

**Botanical Cosmeceuticals for skin care****Rajesh Kumar\***

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**ABSTRACT**

Currently a new term in the cosmetic industry is 'Cosmeceuticals', which is the fastest growing segment of the natural personal care trade. They are the next generation of skin care. 'Cosmeceuticals' are the advances made within the world of skin products and the new paradigm in skincare. All cosmeceutical claims to contain functional ingredients with either therapeutic, disease-fighting or healing properties. There is no regulatory category for Cosmeceuticals; hence this review tries to understand regulatory scenario as well the difference between drug and cosmetics is enlightened. The paper is an earnest endeavor for commonly use of botanicals as skin cosmeceutical, classification of cosmeceutical, examples of some most important Botanicals for skin care and other cosmeceutical product that claims a beneficial physiologic effect. This review paper is to give recent knowledge about the latest trend of botanical Cosmeceuticals and their advantages over synthetic cosmetics.

**INTRODUCTION**

Cosmeceuticals are the advances made within the world of dermatological products and the new backbone in skincare. Cosmeceutical 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" was popularized by American dermatologist. Albert Kligman in the late 1970's. However the Egyptians were the first to recognize the health-giving properties of cosmetics. The "Ebers" a medical papyrus wrote in 1600 BC, made frequent to several cosmeceutical-type products. A favorite formulation was using honey and milk that claimed to help cure skin diseases. In the last years, research in aromatic and medicinal plants, and particularly their essential oils (EO), has attracted many investigators. EO have traditionally been used during centuries for their antifungal properties (Rieger MM 1998, Bigby M, 1998). More recently, several studies have shown evidence of the huge potential of these natural products as antifungal agents (Kumar et al., 2016) justifying their current use in a number of pharmaceutical, food, and cosmetic products. Therefore, it is not surprising that EO are one of the most promising groups of natural

products, for the development of broad-spectrum, safer and cheaper antifungal agents.

**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: Skin cosmeceutical products, hair cosmeceutical products and dental cosmeceutical products.

**Preparation of cosmetics:**

The cosmetics preparation are broadly divided into following three categories Solids (Face powders, Talcum powders, Face packs, Masks, Compact powders etc.), Semi solids: (Creams, Ointments, Liniments, pastes etc) and Liquids (Lotions, Moisturizers, Hair oil, Conditioners, Shampoos, Mouth washes, Deodorants, Sprays, etc.).The preparation of botanical cosmetics generally follows the same procedure as in the case of cosmetics. In preparation, suitable bioactive ingredients of their extracts are used

along with requisite ingredients basically used for cosmetics. It requires selection of suitable emulsifying agent, and modified methodology to obtain desirable product of specified parameters. The herbal cosmetics formulation is a sophisticated and sensitive technological profile because it retains the bioactivity of the botanicals during excessive processing and ascertains their availability after application on skin. It is desirable that manufacturers should ensure the quality of products through systematic testing at their level. Other parameters like organoleptic characteristics, pH, viscosity, stability towards light and refrigeration should also be evaluated.

### Why botanical cosmeceuticals?

Herbal extracts are primarily added to the cosmetic formulations due to several associated properties such as antioxidant, anti-inflammatory, antiseptic and antimicrobial properties (Qidwai *et al.*, 2016). Even today, people in rural and urban areas depend upon herbs for traditional cosmetics. Information on the herbal cosmetics was collected via electronic search (using pub med, scifinder, Google Scholar and web of science) and library search for articles published in peer-reviewed journals. Furthermore, information also was obtained from some local books on ethno pharmacology. The herbal extracts, as a whole or part, have been used for various ailments of the skin, hair, and dental care for overall appearance. Cosmetics alone are not sufficient to take care of skin and others body parts, it requires association of active ingredients to check the damage and ageing of the skin. Herbal cosmetics have gained much popularity among the population. Herbal cosmetics products claimed to have efficacy and intrinsic acceptability due to routine use in daily life and avoid the side effects which are commonly seen in synthetic products. Due to the awareness of the environmental damage caused by industrialization, a trend has developed to use products with natural ingredients. Various adverse effects may occur in the form of acute toxicity, percutaneous absorption, skin irritation, eye irritation, skin sensitization and photosensitization, sub chronic toxicity, mutagenicity, and photo toxicity by the usage of synthetic products that's why today's generation prefers herbal cosmetics for hair, skin and dental care. This review attempts and emphasizes the benefits of herbal extracts in cosmetics.

Botanicals comprise the largest category of cosmeceutical additives found into the market place today. Some botanicals that may benefit the

skin include green tea extract, ferulic acid, and grape seed extract. Ferulic acid: This compound, which is derived from plants, is considered to be a potent antioxidant, and has been shown to provide photo protection to skin. Furthermore, when ferulic acid is combined with vitamins C and E, the product has been shown to provide substantial UV protection for human skin. Moreover, Murray *et al.* reported that because its mechanism of action is different from sunscreens, ferulic acid could be expected to supplement the sun protection provided by sunscreens. Grape Seed Extract: This botanical has been established as a potent antioxidant and has been shown to speed wound contraction and closure. Topical application of grape seed extract has also been shown to enhance the sun protection factor in humans (Abdullah *et al.*, 2012).

### Commonly used skin cosmeceuticals

Hydroxy acid also referred to as fruit acids; they are a common ingredient found in many cosmeceutical products. Examples include citric acid, malic acid, and lactic acid. AHAs improve skin texture and reduce the signs of aging by promoting cell seeding in the outer layers of the epidermis and by restoring hydration. One hypothesis suggests that AHAs reduce the calcium ion concentration in the epidermis and, through chelation, remove the ions from the cell adhesions, which are thereby disrupted, resulting in desquamation. This is enhanced by cleavage of the endogenous stratum corneum chymotryptic enzyme on the catherins, which are otherwise protected from proteolysis by conjugation with calcium ions. The resulting reduction of the calcium ion levels tends to promote cell growth and slow cell differentiation, thus giving rise to younger looking (Abdullah *et al.*, 2012).

Skin-lightening agents added to product formulations have become increasingly popular and such products are in demand. Common depigmenting ingredients include hydroquinone, ascorbic acid (vitamin C), kojic acid, and licorice extract (glabridin). Hydroquinone: Hydroquinone has been the popular agent of choice for skin lightening. The US FDA has proposed concentrations between 1.5% and 2% in skin lighteners. A recent study suggests that this concern has been based mainly on studies with animal models utilizing long-term exposure at high dosages are carcinogenic. Routine topical application may pose no greater risk than that from levels present in common foods. 4) 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. Moisturizers: Moisturizers restore water content to the epidermis, and provide a soothing protective film. They improve the appearance and tactile

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). The most important herbals used for skin are summarized in table 1.

**Table 1: Most important Botanicals for skin care**

S. No.	Botanical Name With Family	Uses	References
1.	<i>Allium sativum</i> - Liliaceae	Garlic oil is useful to control sores, pimples and acne.	Lyantagaye SL, 2011
2.	<i>Aloe vera</i> - Liliaceae	Leaves juice, its pulp or extracted material is applied on skin for smoothness, healing controlling skin burn, sun burn and injury.	Gupta et al., 2006
3.	<i>Azadirachta indica</i> - Meliaceae	Bark, seed, fruits and leaves contain diterpenes and highly oxidized tetramer warmer parts triterpenoids .	Siddiqui et al., 1987
4.	<i>Carica papaya</i> - Caricaceae	Milky juice of unripe fruit is a good ingredient for facial and face cream.	Sadek KM, 2012
5.	<i>Citrus limon</i> - Rutaceae	Potential source of vitamin C; oil is used in various preparation to reduce skin itching and skin nourishment.	Molina et al., 2010
6.	<i>Cocos nucifera</i> - Arecaceae	Oil is useful for skin itching and rashes	Yong et al., 2009
7.	<i>Cucumis sativus</i> - Cucurbitaceae	Water extract of fruits and seeds protect skin from sunburn	Yan et al., 2011
8.	<i>Curcuma longa</i> - Zingiberaceae	Rhizome powder possesses anti-inflammatory and anti-oxidant properties.	Awasthi and Dixit, 2009.
9.	<i>Jasminum grandiflorum</i> - Oleaceae	Essential oil extracted from flowers is used in skin creams and lotions to control skin diseases.	Chaturvedi and Tripathi, 2011
10.	<i>Juniperus communis</i> - Cupressaceae	Whole plant extract is useful in skin creams to control skin rejuvenation.	Melvina et al., 2005
11.	<i>Lavandula vera</i> -Lamiaceae	Essential oil is used in skin anti-acne	Zuzarte et al., 2010
12.	<i>Mangifera indica</i> - Anacardiaceae	Plant extract possesses anti-oxidant properties	Scartezini and Speroni, 2000
13.	<i>Mimosa pudica</i> - Mimosaceae	Herb extract applied in skin creams	Behera, et al., 2006
14.	<i>Momordica charantia</i> -Cucurbitaceae	Plant extract possesses antioxidant properties	Beloin et al., 2005
15.	<i>Ocimum sanctum</i> - Lamiaceae	Leaves extract is useful to control skin infection.	Prakash and Gupta, 2005

### Adverse effects of synthetic cosmetics:

Skin caring agents remain on the body for a very short period of time and rarely cause significant adverse reactions, however, perfume and others constituents may cause skin irritation and allergic reactions. Moisturizers increase the hygroscopic properties of the skin; however, high concentration of these substances may cause irritation and exfoliation. Skin lightening/depigmenting agents, such as hydroquinone (HQ), are one of the most widely prescribed agents. Ochronosis is an uncommon adverse effect of HQ, characterized by progressive darkening of the area to which the cream containing high concentrations of HQ is applied for many years (Nigam PK, 2009). p-phenylenediamine (PPD), in the form of commercial hair dye mixed into the henna paste, which is very harmful. Addition of this artificial dye stains the skin in much shorter duration, an hour or less. Adverse reactions to PPD can include stinging sensations, with an erythematous rash, swelling, blisters, and surface oozing (Nigam PK, 1988). Adverse effects to sun-screening agents may result in irritant, allergic, phototoxic, or photoallergic reactions, and caused not only by

the active constituents but also by the additives such as fragrances and stabilizers. Benzophenones are probably the most common sensitizers, while dibenzoylmethanes, para-aminobenzoic acid (PABA), and cinnamates may cause photoallergic dermatitis (Johansen et al., 1996).

The allergic complications associated with deodorants and fragrances are usually caused by fragrance or other ingredients. Fragrance can enter the body through lungs, airways, skin, ingestion, and via pathways from the nose directly to the brain and can cause headaches, irritation to eyes, nose, and throat, dizziness, fatigue, forgetfulness, and other symptoms. Fragrance is the number one cause of skin allergic reactions to cosmetics (De Groot AC and Frosch et al., 1997, 10. Bridges 2002 ).

Shampoos and conditioners have only a brief contact with the skin and are not a common cause of cutaneous irritant or allergic contact dermatitis. However, eye irritation can be a problem. Possible sensitizers in shampoos include formalin, parabens, hexachlorophene, triclosan, and fragrances. Matting of scalp hair is most commonly a sudden, usually irreversible, and tangling of scalp hair resulting from shampooing.

Hair straightening (relaxing) with pressing oils and heated metal combs or round tongs may be associated with hair-shaft breakage and scarring alopecia. Hair removal techniques may partially account for allergic and photoallergic reactions (Schafer *et al.*, 2002).

The adverse effects of shaving include skin irritation, cuts in the skin, ingrown hair (pseudofolliculitis), etc. The active ingredients in hair bleaches are hydrogen peroxide solutions that oxidize melanin to a lighter color. They may be supplemented with persulfate boosters. The disadvantages of bleaching include skin irritation, temporary skin discoloration, pruritus, and the prominence of bleached hair against tanned or naturally dark skin. Ammonium persulfate may cause types I and IV allergic contact reactions.

#### **Consistent with its mechanism of action?**

The uppermost layer of skin i.e. stratum corneum is an effective barrier to transepidermal water loss and to penetration of exogenous substances. One need not progress to the stage of clinical trials to suspect that these active ingredient marketing claims have little basis in scientific reality. For example, topically applied hyaluronic acid is found in many cosmeceutical moisturizers. It has not been shown that hyaluronic acid penetrates through the stratum corneum. It increases cutaneous water-holding capacity; but does not have any other pharmacologic effects in human skin.

#### **Delivery of botanicals using nanoparticles -a new paradigm:**

Various novel drug delivery systems such as liposomes, niosomes, microspheres and phytosomes have been reported for the delivery of herbal drugs. Incorporation of herbal drugs in the delivery system also aids to increase in solubility, enhanced stability, protection from toxicity, enhanced pharmacological activity, improved tissue macrophage distribution, sustained delivery and protection from physical and chemical degradation. The phytosomal carriers have been studied for effective delivery of herbal extracts of ginseng, ginkgo biloba etc. Direct binding of phosphatidylcholine to herbal extract components led to better absorption characteristics as compared to conventional delivery of herbal extracts. Other vesicular assemblies like microspheres, nanoemulsions, polymeric nanoparticles etc. have been proved beneficial to carry herbal components.

Nanoparticles are the submicron size particles having size range 10 to 1000 nm. The main advantages of the nanoparticles is their stability and long term storage. The particle size and surface characteristics of nanoparticles can be easily modified for controlled and targeted drug delivery. Nanosizing led to increased solubility of components, reduction in the dose via improved absorption of active ingredient. Nanoparticles are efficient delivery systems for the delivery of both hydrophilic and hydrophobic drugs.

#### **CONCLUSION**

Botanicals have lesser side effects and rich sources of beneficial compounds including antioxidants, anti-inflammatory, antiseptic and antimicrobial properties. In India most of the populations use herbal cosmetics for their body care. Presently herbal cosmetics have been increased in personal care system and there is a great demand for the botanical cosmetics in daily life. Moreover other cosmetic treatment is expensive and cannot be afforded by poor people.

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