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COSMECEUTICALS: ENHANCE THE HEALTH & BEAUTY OF THE SKIN

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ABSTRACT

Acosmeceuticals is an ingredient with medicinal properties thatmanifests beneficial topical actions and provides protection againstdegenerative skin conditions.Like cosmetics, Cosmeceuticals are topicallyapplied, but they contain ingredients that influence the biologicalfunction of the skin. Cosmeceuticals improve appearance bydelivering nutrients necessary for healthy skin. Cosmeceuticalstypically claim to improve skin tone, texture, and radiance, whilereducing wrinkling.A product can be a drug, a cosmetic, or a combinationof both, but the term "Cosmeceuticals" has no meaning under the law".So the term Cosmeceuticals is not recognized by the Federal Food,Drug, and Cosmetic Act. Although cosmetics and Cosmeceuticals are tested for safety, testing to determine whether beneficial ingredients actually live up to a manufacturer's claims is not mandatory.

Keywords: Cosmeceuticals, skin tone, cosmetics, appearance etc.

INTRODUCTION

Cosmeceuticals are cosmetic products with biologically active ingredients purporting to have medical or drug-like benefits. A Cosmeceuticals is an ingredient with medicinal properties thatmanifests beneficial topical actions and provides protection againstdegenerative skin conditions. The word "Cosmeceuticals" waspopularized by Albert M. Kligman in the late 1970s. It encompassescosmetic actives with therapeutic, disease fighting, or healingproperties, serving as a bridge between personal care products and pharmaceuticals. Like cosmetics, cosmeceuticals are topicallyapplied, but they contain ingredients that influence the biologicalfunction of the skin. Cosmeceuticals improve appearance bydelivering nutrients necessary for healthy skin. Cosmeceuticalstypically claim to improve

skin tone, texture, and radiance, whilereducing wrinkling. Cosmeceuticals are the fastest-growing segment of the natural personal care industry [1]. Consumers are always interested in maintaining a youthful appearance, and as the global population's median age increases, this market is increasingly expanding. According to the United States Food and Drug Administration (FDA), the Food, Drugs, andCosmetics Act; A product can be a drug, a cosmetic, or a combinationof both, but the term "Cosmeceuticals" has no meaning under the law".So the term Cosmeceuticals is not recognized by the Federal Food,Drug, and Cosmetic Act. Although cosmetics and Cosmeceuticals are tested for safety, testing to determine whether beneficial ingredients actually live up to a manufacturer's claims is not mandatory. In general, vitamins, herbs, various oils, and botanical extracts may be used in cosmeceuticals, but the manufacturer may not claim that these products penetrate beyond the skin's surface layers or thatthey have drug like or therapeutic effects[2]. Cosmeceuticals improve appearance, but they do so by delivering nutrients necessary for healthy skin. Desirable features of cosmeceutical agents are efficacy, safety, formulation stability, novelty, and patent protection, metabolism within skin and inexpensive Manufacture [3].

SKIN CARE 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. UV radiations from sunlight penetrate the skin and accelerated damage due to free radicals, which includes inflammation, wrinkling andhyper pigmentation. Due to prolonged exposure to UV radiation the collagen and elastin fibers of the skin are broken down by enzymes collagenase and elastate and texture of skin deteriorates. Collagen and elastin are responsible for maintaining the elasticity and integrity ofthe skin. Several plant extracts and anti oxidants obtained from natural sources are able to prevent the aging and also improving the appearance of the skin[4].

Cosmeceuticals being cosmetic products having medicinal or drug-like benefits are able to affect the biological functioning of skin owing to 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. The most important botanicals pertaining to dermatologic uses,

such as Cosmeceuticals, include teas, soy, pomegranate, date, grape seed, Pycnogenol, horse chestnut, German chamomile, curcuma, comfrey, allantoin, and aloe; only green and black tea, soy, Pomegranate, and date have been studied to the extent that clinical trials for the treatment of parameters of extrinsic aging have been published.[5].

The following ingredients are most commonly used Cosmeceuticals, some of them listed below,

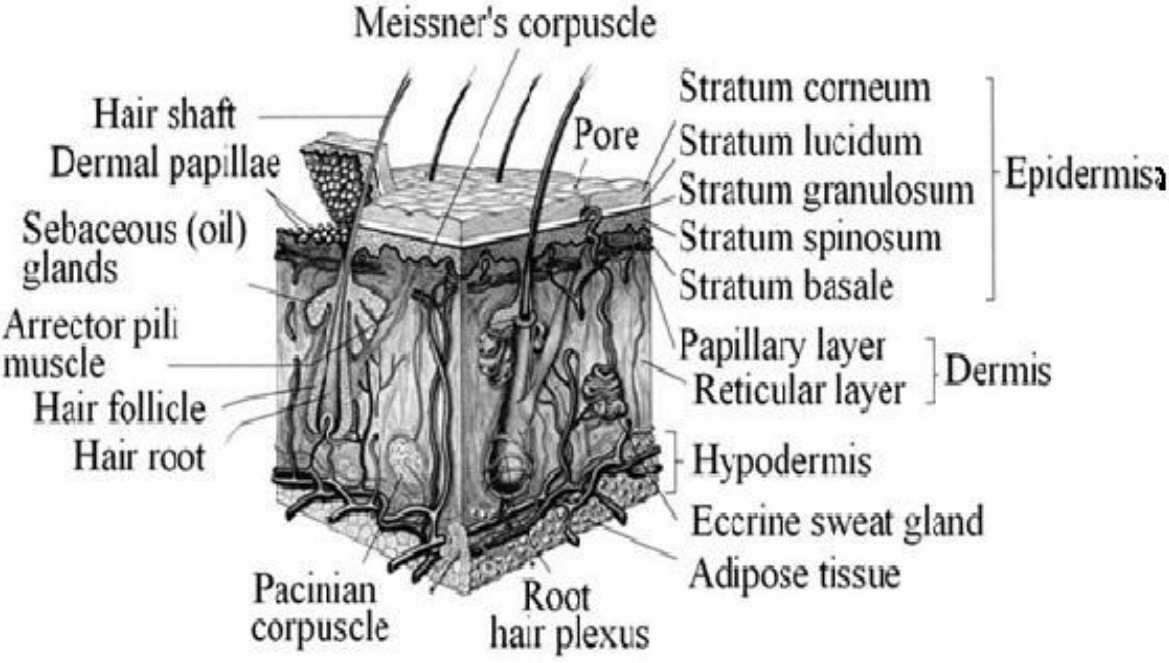

Fig. 1: Structure of the skin

Skin Lightening Agents

Hyperpigmentation is the changing of colour intensity of the skin todarker hue, which is due to an increased amount of melanin in theepidermis, the dermis, or both. This change can be due to 2pathophysiologic processes: melanocytosis (increased number ofmelanocytes) and melanosis (increased amount of melanin). Skinlightening agents work best when melanosis or melanocytosis isconfined to the epidermis. Patients with Fitzpatrick skin types I-IIIhave advantage over type- IV such as type I-III benefit from local pigment lightening for the treatment of hormonally induced melasma and postinflammatory hyperpigmentation caused by acne and trauma, whereas those with Fitzpatrick skin types IV and darkermay also seek therapy for pigmentary changes that occur around theeyes, in the intertriginous areas, following dermatitis, or with acneand trauma33. Standard dermatologic agent for skin

lighteningis hydroquinone but its safety is questionable, leading to the use ofalternative agents such as retinoids, mequinol, azelaic acid, arbutin,kojic acid, aleosin, licorice extract, ascorbic acid, soy proteins,and N -acetyl glucosamine[6].

Sunscreen Agents

Use of sunscreen agents and limiting the exposure to sun prevents early wrinkling and skin cancer. Sunscreen agents are used to prevent sunburns. There are two kinds of sunscreen agents: chemical and physical. Chemical sunscreen agents protect the skin from the sun by absorbing the ultraviolet (UV) and visible sun rays, while physical sunscreen agents reflect, scatter, absorb, or block the rays. Sunscreen agents often may comprise more than one ingredient. For example, products may contain an ingredient that provides protection against the ultraviolet A (UVA) sun rays and anotheringredient that protects from the ultraviolet B (UVB) sun rays, which are more likely to cause sunburns than the UVA sun rays.

Ideally, coverage should include protection against both UVA and UVB sun rays. The sun protection factor (SPF) that is present on the label of these products reflects the minimum amount of UVB sunlight that is needed with that product to produce redness on sunscreenprotected skin as compared with unprotected skin. Sunscreen products with high SPFs provide more protection against the sun. The following sunscreen agents have been recommended by the U.S. Department of Health :

• Cycloform (isobutyl p-amino benzoate)
• Propylene glycol p-amino benzoate
• Monoglyceryl p-amino benzoate
• Digalloyltrioleate
• Benzyl salicylate and benzyl cinnamate (2% each)

Besides these, chemical sunscreens mainly based on para-amino benzoic acid, its deivatives, cinnamates, various salicylates and benzophenones, dibenzoylmethanes, anthraline derivatives,octocrylene and homosalate are frequently employed as sun blocking agents. Direct physical blockers include metal containing compounds such as iron, zinc, titanium, and bismuth. Zinc oxide and titanium dioxide are highly reflective white powders, but submicron zinc oxide or titaniumdioxide powder particles transmit visible light while retaining their UV blocking properties, thus rendering the sun block invisible on the skin.

Other commercially available sunscreens are Benzophenone-8, Neo Heliopan MA and BB, Parsol MCX and HS, Escalol 557, 587, and 597[7].

Moisturizing Agents

Stratum corneum is the primary barrier of the skin whose one of main purpose is to keep inside in & outside out. This barrier is rich in cholesterol, free fatty acids, and ceramides. Many oilypreparations 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 whichprovide flexibility to the skin. Humectants are cardinal ingredients of the moisturizing formulations.

Humectants also help in preventing drying out of the formulations. When moisturizers are applied to the skin, a thin film of humectants is formed which retains moisture and imparts better appearance to the skin. Bio-mimetic lipid containing formulations facilitate in normalizing the damaged skin. Water can cause the excretion of cytokines when applied to the skin for a prolonged period of time. This may further lead to edema, vasodilatation, and inflammation gets induced. Moisturizers by hydrating the skin, make the stratum corneum softer & can even alter physiology of skin. Ceramidecontaining moisturizers are very popular as these contain the samebalance of lipids as our skin. There are nine different types of Ceramide in the stratum corneum named as Ceramide 1- 9. They constitute 40-50% of the lipids in this outermost layer. It has beenproven that these substances help to treat eczema, and can even be used for dry skin. Fluocinolide containing ceramides formulation has been found to reduce eczema [8]. Besides these, black cohosh, soy extract, and vitamins A and E also help in augmenting the skin's natural moisture balance. Complex mixture of hyaluronic acid and a revival complex containing green tea leaf extract, and glutathione are also promising moisturizingagents [7].

Bleaching agents

Bleaching agents are used for bleaching/fading the various marks and act to block the formation of the skin pigment melanin. Hydroquinone is the most commonly used agent for ‘bleaching’ brown marks, liver spots, melasma, etc. Kojic acid, extracted from mushrooms, is a slightly less effective agent, either may be compounded with tretinoin or topical steroids, α and β -hydroxy acids [9] .As with any bleaching agent,aggressive exfoliation, and sun

protection are necessary for good results. A synthetic detergent bar was developed containing hydroquinone as a skin-bleaching agent. The bar is maintained at about a pH of between 4 and 7 and includes a compressed mixture of a synthetic anionic detergent, hydroquinone, a stabilizer for hydroquinone, water, a buffer which maintains the pH of the bar and excipients such as waxes, paraffin, dextrin, and starch[10] . Similarly, a skin bleaching preparation comprising hydroquinone, tertiary butyl hydroquinone, and optionally an additional stabilizer and can additionally contain a buffer to maintain the pH between about 3.5 and 7.5.Because of the maintenance of low pH and the presence of a stabilizer, hydroquinone is not oxidized and thus the product is characterized by an extended shelf life[11].

Hydroxy Acids

Hydroxy acids are organic carboxylic acids classified into alphaHydroxy acids (AHA), beta-hydroxy acids (BHA), polyhydroxy acids, and bionic acids on the basis of their molecular structure. Hydroxyacids are found in most of the marketed cosmetic preparation but are used in very low concentration. AHAs range from simple aliphatic compounds to complex molecules. Derived product can be either from natural or non-natural origin, product derived from natural origin are known as fruit acid. Hydroxy acids are found to be present in antiaging formulations, moisturizers, and peels, and in treatment products to improve hyperpigmentation and acne. The skin appears to be smoother and more uniform.

The likely cause of these changes is the property of AHAs to enhance epidermal shedding. Some claim that AHAs increase the synthesis of glycosaminoglycans (GAGs), improve the quality of elastic fibers, and increase the density of collagen. BHAs are aromatic compounds. Salicylic acid is the reference BHA; it has dermatolytic properties and helps in various xerotic and ichthyotic disorders. Other BHAs include 2-hydroxy-5-octanoyl benzoic acid, also known as betalipohydroxyaci (B-LHA), and tropic acid.

Mechanism of action of hydroxyl acid is unknown however one finding of its biological activities may be attributed to the inherent acid strength of the compounds. Ability of AHAs to increase sensitivity to UV radiation has been proved and thus sunscreen application may be advisable when these products are used. Some AHAs comprise the following: lactobionic acid, glycolic acid, lacticacid, citric acid, mandelic acid, malic acid, and tartaric acid [12].

Antioxidants [5]

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, mostimportantly reactive oxygen species (ROS) and other freeradicals. These species are continuously produced duringphysiological cellular metabolism. To counteract theharmful effects of ROS, the skin is equipped with anantioxidant system to maintain equilibrium between thepro-oxidants, or damaging agents, and the antioxidants, or protective agents; these antioxidants intervene atdifferent 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 photodamage. 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 certainchallenges for use in a multipurpose skin care formulation. A recently introduced synthetic collagenfraction 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 8 naturally occurring molecules (4 tocopherols and 4 tocotrienols), 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. Vitamin E topically applied before UV irradiation hasbeen shown to reduce erythema, edema, sunburn cells, immunosuppression caused by sunlight, and DNA adduct formation.

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.[13] Topical kinetin and niacinamide have been found to exert a synergistic antiaging cutaneous effect in people in the Republic of China.[14]

Vitamin B5

Also known as pantothenic acid aids in the production of the lipoproteins of the skin,

hastening itshealing time. Other B vitamins also nourish the skin.[15]

Vitamin P

Comprises bioflavonoid, which aren't vitamins but they are nutritional supplements that contain Antioxidants like grape see, gingko biloba and citrus derivatives. These function as antioxidants to eliminate free radicals that can damage skin cells. They remove the redness and irritation in skin.[15]

Preservatives [16]

Preservatives are chemicals that kill bacteria, fungi and molds. They are commonly present in ANY product that contains water. For this reason, oil-based skin care products and anhydrous (water free) skin care products, do not need preservatives. However, creams, lotions and any other product where water is present, require adding a preservative.

Exfoliants

Exfoliants promote skin turnover by removing adherent cells in the stratum corneum. Common Exfoliants found in cosmeceutical preparations include salicylic acid (SA), lactic acid, and glycolic acid. There are concerns that repeated use of SA and AHAs could cause the dermis and epidermis to be more vulnerable to penetration by UV radiation. Therefore, patients should be advised to use adequate sun protection. The Cosmetic Ingredient Review Expert Panel concluded that SAs are safe to use when formulated to avoid skin irritation and to be nonpshotosensitizing, or when directions for use include the daily application of sun protection.[17] Sufficient data is not available to establish a limit on SA concentration or to identify the minimum pH of formulations to inhibit skin irritation.[18]

Common Cosmeceuticals contents [19-21]

Ingredient	Purported action	Source
Vitamins	Antioxidant	Vitamins A, C, and E
β-Hydroxy acids (BHAs)	Antibacterial	Salicylic acid
Allatonin	Soothes	Comfrey
Aloe vera	Softens skin	Aloe vera
Arnica	Astringent and soothes	Arnica montana
Lupeol	skin conditioning agent	Cratacvanurvula
Witch hazel	Tones	Hamamelisvirginiana

Pycnogenol	Antiaging effect	Grape seed extract
Boswellia	Antiinflammatory and antiaging	Boswelliaserrata
Turmeric oil	Antibacterial and antiinflammatory	Curcuma longa
Oleanolic extract	improves texture,	Olive leaf
β-Carotene	Minimizes lipid peroxidation	Carrots and tomatoes
Centella	Skin conditioning agent,	Centellaasciatica
Licorice extract	Skin whitening properties,	Glycyrrhizaglabra

Toxicity

It is accepted that cosmeceuticals must be as safe as a cosmetic and should not act as a drug. They have performance characteristics that suggest pharmaceutical action, but they are registered (where necessary) and sold as a cosmetics[22-23].The skin care industry ismarketing a huge number of new agents claiming promising results that have not yet been proven which can lead to serious side effects.

The interactions between cosmeceuticals and skin are complex, depending on the specific composites in cosmeceuticals products, condition of the skin or general health status of a subject, and also the environment where the action occurs. Hundreds of substances have been screened, synthesized, and tested and many have been included in commercially available products. In addition, the desired functions of a cosmeceuticals might require a coordinating action of multiple ingredients. Moreover, there are problematic skin conditions that might change the interactive pattern and outcome between cosmeceuticals and skin. Scientific clinical evaluation is a must for research, development, and application of cosmeceuticals.

Most consumers mistakenly believe that cosmeceuticals are regulated and tested as drugs. They also believe that the ingredients and final products have been tested for safety and that the claimsmade in advertisements are valid. Although cosmeceuticals and pharmaceutical ingredients have never been closer together, their regulatory environments are vastly different due to the distinctCongressional mandates given the Food and Drug Administration[24].

CONCLUSION

From the above studyCosmeceuticals are cosmetic products with biologically active ingredients purporting to have medical or drug-like benefits.It encompasses cosmetic actives

with therapeutic, disease fighting, or healing properties, serving as a bridge between personal care products and pharmaceuticals. Like cosmetics, cosmeceuticals are topically applied, but they contain ingredients that influence the biological function of the skin. Cosmeceuticals improve appearance by delivering nutrients necessary for healthy skin. It is prepared by both sources natural and synthetic. Cosmeceuticals may also be considered to be hybrids between cosmetics and pharmaceuticals that are then intended to enhance the health and beauty of skin. The cosmeceutical industry is constantly seeking new and pioneering products that will combine both proven biological activity and an efficient delivery system. The global trend in the cosmetic industry towardsdeveloping 'medicinally' active cosmetics, and in the pharmaceutical industry towards 'cosmetically' orientedmedicinal products as part of a current 'life-style' ideology [25].

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