


**REVIEW ARTICLE**

Skin care and rejuvenation by cosmeceutical facial mask

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Abstract

Skin health is an important aspect of aesthetics. Dermatologists and scientists try to develop novel methods and materials to fulfill this aim. Facial cosmetics keep skin moist and remove sebum from the skin to maintain proper skin health. The use of suitable cosmetics according to the facial skin type results in healthy skin. Facial masks are the most prevalent cosmetic products utilized for skin rejuvenation. Facial masks are divided into four groups: (a) sheet masks; (b) peel-off masks; (c) rinse-off masks; and (d) hydrogels. Each of these has some advantages for specific skin types based on the ingredients used. The following article presents the available information about the facial mask. Also, we have focused on the facial masks available in the market. Despite several developments in this field, extensive research is required for performing successful and precise clinical trials in the future. Further improvements would enable the researchers to develop new products in this field. In this review, we present the most recent breakthroughs in the field of skin care and rejuvenation by cosmeceutical facial mask. This information is valuable to get the picture of the latest trends and also helpful for clinicians and related manufacturing companies.

KEYWORDS

facial rejuvenation, formulation, rejuvenation, skin barrier, skin care

1 | INTRODUCTION

Skin is the largest organ and serves as a barrier to the entry of microbes into the body. Thus, skin health is an important aspect of personal health. Moreover, it has a psychosocial effect on people and communications.¹ There has been no standard classification of facial skin types till date. Helena Rubinstein in 1900s described four fundamental types of skin, and this information has been used for many years by the cosmeceutical industry. It seems, due to the developments in the field of cosmetic products, the traditional designations for skin types that were based on only a fraction of skins were not suitable. Leslie Baumann in 2008 introduced an innovative approach to classify skin into 16 types that is more functional and categorizes the facial skin types based on some features such as dry

or oily, sensitive or resistant, pigmented or not pigmented, and wrinkled or unwrinkled (tight).²

The skin type may vary during the lifetime due to variation in the sebum secretion.³ Sebum secretion is not uniform on the whole area of the face. Forehead, nose, both cheeks, and chin are the sebum measurement areas. The normal average skin sebum secretion for the whole face is 118.7-180.9 $\mu\text{g}/\text{cm}^2$, and the acidity level is 5.6-6 due to the presence of acid in secreted sebum, sweat, and keratin. The average sebum secretion for dry, oily, and combination type skin is 97.3-147.6, 204.6-235.4, and 109.8-145.5 $\mu\text{g}/\text{cm}^2$, respectively.^{4,5} The skin cosmetic materials are formulated according to the skin type. The cosmetics should moisturize the skin and wipe out the sebum and contaminants to facilitate a healthy skin.^{6,7} The

skin water content (stratum corneum hydration state) plays a significant role in skin health, aesthetics, and glow.⁸ Skin delicacy can be affected by ultraviolet (UV) exposure (sun damage), senescence, dehydration, stress, medication, and regime type. The cosmetic products should be nonacnegenic, noncomedogenic, and hypoallergenic to have an effectual influence on the skin.⁹ Facial masks are accessible merchandizes, can be easily applied, and show instant effects on the skin. Bioactive ingredients with different mechanisms are added to the masks to endow them with rejuvenation properties, including moisturizers, exfoliants, lightening and herbal ingredients, different kinds of vitamins, proteins, minerals, growth factor (GF), and other materials such as honey and coenzyme Q. It is expected that the applied mask would moisturize the skin properly and deeply, remove the sebum, and rejuvenate the skin. The skin masks usually have pseudoplastic properties for a handy application. They are available in different forms such as gel, emulsion, sheet, and paste. In this review, we present categorized information about the type and ingredients of facial masks. We believe that this study will be of interest to the researcher and mask production companies to design effective, valuable, and notable masks.

2 | TYPE OF MASKS

2.1 | Sheet mask

The sheet mask is an old kind of mask and more commonly available than other types, due to the long period of availability in the market. From a recent study conducted by National Purchase Diary Panel Inc. group in the United States, the sale of masks increased by about 60%, overwhelming the other categories in the skin care business.¹⁰ The most important concern about sheet mask is the different artificial fragrances and dyes, parabens, and phthalate esters used that can be harmful to the skin. Some physicians believe that the sheet masks are often not designed for oily skin or acne prone skin because of an increase in the number of bacteria on the surface skin. Besides, sheet mask prevents quick evaporation of water phase and extends the time frame the ingredients require to penetrate deep into the skin. Depending on the brand, sheet mask can contain various ingredients that are commonly used, such as Aloe Vera and vitamin C, to more unusual ones such as pearl, snail extract, and seaweed. The different types of sheet masks can be categorized based on the variety of the fabric types. It seems coarse texture kind of masks is the least expensive and advanced, produced through biotechnology processes. Pulp masks with a finer texture, hydrogel masks, bio-cellulose masks,¹¹ foil sheet masks, knit cotton masks, ampoule sheet mask, and bubbling sheet masks (usually made from charcoal and detoxifying ingredients with the addition of sparkling water)¹² are the different types of sheet masks. On the other hand, recently, use of homemade mask has increased due to some reasons such as high price of the professional mask and people's desire to use natural resources, but long-term effectiveness, availability of different recipes, and nonclassification of the use of the materials regarding the suitability for different type of skins has resulted in a

market for industrial products. The purpose of this part is to review the different types of most popular and available sheet masks in the market based on the materials. The sheet mask materials make them different in shape and structure. Except for some of the sheet masks mentioned above, cream mask and masks that are stiff in the air after application are the other types of masks that we have ignored because of the need for an extensive study which will require a separate article. We think this classification can be useful in understanding the difference between the different types of sheet masks.

2.2 | Rinse-off mask

Rinseable masks are of several different types, such as moisturizing, cleansing, toning, exfoliating, waxy, and mud masks. Waxy masks are usually used for dry skin to regulate the epidermal hydration level and restrict the transepidermal water loss. The water content balance between the stratum corneum and skin surface lipid is an important factor in skin appearance. Polyherbal formulations are very promising in this regard because of their capability of retaining moisture and natural organic sources. Synthetic materials are also used in moisturizers, but they have some drawbacks. For example, propylene glycol which is used as a humectant can cause allergic reaction, hives, and eczema. Petroleum used as an emollient and occlusive agent can cause dryness and chapping as side effects. Paraben has antimicrobial feature, but it can cause allergic reaction and skin rashes. Diethanolamine is used as an emulsifier but irritates the skin; diazolidinyl urea, imidazolidinyl urea, and benzalkonium chloride are used as preservatives, but their side effect is contact dermatitis. Herbal moisturizers consist of soy lecithin, glycerin, and *Aloe vera* (containing barbaloin, aloe-emodin, aloesin, amino acids, enzymes, vitamins) as humectant; triple distilled water, *Triticum sativum*, and *Trigonella foenum graecum* as emollient/occlusive agents; *Cucumis sativus* (containing silica, vitamin C, folic acid) as adhesives/emollient; *Acacia* as an emulsifier; *Azadirachta indica* (Neem) as preservative; *Santalum alba* (sandal oil) for fragrance; and rose water for cooling effect/fragrance.¹³ The herbal mask is a type of rinse-off mask that is nonallergic and nontoxic. Grace et al¹⁴ synthesized a herbal mask using *Cajanus cajan*, green gram, sandalwood, almond, turmeric, rose petals, and green tea leaves that improves blood circulation, rejuvenates the skin, and restores the skin elasticity.

2.3 | Peel-out mask

Some materials such as clay, which is frequently used in cosmetic preparations, have no proper and handy applicability; thus, they are immobilized on the substrate to have a facile usage. These types of masks form a film on the skin which can be easily peeled out. Most of the peel-off masks are based on polyvinyl alcohol (PVA) or polyvinyl acetate (PVAc), which cause occlusion and tensor effect.¹⁵ Various materials such as herbal soap, moisturizer, plasticizer, fragrances, and preservative can be embedded in the mask. Various formulations are utilized for masks, but generally, their applicability

is controlled by drying agents, such as alcohol, and matrix concentration. Alcohol, due to its lower vapor pressure than water, is frequently used as a drying agent that controls the application time. The higher the concentration of alcohol the less the drying time required. The matrix concentration determines the viscosity, film formation, and thickness of application. This concentration should be optimized to prepare an appropriate mask for the application.^{16–18} The application time depends on the ingredients of the mask. Various herbals have been used in masks for different purposes, such as apple used as an antioxidant, walnut as an emollient, orange peel as an astringent and toner, cucumber as a soothing agent, and beetroot as an acne reduction agent.¹⁹ A mask for acne vulgaris treatment was synthesized based on tretinoin (medication for acne) with glycerin as the humectant (increases the skin hydration) and sodium metabisulfite as the antioxidant in PVA matrix.²⁰ Berings et al used green clay and *Aloe vera* in PVA matrix as a peel-off mask which exhibited antimicrobial features. Green clay has dermatological use and eliminates dirt, dead skin cells, and oil.²¹ Different types of clay have cosmeceutical usage such as smectite, illite, kaolinite, and chrolite.²² *Aloe Vera* has antioxidant and anti-inflammatory properties and, also, sterilizes the application area and has a synergistic effect with clay.¹⁶ It was reported that chitosan has a filmogenic property. Its molecular weight determines the evaporation rate, flexibility, and stability of the mask. Chitosan derivatives such as succinyl chitosan have a high water retention capacity which is suitable for the cosmetic application.²³ Tretinoin (retinoic acid) is used for acne and wrinkle treatment. It is loaded in PVA for use in facial masks.²⁴ Pichayakorn et al²⁵ used deproteinized natural rubber latex to make a facial mask which exhibited good elasticity and modulus. The entrapment of *Prunus spinosa* in polymer matrices resulted in a sustained release formulation that increased the mask efficiency.²⁶

2.4 | Hydrogel mask

Hydrogels are 3D networks of polymers in which water can be absorbed several times the gel weight. Hydrogel masks are usually used for sensitive skins with cooling and soothing effects. Silk sericin embedded in nanocellulose was applied as a facial mask and exhibited proper biological features for facial treatment.²⁷ Carboxymethylcellulose (CMC) was also used as a reinforcement for PVA-CMC hydrogel.²⁸ *Dillenia* is an indigenous fruit of southeastern Asia rich in pectin. The gelatinous pulp of *Dillenia* was used as a gel-like facial mask. It was shown to have a suitable viscosity, pH, and antioxidant properties.²⁹ Antimicrobial, antioxidant, and anti-inflammatory Neem leaf hydrocolloids (native to India, Nepal, Pakistan, Bangladesh, and Sri Lanka) were embedded in an anti-acne gel for facial mask usage.³⁰ In one clinical trial, 10 volunteers used Neem mask for 15 days. No skin irritation was observed; moreover, the skin oiliness and acne decreased, and the skin complexion improved.³¹ *Acacia nilotica* Del. fruits (Qarad) and *Quercus infectoria* Olive. galls embedded in PVA hydrogel showed antibacterial effect as well.³²

3 | INGREDIENTS OF FACIAL MASK AND MECHANISMS OF ACTION

The ingredients that are used to prepare the facial masks can vary depending on the brand and shape of the mask. The summarized schematic view of these ingredients is shown in Figure 1.

3.1 | Vitamins

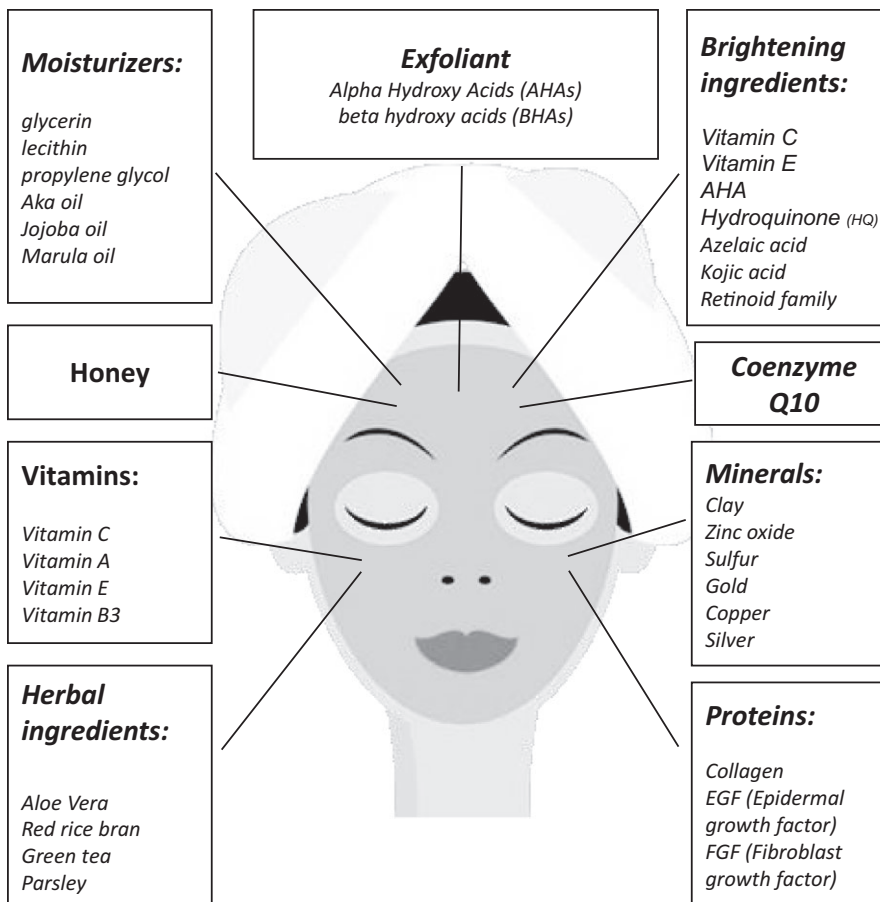
There are many factors that cause the generation of reactive oxygen species (ROS); some of them are well known, and some are not yet fully understood. The changes in cellular respiration and generation of ROS³³ is only one of the causes of skin aging. Vitamins A, C, and E are used more in facial masks than the other vitamins. Vitamins are important agents for eliminating the ROS, which can be used in facial masks.

3.1.1 | Vitamin C (L-ascorbic acid)

Vitamin C plays an active role as an antioxidant and to eliminate ROS that can cause damage to nucleic acids, proteins, and cell membranes. The level of vitamin C decreases with age. Topical vitamin C increases the messenger RNA (mRNA) level of collagen I and III and their processing enzymes in the human body.^{34,35} Topical vitamin C has been reported to improve wound healing³⁶ and reduce facial wrinkles,^{37,38} improve the appearance of photoaged skin, and protect against immediate effects of UV radiation.³⁹ Also, this vitamin can increase collagen synthesis and help in the prevention of skin aging. Vitamin C derivatives such as ascorbyl palmitate, ascorbyl tetraisoalmitate, and magnesium ascorbyl phosphate with emulsion formulation are used in the pharmaceutical industry due to their better stability in comparison with ascorbic acid.⁴⁰ Antioxidants such as vitamin C act by neutralizing the singlet oxygen cascade and, therefore, limit the formation of ROS.⁴¹ Minor adverse reactions such as skin irritation and oxidative changes due to vitamin C causing yellow staining of the skin and clothes, and hypopigmented hair can occur.⁴² Rarely, contact dermatitis has also been reported.^{38,39,43,44} Vitamin C has the potential to enhance the density of dermal papillae, perhaps through the mechanism of angiogenesis. Topical vitamin C may have therapeutic effects by partially correcting the regressive structural changes associated with the aging process.³⁶

3.1.2 | Vitamin A

The aging of skin results in the breakdown of collagen and elastin network in the skin.⁴⁵ Vitamin A1 decreases collagenase level and regulates keratinization. Retinol is also effective in the treatment of acne, reducing wrinkles, and increasing the skin protection against UV radiation.⁴⁶ In different studies, a nanofiber mask containing ascorbic acid, retinoic acid, gold nanoparticle, and the antiwrinkle agent was used in a dried form of the mask because of the advantage of controlled release after addition of water; this increases the stability of antioxidants and shelf life of the mask.⁴⁷



Most Important Ingredients in Facial Mask

FIGURE 1 Most important ingredients in facial mask

3.1.3 | Vitamin E or tocopherol

There are eight types of vitamin E (α -, β -, γ -, and σ -tocopherols and their related corresponding tocotrienols). γ -tocopherol levels are the highest in the human skin.⁴⁸ Vitamin E functions as an antioxidant. Its nonantioxidant function can protect the integrity of the tissues. Vitamin E is a lipid-soluble nonenzymatic antioxidant and anti-inflammatory agent that protects the skin from the adverse effects of oxidative stress and scavenges free oxygen radicals that increase in the aged skin or during photoaging.⁴⁹ Also, vitamin E in the skin can inhibit the production of prostaglandin E2 and nitric oxide and also prevent sunburn, UV B-induced lipid peroxidation, and edema.^{50,51} Therefore, it has a role in the protection of epidermis from oxidative stress. Vitamin E also has a role in photoadduct formation and immunosuppression.⁵² Most of the over-the-counter antiaging creams contain 0.5%-1% of vitamin E.⁵³

3.1.4 | Vitamin B3 or niacinamide

During the 1970s, various clinical trials highlighted the good skin penetration of niacinamide, and since then, scientists have been increasingly interested in exploring the topical effects of niacinamide and its application for skin care. Niacinamide has several proposed

medicinal applications in the skin including anti-inflammatory action,⁵⁴ prevention of photoimmunosuppression,⁵⁵ and increased intercellular lipid synthesis.⁵⁶ Also, niacinamide is an effective skin lightening compound that works by inhibiting the melanosome transfer from melanocytes to keratinocytes.⁵⁷

3.2 | Protein

Proteins are effective substances for the skin's resistance and rejuvenation. Collagen is one of the most important proteins in the dermal layer of skin which reduces with age. It is widely used in facial masks as the peptide form. Although this material is highly advertised and suitable for cosmetic products, it still exhibits limitations in use due to its low permeability into the upper layer of skin or stratum corneum. The ability to penetrate depends on factors including the physicochemical properties of the substance such as molecular size, stability, solubility, and the acid dissociation constant, the number of molecular hydrogen bonding groups, integrity, thickness and components of the skin, skin metabolism, area, and the duration of application. Proteins with a higher number of hydrogen bonds and numerous large molecules have less permeability into the skin.⁵⁸ Growth factor levels in the body peak in the youth and decline thereafter. It has been hypothesized that skin aging is related to the

level of the cytokines and GFs in the body. Besides collagen, GFs with special cell signaling mechanisms are the most used agents in the cosmeceutical industries. Due to the high technology needed for using GFs, cosmetic products with GFs are very expensive.

The low permeability of GFs and certain formulations necessitates the use of a proper vehicle to deliver this material to the skin. One of the common ways to utilize GFs is using a liposomal structure. A liposome is a spheroid form of lipid that can carry small amounts of molecules because of the lipid content which dissolves in the lipid cell wall and enters the skin cells. Any topical drug or agent should be lipid-soluble, rather than water-soluble, to have a good skin permeability through the stratum corneum, or enhancers are to be used. Protein transduction domain (PTD) technology shows better permeability compared with the existing liposomal structure. This technology solves the problem of using small sized molecules in a liposome and enables the effective delivery of macromolecules and large proteins into the skin. ADBIOTECH™ Company has used this technology to integrate PTD and GFs (PTD-EGF, PTD-FGF). This technology shows increased elasticity and antioxidant effects in the skin.⁵⁹ The topical application of human- or animal-derived GFs may also increase the dermal collagen synthesis, and this is associated with reduced signs of skin aging such as fine lines and wrinkles.⁴⁵ After reviewing the markets, we found that epidermal growth factor (EGF) and fibroblast growth factor (FGF), which have a significant influence on the skin, are widely used in cosmeceutical products such as creams, lotions, and facial masks. Topical GFs successfully penetrate the stratum corneum and bind to specific receptors on keratinocytes. Fabi and Sundaram in 2014 demonstrated that, after the binding of GFs to receptors, GFs secreted by the keratinocytes could stimulate fibroblasts to synthesize GFs that exerted effects in the dermis.⁶⁰ Fibroblast-derived GFs also stimulate keratinocyte proliferation, resulting in amplification of the initial signaling pathways.⁶¹ It seems that this is an area where the cosmetic companies should be focusing regarding the research and development of liposomal delivery systems and bringing more masks with GFs to the market.

3.3 | Herbal ingredients

Nowadays, herbal ingredients have been highly regarded in the cosmetics industry because of their historical and traditional importance. The increasing use of natural plant ingredients in personal care products raises new safety issues that require novel approaches for their safety evaluation similar to those of plant-derived food ingredients.⁶² Use of these substances provide essential nutrients for healthy skin and positively influence the biological functions of the skin⁶¹ such as anti-inflammatory and antioxidant properties.⁶³ Numerous herbal ingredients are used in facial care products, but we have listed the herbal substances that are used in face masks more than the other herbal ingredients.

Aloe vera is composed of polysaccharides, enzymes, vitamins (B2, B6, C, and E), minerals (selenium and manganese), and amino acids such as proline and salicylic acid that provide hydration, smoothness, and elasticity to the damaged skin, especially the skin

that is affected by free radicals.⁶⁴ A study was recently conducted by Reveny et al on the formulations with different concentrations of *Aloe vera* extract and the evaluation of the effectiveness of this face mask with antiaging effect on the volunteer's skin. The results showed that increasing concentrations of *Aloe vera* extract increase the antiaging potential of the mask.⁶⁵ *Aloe vera* exhibits a variety of pharmacological properties such as antioxidant, antimicrobial, anticancer, immunomodulatory,⁶⁶ hyperglycemic,⁶⁷ wound healing,⁶⁸ hyperlipidemic, and antidiabetic properties. *Aloe vera* is also used in traditional medicines for the treatment of cuts, burns, and eczema. Nowadays, many industries use *Aloe vera* extract because of its special properties.⁶⁹ *Aloe vera* is one of the plants that are widely used directly, without any processing, as traditional herbal remedies for inflammation, skin moisturizing, and antiacne and antiallergic effects. Chandegara and Varshney⁷⁰ in 2013 reviewed the different processing methods and their effects on the amount of biologically active components extracted from different *Aloe vera* formulations.

Choosing an effective method, proper handling, and careful harvesting are the most important parameters in the processing of the plant. Improper processing could decrease the amount and quality of the extracts with no active ingredients.^{71,72} They emphasized that fresh gel could be more effective as a mask, and cold processing is the best method of use that preserves the beneficial properties. Also, they showed that temperature is the main factor for the processing of *Aloe vera* and, in particular, gel extraction process.⁷⁰ Besides these advantages, *Aloe vera* can provoke allergic reactions such as contact dermatitis.^{73,74}

Red rice bran is a byproduct of rice which is rich in antioxidants such as tocopherol, tocotrienols, and gamma-oryzanol and have more antioxidant activities compared with the white rice bran. A recent study on a peel-off gel mask containing red rice bran extract used three types of materials with this extract (PVA, hydroxypropyl methylcellulose, and gelatin). PVA showed better physical properties within 8 weeks, whereas the gelatin-based mask had the highest antioxidant activity.⁷⁵

Green tea has more antioxidant properties than vitamins C and E. This combination has anti-inflammatory, anticancer, antibacterial, and antiacne properties.⁷⁶

Parsley is useful in controlling sebum. This plant has large amounts of vitamins (C, A, B, E, K, and beta-carotene) and minerals (magnesium, iron, phosphorus, manganese, sodium, potassium, sulfur, and calcium). An in vivo study to evaluate the effect of the peel-off mask of parsley powder showed that the mask containing this extract at a concentration of 4% was effective for oil control.⁷⁷

3.4 | Minerals

Clay, zinc oxide, sulfur, gold, copper, and silver are minerals that can be used in face masks. Sulfur is known in dermatology for its antibacterial, antifungal, and corneolytic properties.⁷⁸ Clay is used as an ingredient in medicine and aesthetic and cosmetic products. In addition to its cleansing (scrub) and skin moisturizing properties, it is

effective in the treatment of lip dystrophy in the early stages and in reducing cellulite and acne^{66,67} (pore minimalist mask from Dr Jart). Also, clay is used widely in face masks for skin toning⁷⁹ (pure clay mask from L'Oreal Co. Ltd).⁸⁰ Nanoparticles of gold (LEXON nanotech Co. Ltd.)^{81,82} and Silver Cosil whitening mask (natural Korea Co. Ltd.)⁸³ are used in different forms of cosmeceutical products and show antimicrobial and antifungal properties. The new generations of masks that contain silver are very effective in sterilization and help to reduce the skin pore size, and prevent and treat acne.^{84,85} Also, different studies have shown that nanoparticles of zinc oxide⁸⁶ and copper⁸⁷ have antibacterial and antimicrobial properties, respectively.

3.5 | Honey

Bee's honey is a nutritious natural substance widely used in cosmetic treatment. Honey is used in preparing facial washes, skin moisturizers, hair conditioners, in the treatment of pimples,⁸⁸ and in healing of wounds and ulcers^{89,90} as an antioxidant, antibacterial, anti-inflammatory, and antiviral agent.⁹¹ In the cosmetic formulations, it exerts emollient, humectant, soothing, and hair conditioning effects, keeps the skin youthful, retards wrinkle formation, regulates pH, and prevents infections by pathogens,⁹² especially in combination with other materials listed above.⁹³

The compounds present in honey are carbohydrates (fructose), 18 free amino acids, water, calcium, iron, zinc, potassium, phosphorous, magnesium, selenium, chromium, manganese, proteins, enzymes, and vitamins such as vitamin B₂, B₄, B₅, B₆, B₁₁, and vitamin C,⁹⁴ which are essential elements for the production of erythrocytes.⁹⁵ The used amounts range from 1% to 10%, but concentrations up to 70% can be achieved by mixing with oils, gel, and emulsifiers, or polymer entrapment in facial mask.⁹⁶ Also, the new features of honey discovered by the recent studies are useful. The recent *in vitro* studies have shown that honey can reduce microbial pathogenicity as well as reverse antimicrobial resistance.⁹⁷

3.6 | Coenzyme Q10

Coenzyme Q10 (CoQ10) or ubiquinone is the most important carrier of electrons in cellular respiration and is effective in the treatment of damaged and aged skin. The skin requires various enzymatic and nonenzymatic antioxidant complexes such as glutathione peroxidase, superoxide dismutase, and catalase and low molecular weight antioxidants such as vitamin E isoforms, vitamin C, glutathione (GSH), uric acid, and ubiquinol.⁹⁸ CoQ10 is a nonenzymatic agent that can stimulate repair processes as a natural antioxidant, removing the damaged biomolecules before they accumulate to cause altered cell metabolism or viability^{99,100} Based on clinical studies, CoQ10 is more effective in the presence of other elements such as vitamins (vitamins A, C, D, and B₆) and the amino acids arginine, cysteine, methionine, glutathione, and carnitine.¹⁰¹ CoQ10 formulation and ethanol can facilitate the penetration of substances into the stratum corneum.¹⁰²

3.7 | Exfoliant

Removing dead cells and debris from the epidermis or scrubbing is one of the popular ways to maintain moisture, refresh the skin, keep the pores clean, and improve local blood circulation. Homemade natural or organic exfoliating treatments that are derived from traditional medicine, which are related to the culture and available material in each country, are regularly used, but their active ingredients are in small quantities, and in some cases, they cannot get rid of the upper layer of skin, especially for removing a scar. Physician's advice using chemical exfoliants as part of skin care treatments to increase the penetration of the drugs. Recently, products that contain alpha hydroxy acids (AHAs) are marketed widely and used for different purposes depending on the concentration, such as smoothing fine lines and surface wrinkles, improving skin texture and tone, unblocking and cleansing pores, and for adjustment of pH (the degree of acidity or alkalinity). More recently, beta hydroxy acids (BHAs) or a combination of AHAs and BHAs are being used in skin care products. While both AHAs and BHAs act as exfoliants, they have an additional effect of improving the skin texture. The adverse effects reported in the FDA website for AHA until 2004 are 114 in number and include burning (45), dermatitis or rash (35), swelling (29), pigmentary changes (15), blisters or welts (14), skin peeling (13), itching (12), irritation or tenderness (8), chemical burns (6), and increased sunburn (3). Although the reported adverse effects of AHA have been considerably lower in the subsequent years, BHA has been more commonly used in the cosmetic products. The ingredients of BHA are salicylic acid (or related substances, such as salicylate, sodium salicylate, and some natural material such as willow extract), beta hydroxybutanoic acid, tropic acid, trethocanic acid, and on rare occasions, citric acid. It is obvious that all the exfoliating agents can act as a brightening factor for the skin.

3.8 | Brightening

Some useful ingredients such as brightening active factors have the same function and can be used along with the other ingredients to create a sense of satisfaction in the consumers. Some factors that we mentioned above, such as vitamin C and E,¹⁰³ AHA, and hydroquinone, are the gold standard in the United States for the treatment of generalized facial hyperpigmentation.¹⁰⁴ It has been banned in all the European countries (eg, France) because of the risk of cancer.¹⁰⁵

Azelaic acid, kojic acid, and retinoid family ingredients such as tretinoin, adapalene, tazarotene, and isotretinoin are the most prescribed lightening factors by physicians. The depigmentation activity of azelaic acid is mediated by antiproliferative and cytotoxic effects on the melanocytes. Its most frequent side effects include transient erythema and cutaneous irritation, characterized by scaling, itching, and burning, which generally resolve after 2-4 weeks of application.^{104,106} Kojic acid acts as a free radical scavenger and antioxidant, and it decreases the melanin content in melanocytes by inhibiting the conversion of melanin precursor to melanin.¹⁰⁷ Kojic

acid had been found to cause allergic reactions, and it showed only modest effectiveness in clinical trials. Multiple clinical studies have demonstrated its increased sensitizing potential. Also, it is associated with contact dermatitis and erythema.¹⁰⁸ Retinoid family demonstrates anti-inflammatory properties and acceleration of epidermal cell turnover.¹⁰⁹ They can disperse the keratinocyte pigmented granules. The most common adverse effects include burning, stinging, erythema, dryness, desquamation, and scaling. Although the adverse effects are reversible, retinoid dermatitis may itself lead to postinflammatory hyperpigmentation, especially in dark-skinned individuals.^{109,110} Despite what has been described above, a majority in the cosmetic industry prefer using vitamin (Niacinamide [B3] in SK-II Brightening Source Derm Revival Mask) or a natural source of brightening agent such as clay (Mineral clay firming mask; St Ives Co. Ltd) and Galactomyces Ferment Extract (SK-II Facial Treatment Masks), a genus of fungi that improves the human skin keratinization, pores, sebum excretion, brightness, and acne.¹¹¹

3.9 | Moisturizers

Moisturizers contain <5% lipid ingredients namely hydrator, humectants, glycerin (evo[®], Hydrator moisture mask), lecithin, and propylene glycol that have hydrophilic side and lipophilic to attach on the skin and draw water into the outer layer of skin.¹¹² Also, AHAs such as glycolic acid, hyaluronic acid, sodium hyaluronate, sorbitol, lactic, citric, and allantoin are used along with a hydrator in facial masks which helps the dead skin cells shed off, helps the skin keep in more water, and leaves the skin feeling smoother and softer. According to Dermaxime[®], a manufacturer of antiaging skin care products,¹¹³ glycerin helps to maintain the skin's water balance on an intercellular level. Glycerin mimics what is known as the skin's natural moisturizing factor; it can significantly influence the water binding materials in the stratum corneum (LANEIGE[®] Water Sleeping Mask).^{114,115} On the other hand, moisturizing products contain at most 25% of lipid. Moisturizers provide certain lipids to protect the skin. The lipid stays only on top of the skin, instead of being absorbed by the skin, to form a transparent layer that prevents water loss. Emollients/moisturizers, such as aka oil, jojoba oil, marula oil, and shea butter, work by forming an oily layer on top of the skin and trapping water.¹¹⁶

4 | CONCLUSION

As it has been described, skin sebum secretion necessitates the creation of special skin care products. Three types of cosmeceutical facial masks are widely used for skin beautification. Different types of wash-off masks are available such as moisturizing, cleansing, exfoliating, and mud types. The peel-out mask can be embedded with various nutrients to nourish the skin. Gel masks have cooling and moisturizing effect. Moreover, skin nourishment factors can be added to the gel mask for better performance. The facial mask used should be according to the skin type to achieve healthy skin. It seems that, based on the available market drivers, traditional medicine and natural ingredients are more favored by customers, but it is obvious that the efficacy

of chemical ingredients can alter the market. On the other hand, the tendency to use new technology and advanced therapy is increasing. It is recommended that the research and development section of the market player companies in this area should pay attention to the use of natural ingredients along with new technologies such as liposomal transfer of GF and liposomal transfer of nanoparticle, represented by nanotechnology and biotechnology science. We have tried to list the more attractive kind of masks and their ingredients, but among the different types of masks available, the sheet mask is attractive due to its easy application. However, a new generation of masks that contain more effective ingredients with this capacity and which pass the skin barrier is required with a different shape than that listed above. Among the eight important categories of ingredients, proteins and herbal ingredients are of interest to the customers and cosmetic industry. In summary, an attempt to add different materials to the facial mask could be an effective method to increase the market share, besides the beneficial effects. Nowadays, a number of different facial masks with different proposed effects are available in the market. Due to the variety of materials that are proposed by traditional and modern science to improve the facial mask properties, future studies on cellular and molecular signaling pathways and a comprehensive understanding of their role when used topically will play an important role in designing a proper facial mask.

DISCLOSURE

The author reports no conflict of interests in this work.

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