Cosmetic products for skincare

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Abstract:

Cosmetic products are formulated with several ingredients to meet the requirements of varied consumers and ensure cosmetic effectiveness. Technological advancements contributed to pharmaceutical formulations, ensuring efficacy and patient acceptability; cosmetic products are no exception. Cosmetic products are intended to maintain skin in good and healthy condition. Skin care products should be formulated with utmost care to satisfy specific skin conditions' requirements. Preferably, skin care products formulated with an adequate buffer system at a more acidic pH can retain the acid mantle and skin barrier function, retaining or improving skin condition. All cosmetic preparation has their application for long or short periods to beautify the body and keep the body healthy to some extent.

Keywords: cosmetics, skincare products, moisturizer.

Introduction

Across the globe, people prefer to use cosmetics. Cosmetics originated from the Greek word "COSMETIKOS", which means adorn and preparation, which is used for this purpose and is known as cosmetic [1]. We can define cosmetics as "Cosmetics are external preparations meant to be applied on the external part of the body, i.e., nails, skin, hair for colouring, covering, softening, cleaning, nourishing, waving, setting, mollification, preservation, removal and protection" etc[2]. Thus, cosmetics is the art of decorating yourself to look beautiful. According to the D & C Act: - Cosmetics mean any articles meant to be rubbed, poured, sprinkled, sprayed on or introduced into, or otherwise applied to any part of the human body for cleansing, beautifying, promoting attractiveness or altering appearance and include any article intended for use as a component of cosmetic[3].We can also define it as "Cosmetic, an item intended to be rubbed, poured, sprinkled or sprayed on, introduced into or otherwise applied to the human body or any part thereof for cleansing, beautifying, promoting attractiveness or altering the appearance"[2].

Cosmetics are composed of mixtures of chemical compounds derived from either natural sources or synthetically created ones [4]. Cosmetics have various purposes, including personal and skin care. They can also conceal blemishes and enhance natural features (such as the eyebrows and eyelashes). Makeup can also add colour to a person's face, improve a person's features or change the appearance of the face entirely to resemble a different person, creature, or object [5].

In the United States, the Food and Drug Administration (FDA), which regulates cosmetics [6], defines cosmetics as products "intended to be applied to the human body for cleansing, beautifying, promoting attractiveness, or altering the appearance without affecting the body's structure or functions." This broad definition includes any material intended for use as an ingredient in a cosmetic product, with the FDA specifically excluding pure soap from this category [7].

All cosmetic preparation has their application for long or short periods to beautify the body, keep it healthy to some extent, and have a psychological impact on others. The "active life" of any cosmetic preparation begins when it is brought in contact with the skin/hair/teeth/or nails and ends when it is removed or evaporated. While in its active life, it has an intimate reciprocal relationship, which results in cosmetic changes in the body. The cosmetic product prevents its outmost layer from drying out, penetrates below the external layer and introduces active substances into deep-lying strata or superficially adheres to change the colour or lustre of areas. Cosmetics used for decorative purposes, i.e., eye lines, rouges, mascara, face masking preparations, etc., also carry the inherent risk of undesirable side effects. It may inhibit critical physiological processes, chemically modify certain skin constituents (e.g., bleaching and colouring preparations), contribute towards their removal or even give rise to specific allergic reactions.

Standard steps in skincare routine

The skincare routine starts with a standard step called cleansing, in which one more of the below-mentioned processes is done.

1. **Foaming washes or Cleansers** are applied to remove excess oil, dirt, or leftover makeup from the skin [8,12]. Based on the skin type, Different cleansing products are available, e.g., sulfate-free cleansers and spin brushes [8,12].
2. **Cleansing oil, or oil cleanser,** is an oily solution capable of emulsifying the natural oil and any leftover makeup to exert the cleansing action. There are two steps in the cleansing process. Once the oily cleanser has emulsified the debris on the skin, a second cleanser, such as a mild gel cream or milk, is applied to remove any traces of oily cleanser applied first completely.
3. **Toners** help to remove any leftover cleanser and restore the skin's pH. along with retaining the skin hydration. It is normally done with a cotton pad or can be sprayed over the skin with a sprayer or patting the toner with the hands. Toners consist of water, herbal extracts, citric acid, etc. Witch hazel, a common ingredient in toner, helps tighten the skin's pores and refresh it. Since alcohol dries up the skin, it is less preferred. Alcohol is less preferred due to its drying properties, but it is a good component for oily skin. Other active ingredients are tea tree oil, salicylic acid, and glycolic acid.
4. **Hyperpigmentation treatment:** hyperpigmentation spots on the skin can be mitigated by including Kojic acid in soap, powder or cream, and Arbutin (a b-D-glucopyranoside derivative of hydroquinone) serum or cream [9,12].
5. **Facial masks** are typically applied on a dry, cleansed face except for eyes and lips and afterwards removed. Clay-based masks are used on oily skin, where kaolin clay or Fuller's earth transport essential oils or chemicals onto the skin and dry completely after application. Upon drying, the clay tends to absorb the excess oil or dirt from the skin, through which it opens up the blocked pathways or pores. Peel masks have an inherent gel-like consistency and include acids or agents that function as exfoliating agents to the skin; they may also contain ingredients to hydrate, anti-wrinkles or even skin tone. They are allowed to dry and then slowly peel off. Since it is prone to over-drying, it is not advised for dry or sensitive skin. Another popular variety in Asia and a new product is a sheet mask, where a thin sheet of fibre or cotton is brushed or soaked with serums or other skin treatment agents. They are more user-friendly, less messy, and easy to use as they do not need any skill, knowledge, or equipment. The sheet masks are provided with holes corresponding to eyes and lips. It is available to suit different skin conditions and skin complaints.

6. **Exfoliants** are products that improve the skin's appearance by shedding down the dead cells from the outermost layer of skin. Chemicals, acids or other abrasive substances assist in the shedding of dead cells. Exfoliation can also help to even out the rough skin, clear blocked pores to reduce acne and improve the skin's appearance and healing of scars. Chemical exfoliants include azelaic acid, malic acid, citric acid, lactic acid, salicylic acid, papain, acetic acid, mandelic acid, glycolic acid, and bromelain. They may be found in cleansers, scrubs, peels, and leave-on products such as toners, serums, and moisturizers. Abrasive exfoliants include gels, creams or lotions, and physical objects.

7. **Moisturizers** help to hydrate the skin by retaining moisture and are available as creams or lotions applied with the fingertips or a cotton pad. Typical ingredients are polyols such as glycerol, sorbitol, and partially hydrolyzed proteins [11]. Tinted moisturizers are available with a small foundation content, which can cover up minor blemishes or even skin tones. Eyes require a different moisturizer than the rest of the face as the skin around the eyes is fragile and sensitive, indicating the first symptoms of ageing. Eye creams are gentle lotions or gels; The caffeine or Vitamin K reduces the puffiness or dark circles under the eyes. Eye creams or gels are applied over the entire eye area with a finger as a patting motion. Finding a moisturizer with SPF is beneficial in preventing ageing and wrinkles.

8. **Sunscreens** protect the skin from the sun and are available as creams, lotions, sprays, gels, sticks, or other topical projects. The organic or inorganic filters can absorb or reflect harmful UV radiation. [10,11] Sunscreens are differentiated with 'SPF', which means 'sun protection factor, to show their protecting abilities against UVB[10,11]. UVA ratings on sunscreens can be understood using the stars count or plus symbols as it may vary across countries [10,11]. UVA ratings do not specifically depict the amount of UVA protection sunscreen provides. Still, rather the ratio of equal UVA and UVB protection. [10,11] The 'gold standard' sunscreen recommendation should be a minimum of SPF 30 or at least 4 stars or plus symbols [10,11].Daily sunscreen application is critical.

9. **Serums** are liquid preparations that can spread on the skin and are light and easily absorbed. It is normally applied before moisturizer and ensures a good amount of any specific ingredient on the face. The serum helps to reduce the fine lines and wrinkles on one's face and improves the smoothness of the face [11].

SKIN CARE PRODUCTS

MOISTURIZERS

There has been a recent migration in humankind's thinking toward a desire for holistic products, especially skincare. Moisturizers are the most prescribed products in dermatology practice and also the most intriguing one. The incidence of dryness-related dermatoses increases courtesy of urbanization, adulteration, pollution, increased life span, and abandonment of traditional oil massages and baths. Most of the human population applies many moisturizers throughout their lifetime; thus, a dermatologist must have a comprehensive knowledge of the same. "moisturizer" is a marketing term with little or no scientific meaning [12]. Consumers regard them to increase the skin's water content, while dermatologists consider them bland oleaginous substances. Dryness is not a single entity but is characterized by differences in chemistry and morphology in the epidermis depending on internal and external stressors [13]. There are four main types of moisturizers depending on their mechanism of action1.Emollients: They are mainly lipids and oils, which hydrate and improve the skin's softness, flexibility, and smoothness [14]. The skin lubricity contributes to consumer satisfaction. Intracellular lipids comprising multilamellar, which are located between SC, play a significant role in skin architecture. In SC, ceramides are the major lipid constituents, and along with neutral lipids, they form broad laminated intercellular sheets that act as barriers to our environment. Natural ceramides or synthetic ones are too expensive. Hence, several pseudo-ceramides are useful as emollients. Lipophilic compounds such as cholesterol and ceramides are used in topical skin creams. They get easily incorporated into liposomes, making the skin texture softer and smoother. Nanoencapsulated triceramides are also used to increase the hydration of the skin. Long-chain saturated fatty acids, such as stearic, linoleic, oleic, lauric, and fatty alcohol, are essential fatty acids found naturally in palm oil, coconut oil, and wool fat. They influence skin physiology and pathology by affecting skin barrier functions, eicosanoid production, membrane fluidity, and cell signalling.

Squalene as a moisturizer: Squalene is one of the most common lipids produced by human skin cells and is a component of human sebum. It is an isoprenoid compound that is an intermediate metabolite in cholesterol synthesis [14]. In humans, about 60% of dietary squalene is absorbed. It is transported in serum generally in association with very low-density lipoproteins and is distributed ubiquitously in human tissues, with the greatest concentration in the skin [15]. Although squalane is produced naturally by the body, the production of this chemical slows drastically after age thirty, thus contributing to dry skin. Hydra-Cell Face Oil 30ml [16]. It acts as a quencher of singlet oxygen, protecting the human skin surface from lipid peroxidation due to exposure to ultraviolet (UV) and other sources of ionizing radiation. Squalane is a saturated form of squalene in which the double bonds have been eliminated by hydrogenation. Squalane is less susceptible to oxidation than squalene. Squalane is thus more commonly used as a moisturizer. [17].

Humectants: They are hygroscopic compounds, which means they attract water from two sources, from the dermis into the epidermis and in humid conditions from the environment [18]. Many humectants have emollient properties as well. Natural moisturizing factor made of a mixture of low molecular weight soluble hygroscopic substances such as lactic acid, pyrrolidone carboxylic acid, and amino acids is a major player in the hydration of the SC. Trihydroxylated molecule glycerol is the most effective humectant. Urea has been shown to reduce trans epidermal water loss (TEWL) in atopic and ichthyotic patients and reduce SLS-induced skin irritation. It is a humectant at a lower concentration (10%), but in higher concentrations (20–30%), it disrupts epidermal proteins' hydrogen bonds, leading to keratolysis. Alpha hydroxy acids are effective in treating xerosis. Lactic acid, particularly the L-isomer, stimulates ceramide synthesis, leading to higher SC ceramide levels, which result in a superior lipid barrier and effective resistance against xerosis.

Occlusives: They are substances that physically block TEWL in the SC. They create a hydrophobic barrier over the skin, contribute to the matrix between corneocytes and have the most pronounced effect when applied to slightly dampened skin, which is thought to diffuse into the intercellular lipid domains, thus contributing to their efficacy. Mineral oils are derived from petroleum. The two most important materials are liquid paraffin (mineral oil) and petrolatum, which are complex combinations of hydrocarbons. Depending on molecular weight distribution, materials with different viscosity are obtained. During refining, the hydrocarbon material is hydrogenated to create oxidation-resistant molecules from the liquid to the solid waxes. This gives these products a long shelf life. Among all, petroleum jelly is one of the best moisturizers, having a water vapour loss resistance 170 times that of olive oil. Still, it is cosmetically less acceptable due to its greasiness [19]. Lanolin, secreted by the sebaceous glands of sheep, is a complex structure of esters, diesters, hydroxy esters of high molecular weight, lanolin alcohols, and lanolin acids. Unlike human sebum, it contains no triglycerides. Petrolatum in a minimum concentration of 5% reduces TEWL by more than 98%, followed by lanolin, mineral oil, and silicones, which only reduce TEWL by 20–30% [19]. The limiting factors with most occlusives are an odour, potential allergenicity, and the greasy feel.

ROLE OF MOISTURIZERS:

Moisturizing action: This is the most vital action by which they increase the water content of the SC. Hydration evens the skin surface by flattening the "valleys" between the skin contour ridges. It also makes the skin surface soft, more extensible, and pliable. The moisturizing action of emollients is evident a maximum of 30 min–1 h after their use and usually lasts for 4 h [20].

Anti-inflammatory action: Many moisturizers inhibit the production of proinflammatory prostanoids by blocking cyclooxygenase activity, thus soothing inflamed skin.

Antimitotic action: Moisturizers containing mineral oils have low-grade antimitotic action on the epidermis and thus are helpful in inflammatory dermatosis like psoriasis, where there is increased epidermal mitotic activity.

Antipruritic action: Emollients downregulate the cytokines, thus reducing the itching. Furthermore, the cooling effect following water's evaporation from the skin surface after using water-based moisturizers has an antipruritic effect.

Photo protective action: These days' sunscreens with variable sun protection factors are incorporated in the moisturizers, providing additional sun protection.

Miscellaneous actions: Quality of life improvement: Having smooth and hydrated skin plays a good role in our social life and psychological satisfaction.

XEOTIC SKIN

The appearance of the skin is essential for an individual, and a flawed presentation often results in reduced self-esteem by self and others. The impression of dryness is formed by inherent sensory components in the skin, along with visible and tactile changes in the surface [13]. A feeling of dryness and uncomfortable skin that is tight, painful, itchy, stings, and tingles are the symptoms of dry skin. The application of moisturizers leads to an increase in water content in the SC, and a smoothing of the surface can be observed as a result of the filling of spaces between partially desquamated skin flakes. Thereafter, skin mechanics change, and the increased hydration will facilitate the degradation of desmosomes, keeping the corneocytes together. A possible strengthening of a weakened skin barrier function may also occur, which can make skin less susceptible to attacks from noxious substances and prevent the development of eczema [13]. This may explain why moisturizers are a useful adjunct in the treatment of inflammatory dermatoses as steroid-sparing therapy.

ADVERSE EFFECTS

As compared to various topical drugs used by dermatologists, moisturizers are rarely associated with health hazards, although they may be used on large body surface areas over a major part of the life span [13]. Various forms of skin discomfort from topical preparations are more commonly encountered, as virtually any substance can cause skin reactions in sensitive areas in some individuals. Atopics are particularly at risk for adverse skin reactions because of the impaired barrier function [13].

Facial skin is also more sensitive than other body regions, possibly the result of a less efficient barrier with a smaller number of SC cell layers and the presence of large follicular pores [13].

Skin irritation: The most common adverse effect of moisturizers can be visible and invisible. They are sensory reactions or subjective sensations with/without signs and symptoms of inflammation.

Common presenting complaints are in the form of smarting, tingling, and stinging sensations. Based on the skin response, it is classified into four mechanisms.

1. Sensory/subjective irritation
2. Allergic contact dermatitis
3. Nonimmunologic contact urticaria
4. Irritant contact dermatitis.

Ideal moisturizer: The search for an ideal moisturizer is a vain task, for the needs and results are highly subjective. However, an ideal moisturizer should have some attributes that make it suitable for most conditions and most applicants.

1. Reduce and prevent further trans epidermal water loss (TEWL)
2. Restore lipid barrier, i.e., duplicating and enhancing the skin's moisturizing retention mechanisms
3. Hypoallergenic, non-sensitizing, fragrance-free, non-comedogenic
4. Absorbed immediately, providing immediate hydration
5. Cosmetically acceptable
6. Affordable.

B. SUNSCREENS

Photoprotective agents protect the skin by preventing and minimizing the damaging effects of ultraviolet (UV) rays of natural light [23]. They can be used as sunblock, which is opaque when applied over the skin and blocks a higher percentage of light than sunscreens, which are translucent and require frequent reapplication for optimum efficacy. Photoaging is manifested as sagging, wrinkling, and photocarcinogenesis is caused by damage to cells and deoxyribonucleic acid (DNA). It has been observed that sunscreens increase skin's tolerance to UV rays [23]. Studies have shown that UVA impairs the antigen-presenting cell (APC) activity of the epidermal cells and thereby causes immune suppression, thus contributing to the growth of skin cancer [23]. Sunscreen agents have been shown to provide significant protection against epidermal APC activity induced by high UVA doses. Mutation occurring in human melanocytes due to damage caused to DNA by UVA radiation is one of the proposed reasons. In summary, UVA radiation can cause nuclear and mitochondrial DNA damage, gene mutations and skin cancer, dysregulation of enzymatic chain reactions, immune suppression, lipid peroxidation (membrane damage), and photoallergic and phototoxic effects [23]. The composition and mechanism of action of sun screening agents vary from exerting their action through blocking, reflecting, and scattering sunlight. Chemical sunscreens absorb high-energy UV rays, and physical blockers reflect or scatter light. Multiple organic compounds are usually incorporated into chemical sun screening agents to achieve protection against a range of the UV spectrum. Inorganic particulates may scatter the microparticles in the upper layers of skin, thereby increasing the optical

pathway of photons, leading to the absorption of more photons and enhancing the sun protection factor (SPF), resulting in high efficiency of the compound [23].

The protection offered by a sunscreen agent against UVA radiation is measured by the Persistent Pigment Darkening (PPD) Protection Factor. This technique was developed in Japan and has been routinely used by manufacturers. Stanfield has discussed its disadvantages. PPD is not done in skin type 1, which is the skin type more prone to solar damage. For wavelengths less than 320nm, the action spectrum is not defined; moreover, the clinical significance of PPD is not very clear.

An immediate pigment darkening response is calculated as the dose of UVA required to produce the effect with the sun screening agent compared to that produced without an agent. Although this test gives rapid results for low doses of UVA, responses have been found to be highly variable, and an accurate reproduction of results is difficult. This is usually performed in skin types III and IV, and its clinical significance is unknown [23].

Safety of Sunscreen Agents:

The safety of sun screening agents is determined by toxicity studies, their ability to cause irritation, sensitization, phototoxicity, and their impact on the environment [23]. Hayden et al. studied the safety of five commonly used sunscreen agents (avobenzone, octinoxate, octocrylene, BZ-3 [oxybenzone] and padimate O by determining the penetration of topical agents and found that BZ-3 penetrated the epidermis the most after 24 hours of exposure; however, the concentration in the stratum corneum was too low to cause toxicity. Toxicities have been reported with BZ-3, which has been associated with anaphylaxis. The inhalation of spray sunscreens can pose a danger as well. McKinney et al. observed pulmonary and cardiovascular changes in rats on inhalation of a product containing TiO2 nanoparticles [24].

ROLE OF PHYSICIAN/DERMATOLOGIST:

Physicians should be aware of the composition of sunscreen agents and the UVA protection factors of formulations. They should also instruct their patients about the proper application technique and insist on reapplication. Additionally, they should counsel preteens and adolescents regarding the regular and proper use of broad-spectrum sunscreens [23].

FOUNDATIONS

Skin contains its own natural protective system against the effects of sunlight, but this is often ineffective to withstand excessive sun exposure; therefore, additional shielding may be required to protect against UV light [24]. Foundation usually contains broad-spectrum physical and chemical sunscreens such as titanium dioxide, zinc oxide, octylmethoxy cinnamate, or oxybenzone – to prevent UV radiation (UVR) exposure. However, these components have been reported to cause skin irritation, photosensitivity, and contact dermatitis by interaction with cutaneous molecules on chronic use. Therefore, natural compounds such as polyphenols may be more optimal photo protectants. [24].

Conclusion

Cosmetics are potential external preparations decorating yourself to look beautiful. For skincare a range of cosmetic products are available that includes moisturiser, humectants, occlusives, sunscreeens etc. This review gives an overview of various skin care products. It covers the skin care routine wherein skin cleansing is done with cleanser, toner, facial mask, exfoliants, moisturisers etc. Judicial use of cosmetics enhances the beauty of individual and hence the products have to be selected based on the skin type and problems.

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