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Abhinay Kumar Dwivedi

Research Scholar, Sri Satya Sai
University of Technology and
Medical Sciences, Sehore,
Madhya Pradesh, India

Deenanath Jhade

Associate Professor, Sri Satya
Sai University of Technology
and Medical Sciences, Sehore,
Madhya Pradesh, India

Cosmetic potential of selected medicinal plants: A review

Abhinay Kumar Dwivedi and Deenanath Jhade

Abstract

The popularity of herbal cosmetics increasing very rapidly among the people due to awareness of harmful side effects and adverse reactions caused by synthetic compounds. Herbs can be used in many forms for their cosmetic effects, various essential oils, juices, fixed oil, plant exudates, extracts, isolated compound, plant products have been used for their cosmetics effects. Higher acceptability of herbal cosmetics is due to safety, lower side effects, higher bio-compatibility, cost effectiveness, easy availability environmental friendly nature and traditional experience of uses. The reliability on herbal cosmetics encourage to screen herbs and natural ingredients for their cosmetic potential. Scientific review of available data and new researches can provide basis to use more plants for their cosmetics potential. This review attempts to emphasize the use of important medicinal plants for their cosmetic potential in herbal cosmetics.

Keywords: herbal cosmetics, medicinal plant, polyphenol, flavonoids, cosmetics

Introduction

Use of natural ingredients as cosmetics appeared throughout the history of man has been developed [1]. The word cosmetic was derived from the Greek word "kosm tikos" meaning having the power, arrange, skill in decorating. Beauty is perhaps the desire of every human being on earth and appearance has always been a matter of prime importance [2]. Since ancient times humans have got special interest in taking care of the external appearance of the their body. Besides everyone desired to look beautiful, they also want to use safe, natural and healthy products. For this reason, cosmetics containing natural ingredients have much more popular as they considered safe, effective and non-toxic in nature [3].

As per as Drug and Cosmetic Act 1940 and Rules 1945, the cosmetics have been defined as "Any article intended to be rubbed, poured, sprinkled or sprayed on, or introduced into, or otherwise applied to, the human body or any part thereof for cleansing, beautifying, promoting attractiveness, or altering the appearance, and includes any article intended for use as a component of cosmetic" (Drugs And Cosmetics Act and Rules, 1945) [4].

The term cosmeceuticals was first used by Raymond Reed founding member of US Society of cosmetics Chemist in 1961. He used the word to brief the active and science based cosmetics. The term was further used by Dr. Albert Kligman in the year 1984 for the substances that have both cosmetic and therapeutic effects [5]. Herbal cosmetics are basically the natural products obtained from plants or other natural sources and used to clean, beautify or provide attractiveness or to alter body appearance.

Cosmetic potential of medicinal plants**Carrot**

Carrot is obtained from the plant *Daucus carota* belonging to family Apiaceae. It is a valuable herb since long time as natural source of vitamin A along and other essential vitamins. Carrot seed oil is used for anti-aging, revitalizing and rejuvenating. It promotes the formation of new cells and helps to reducing wrinkles. It works as natural toner and rejuvenator for the skin [6].

Curcuma (Turmeric)

Turmeric Species such as *Curcuma longa*, *C. Aromatica* and other belonging to family Zingiberaceae have been traditionally used in Ayurvedic, Siddha, Unani, Chinese and folk medicine in south-east Asia [7]. Turmeric may be the first known to be used as cosmetic as it has been traditionally smeared on the skin. It has been used to reduce facial hair growth, reduce acne and improve complexion [8, 9]. Curcuminoids have cosmeceuticals potential as antioxidant, anti-inflammatory and skin lightening agents. Curcuminoids have shown good potential to inhibit elastase, collagenase and hyaluronidase [10].

Corresponding Author:**Abhinay Kumar Dwivedi**

Research Scholar, Sri Satya Sai
University of Technology and
Medical Sciences, Sehore,
Madhya Pradesh, India

Aloe vera

Most commonly used plant for its medicinal and skin care properties worldwide, locally known as ghrit kumari or gwar patha is obtained from *Aloe barbadensis* Miller family liliaceae. In traditional system of medicine Aloe vera is very valuable for skin related problems, it initiates the synthesis of elastin and collagen, these proteins are responsible for prevention of aging of the skin [11, 12]. Aloe vera imparting the freshness sensation by increasing distribution of blood and providing easier oxygen exchange among the cells. Aloe vera can be used for moisturizing and softening the skin. Various products available in the market containing Aloe vera which may be used post-showering to obtain the skin in super soft shape. Aloe vera gel, cream or lotion applied on the face forms a cover that helps to shield the skin from dust and other natural elements which may be injurious to the skin [13, 14].

Neem

Neem (*Azadirachta indica*) commonly known as Margosa or Indian Lilac, belonging to family Meliaceae, It has been used medicinally since ancient times by many different cultures. Many compounds have been found in the exudates of the, *Azadirachta indica* plant that have been used medically by humans to cure of all ailments [15]. The plant shows various health restoring benefits and Effective in skin infection, rashes and pimples, immunity booster, anti-obesity, blood purifier for beautiful and healthy skin, piles, hair disorder and oral disorders [16].

Sandalwood

Commonly known as Indian Sandalwood obtained from *Santalum album* L. (Santalaceae), is one of the oldest and precious sources of natural fragrance with immense medicinal and commercial significance. The oil is obtained from the heartwood of the plant contains about 90% alpha- and betasantalols. Topical applications of oil shows various effect on the skin according to their composition. The sandalwood oil may restore and rejuvenate skin wrinkle due to its antioxidative, anti-inflammatory, nitric oxide scavenging, cell regulatory and metabolic properties [17].

Tulsi

Tulsi is known as Mother Medicine of Nature and The Queen of Herbs is an aromatic shrub *Ocimum sanctum* in the basil family Lamiaceae that is thought to have originated in north central India and now grows throughout the eastern world tropics [18]. Rosmarinic acid was found as the major compound responsible for those anti-ageing activities. The ethanolic extract of *Ocimum sanctum* is an attractive natural source of anti-skin ageing ingredient for applications in cosmetic and cosmeceutical industry [19]. Tulsi showed broad-spectrum activity against *Streptococcus mutans*, the organism responsible for tooth decay, further suggests that it can be used as a herbal mouth wash for treating bad breath, gum disease and mouth ulcers [20, 21].

Cucumber

Cucumis sativus, commonly known as Cucumber belonging to family Cucurbitaceae, is believed to be originated in Asia and found as wild cucumbers in India [22]. The fresh fruit is used internally for the treatment for heat rash, blemished skin. Externally it is used for wounds, burns, sores, and as cosmetic for softening, moisturizing and whitening skin [22]. The juice of cucumber exhibited potent anti-elastase activity and anti-hyaluronidase. Ascorbic acid was found to be 3.5% which

may be responsible for potent anti-wrinkle agent in cosmetic products [23]. Lutein found in leaves may be potentially useful in skin whitening agent [24]. Daily intake of cucumber fruit promotes healthy hair growth, it is useful in skin problems, sunburn and also for curing swelling under the eye. Juice of cucumber is also useful to soften the skin texture. It is also beneficial for curing various skin infection like eczema [25, 26].

Saffron (Kesar)

Saffron the most expensive cultivated herb in the world, is a perennial spicy herb *Crocus sativus* L. Belonging to family Iridaceae and well known as Red Gold in producer countries. The dried stigmas of the plant processed to produce saffron, which has some other importance in pharmaceuticals, cosmetics, perfumery, and textile dye-producing industries [27]. In traditional Greek medicine, it was used refresh the skin of the face and to treat acne, skin diseases and wounds, in addition it also used in body to look younger and brighter [28]. Saffron tepals have rich in crocin and kaempferol, that may be useful for potential cosmetic uses. The most promising activities are anti-Aging Effect, anti-UV Agent, and diseases of the skin and perfumery, Saffron also used as natural colorant in cosmetics [28].

Camellia sinensis (Tea)

The most widely consumed beverages worldwide, and is the second-most consumed drink after water. It is obtained from the leaves, buds, or delicate stems of the plants of the genus *Camellia*. The most widely used plant species for tea is *Camellia sinensis* (L.) Kuntze, family Theaceae [29]. Tea mainly consists of polyphenols, minerals, caffeine and trace amounts of amino acids, vitamins, and carbohydrates. The polyphenols present in tea will vary depending upon the level of fermentation. Green tea mainly consists of catechins, whereas black tea mainly contains tannins [29]. The plant leaves are the most rich sources of catechins, it also contain caffeine a purine alkaloid of high cosmetic significance. Tea extracts are important components of many cosmetics, like moisturizing lotions, creams, shower gels, cosmetic facial masks and hair products. *Camellia sinensis* extracts have multidirectional effect. Among all types of tea extracts, green tea extracts are the most widely used. The beneficial effects of tea plant and its extracts in cosmetics are anti-ageing, skin and hair care and slimming properties. The constituents of tea and its extracts are also effective in photo protection against harmful effects of UV irradiation and skin microcirculation enhancement [30].

Ziziphus mauritiana (Ber)

Ziziphus mauritiana known as Indian Jujube or Ber, family Rhamnaceae, is a tropical fruit found in many parts of the world especially in India, Africa and Pakistan [31, 32]. Traditionally it is used as antiulcer, anti-inflammatory, antibacterial, antifungal, Immunostimulant, Antioxidant, and Wound healing properties. The bioactive compound present in plants are riboflavin-bioflavonoids, ascorbic acid, thiamine, and Pectin A and various chemical substances like mucronine-D, nummularine-B, sativanine-E, mauritine-A, amphibine-H; Jubanine-A, Jubanine-B, Ziziphine-A to Q [33]. Topical application of the leaf extract to has significantly worked on skin aging and viscoelastic properties of the skin. The plant may be useful in the prevention and treatment of hyperpigmentation [34].

Piper betle (Pan)

Piper betle belonging to family Piperaceae commonly known as Pan, Traditionally the leaves have been used for the prevention of bad breath, as a mouth freshener due to their antibacterial activity, it has been used as effective agent for flatulence, wound healing, to enhance digestion and pancreatic lipase stimulant effect, aromatic stimulants, prevention of cataracts and pulmonary diseases [35, 36]. The leaves of *Piper betle* has been found to have skin-lightening effect, the effect has been shown due to the presence of compound 1-allyl-3,4-dihydroxybenzene or hydroxychavicol [37]. The leaf extract of *Piper betle* has been reported for maintaining skin moisture in the old age and reduce pruritus [38].

Hibiscus (China rose)

Hibiscus rosa sinensis, belonging to the Malvaceae family, commonly known as China rose or “Queen of tropics” is beautiful flowering plant. The plant has been used for various therapeutic benefits in infections caused by bacteria and fungi, treating wounds, inflammation, gastric ulcers, diabetes, hair loss, fever and coughs in tropical countries [39]. The flowers and leaves have found to rich in flavonoids, hydroxycinnamic acid derivatives, the flower of the plant has large amount of anthocyanins, kaempferol, catechins, glycosides and dihydrochalcones [40]. Traditionally the plant extract has been used as medicine for the treatment of skin disorders and burns [41, 42]. The plant extracts may have active constituents that protecting the cells from oxidative stress, harmful effects of UV radiation and collagen degradation that might be useful as skin cosmetics [42].

Calendula (Pot marigold)

Calendula officinalis Linn. Commonly known as Pot marigold, has been traditionally used in the treatment of wounds and burns. Topically the infusion of flower has been used as antifungal and antiseptic in wounds, freckles, sprain, marks and conjunctivitis [43]. The active compound are flavonoids, saponins, triterpendiol esters and carotenoids. Topically *Calendula officinalis* flower extract has found effective against UV irradiation-induced skin damage. It has been useful in healing burns and wounds [44].

Tagetes (Marigold)

Tagetes erecta L. Family Asteraceae It is a popular garden plant with strong aromatic essential oil known as tagetes oil, which used to make high-grade perfume. The flower consists of carotenoids consisting of β carotene, lycopene, lutein, zeaxanthin, neoxanthin, phytoene phytofluene, violaxanthin, and α -Cryptoxanthin [45]. The plant has been used for its medicinal properties like anti-inflammatory, analgesic, and anti-edematous since long time, the constituents of flower might be responsible for various dermatological, cosmetic and therapeutic effect [46, 47]. Flower extracts showed significant skin anti-aging effect by enhancing collagen synthesis and it might be protect against photo-aging of skin [48].

Rosemary

Salvia rosmarinus Spenn, commonly known as rosemary, belonging to the Lamiaceae family. The plant has been used in the folk medicine, pharmaceutical, and cosmetics industries for its therapeutic and aromatic properties. The therapeutic potential of plant due to presence of secondary metabolites such as flavonoids, polyphenols, and terpenes oleanolic, micromeric carnosic, rosmarinic, ursolic acid [49, 54]. The oil

and extracts of the plant has been widely used in cosmetics for fragrance it is also used as skin conditioner in definite concentration. It can be used for preservation of cosmetics from degradation. It absorbs harmful UV radiation. The plant has shown its potential as antifungal, bactericidal and anti-alopecia agent [50, 51, 52, 53].

Lavender

Lavandula angustifolia Mill, commonly known as lavender belonging to family lamiaceae. The essential oil obtained from the flowering tops has been used in cosmetics, and medicinal preparations since old age particularly in Greek and Roman. Various species of the plant has found to be useful in cosmetic preservation due to their antioxidant, antimicrobial and antifungal properties, the oil can be used without any dilution [55]. The major active constituents found to be present are *B*-ocimene, terpinen-4-ol, camphor, linalool, 1, 8-cineol, linalyl acetate [56]. Essential oil has been widely used in cosmetics for their fragrance and aromas in soaps, perfumes, moisturizers, shampoos, sunscreen lotions and other body products since long time [57].

Citrus limon (lemon)

Citrus limon (L.) family Rutaceae, popularly known as lemon. The fruits are known for their nutritional, pharmaceutical and cosmetic significance since long time [58]. The important biologically active compounds found in *Citrus limon* fruit and its juice was flavonoids like: hesperidin, hesperetin, naringin, quercetin eriodictyol, apigenin, diosmin and their derivatives [58]. *Citrus limon* fruit extracts and essential oil, have proved to be effective for acne-prone skin, sunburn and mycosis [59]. The essential oil has been used in formulations like disinfectants, topical ointments, shampoos, toothpaste and other cosmetics for their antibiotic and flavoring properties [60]. It is used in combination with vitamin E for anti-aging and anti-wrinkle preparations [61].

Hemidesmus (Indian sarsaparilla)

Hemidesmus indicus (L.) R. Br. Belonging to family Periplocaceae, also known as Indian Sarsaparilla. The plant has been widely used in Ayurveda, Unani and Siddha system [62, 63]. The important constituents found in the plant are steroids, glycosides terpenoids, aldehydes flavonoids, coumarins and others. The oil of the root has been found the rich source of terpenoids, aliphatic acid and aldehyde [64]. The natural fats found in plant responsible for its skin's moisturizing property. The aromatic oil has sweet fragrance, That might be useful in deodorant preparations. The extract of the plant can be used in prevention of acne and dandruff treatment. The antimicrobial property found in plant made it useful in the preparation of medicated talcum powder and hand sanitizer. The plant has used as melanin inhibitor and potential anti-aging ingredient near eyes circle [65, 66, 67].

Betula pendula (Birch)

Betula pendula Roth belonging to family Betulaceae, is commonly known as a birch tree found in the northern hemisphere from Canada to Japan. White or silver birch, Traditionally plant parts have been utilized for various medicinal purposes, it has been used to treat various skin conditions like eczema, inflammations, urinary disorders, rheumatism. The leaf bud oil used as antiseptic in various cosmetic products. The extract of the plant has been reported for many polyphenolic constituents such as quercetin, kaempferol catechin, myricetin, *p*-coumaric acid [68]. The leaf

extract of the plant used for skin-whitening and antioxidant effects in cosmetics ^[69].

Discussion and Conclusion

The plants used in cosmetics not merely enhance beauty but they also have medicinal properties so using medicinal plants for cosmetics may give some desired medicinal benefit for skin and body. As the demand is rising for natural cosmetics over synthetic cosmetics. More plants needed to screen scientifically for their cosmetic potential. Flavonoids, polyphenols, terpenoids, antioxidants, carotenoids and vitamins found to be responsible for cosmetic effects of selected medicinal plants. More selective research needed to prove exact relation between chemical constituent and cosmetic effect of selected plant, which may help to use of selected chemical compound in cosmetic products in future.

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