies for the treatment of scalp diseases. A hair cosmeceutical product includes -conditioning agents, special care ingredients, and hair growth stimulants. Conditioning agents are intended to impart softness and gloss, to reduce fly away and to enhance disentangling facility.(14) A number of ingredients may be used, mostly fatty ingredients, hydrolyzed proteins, quaternized cationic derivatives, cationic polymers, and silicones.

Hair cosmetics can be categorized into two,

- Exocuticle (shampoo, conditioners, serums, hair sprays, waxes)
- Cortex (hair colour, bleaching agent, straightening agent and perming agent)

Shampooing is the most frequent from hair treatment. Current shampoo formulations contain ingredients that can treat specific problems. The extract of yarrow has been used to treat oily hair. Extract contains less than 0.5% by weight of polyphenolic derivative. Spironolactone is an aldosterone antagonist that works by stopping the binding of natural androgens to receptors.(15)

OTHER COSMECEUTICALS

The skin beneath the eye lacks subcutaneous fat and has virtually no oil glands. This delicate skin needs protection and plenty of moisture to replenish and repair, which helps to reduce the signs of premature aging. As the skin ages, it becomes thinner, drier, and rougher. Over-

exposure to the elements and to environmental pollution aggravates this condition. Many topical skin-soothing products intervene in this process, but products for this area need to be particularly gentle and specially formulated with ingredients that work from the inside out by interacting with the cells under the skin's surface - without irritating the eyes. There are numerous cosmeceutical eye creams that nourish the skin with natural emollients and beneficial nutrients. The other functional ingredients include butcher's broom, chamomile, and vitamin E, antioxidants -vitamins A, C and E, green tea and tiare flower, Ginkgo biloba and also cucumber, calendula and a-bisabolol, an active constituent of chamomile, to calm irritate skin. (16)

NEED FOR COSMECEUTICALS

Now a day it's not just the interest of people but certainly has become the need of the people to maintain a youthful & healthy appearance. Ultimately as the population in the world of the median age increases there is a rise in the demand of the cosmeceuticals. Over 560 million people in India are in the age group of 18-35 years. As median age increases, the market is going to boom, especially growing number of women in the workforce feeling the hassle to maintain a youthful and vibrant appearance. This resulted into a rapid growth of cosmeceuticals in the natural personal care industry.

As there is constant growth in the global market, a lot of money is playing in hands of people at the same time, there is increase in the population with higher qualification and knowledge thus this class of population has become more beauty-conscious and thus is spending a high amount of their earning in maintaining a youthful appearance i.e. in cosmeceuticals.(17)

Thus, cosmeceuticals market has become one of the fastest growing markets throughout the globe. Development in technology and the invention of new ingredients has further contributed to the progress in the commercialization of cosmeceuticals products worldwide.

FUTURE PROSPECTS

By the addition of small amount of cosmeceutical agents to the cosmetic formulations do not require medical regulations and it would improve the production of Cosmeceuticals that could help to improve the skin, nail, and body mass growth. Cosmeceuticals are not drugs but are claimed to have drug-like effects. In future, more effective formulations containing herbal component may come in trend. The addition of herbal extracts for therapeutic use requires

better understanding of the herbal potential. The present trend towards herbal cosmetics with effective therapeutic property will continue and may be some newer herbs will also be placed in cosmetics world. In coming future, the regulatory authorities will need to frame some laws concerned with safety, efficacy and quality assessment of these newer herbal cosmeceuticals.

The great demand of cosmeceuticals has led to development of products to counteract the signs of aging skin, to decrease erythema, and even tone out and pigmentation. These cosmeceuticals can help protect the skin from photo damage and in some ways repair it through stimulation of new collagen production.(18)

Further research in wound healing and biotechnology will serve to expand this field. In conclusion, Cosmeceuticals are not only the external beautification but also it improves the internal beauty through the health-related function.

CONCLUSION

Natural products are not synonymous with safety, and indeed, being the opposite of synthetically produced products, they may have a greater variability in content. Pure chemical compounding can significantly minimize contamination, whereas making products from natural sources can never totally have batch-to-batch consistency, and biological additives can cause problems for the patient. The future promises increasingly sophisticated formulations for cosmetics and skin-care products. Cosmetic companies are finding ways to deliver small-dose ingredients that do not require medical regulations and to introduce steroids and hormones into lip balms, which would result in the production of cosmeceuticals that could help to improve body mass, nail, and hair growth. New challenges will also be presented to government regulatory agencies as more chemicals with true biological activity are invented and tested. Biotechnology will also compete directly with the pharmaceuticals and cosmetic business. One can easily conclude that cosmeceuticals will continue to evolve in parallel with advances in our understanding of skin biology, along with improved methods of measuring the benefits that may be provided by well-engineered skin care products. But we have to consider the changes in the science and technology, so clinicians, scientists and dermatologists have to update their knowledge in this field to produce high quality products with safety.

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