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Ethnopharmacological relevance's of herbal plants used in cosmetics and toiletries preparations

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Abstract

There are thousands of herbs that are used in preparation of various herbal cosmetics and toiletries preparations. Day-by-day, use of herbal cosmetics and toiletries preparations are increasing as currently available cosmetics are showing unwanted effects upon prolonged use. They are prepared by using different herbs or their extracts or juice derived from them. Herbal cosmetics and toiletries preparations are being used by Indian peoples and peoples from Indian sub-continental region since ancient time. They are used to improve the appearance of the skin. Herbal cosmetics are becoming more popular because they are comparatively cheaper, safe and easily available. WHO as well as AYUSH department of India, encourages the peoples to use these types of cosmetics for routine use. In the present paper, we have covered various pharmacognostic and relevant information of medicinal plants used in the cosmetics and toiletries preparations.

Keywords: Cosmetics; Toiletries, Herbal; Beauty; Standardization

Graphical abstract



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1. Introduction

There is long history of the use of medicinal plants in the treatment of various diseases or disorders of animals and human being [1-20]. They are not only use in therapeutic formulation to cure or prevent or in mitigation of diseases or disorders, but also, they are used to improve the beautification of the person. Some of them also find their application in regular cooking in the Indian kitchen. Cosmetic preparations made by use of herbal drugs (medicinal plants) are commonly called as herbal cosmetics [21-22]. One of the reasons behind its popularity is use of herbal cosmetics as they are comparatively cheaper and widely acceptance by peoples. These formulations are developed and modified by traditional Guru-Shishhya Parampara. In the ancient books, there is a reference of many plants and their parts such as leaves, roots, barks, flowers, etc that are used in cosmetic preparation [23-24].

Herbs do not produce instant cures but they produce slower but prolong effect. They offer a way to put the body in proper tune with nature. There are number of herbal cosmetic and toiletry preparations (C & T) available in the market. The demand of herbal medicines is increasing rapidly due to their skin friendliness and lack of side effects. The natural constituents in the herbs possesses prolong effect with minimum side effects. The science of Ayurveda had used many herbs and flowers to create cosmetics to beautify and protect against external effects [25-26].

2. Advantages of using herbs in C and T preparations

There are number of advantages in the use of herbal drugs in making of cosmetics. They are discussed below [27].

- Safe to use
 - Compatible with all skin types
 - Wide Selection to choose From
 - Fit your Budget
 - Not tested on animals
 - Less side effects
-

3. Herbs used in C and T preparations

There are numerous herbs available naturally having different uses in cosmetics and toiletries preparations for skincare, hair care and as antioxidants, fragrant etc.

3.1. *Aloe vera*



Figure 1 Leaves of *Aloe vera*

Aloe vera (Figure 1) is a most ingenious mixture of an antibiotic, an astringent coagulating agent, a pain inhibitor and a growth stimulator (also called wound hormone). It accelerates the healing of injured surfaces. It is used for pain relief and healing of 'hemorrhoids, applied externally and internally [9,28].

3.2. *Embilica officinalis*

Plant occurs throughout India and bears an edible fruit (Figure 2). This fruit is highly prized both for its high Vitamin C content and for the precious oil, which is extracted from its seeds and pulp and used as a treatment for hair and scalp problems. It is used in eye syndromes, hair loss and children ailments, etc [29].



Figure 2 Fruits of *Embilica officinalis*

3.3. *Sapindus mukorossi*

Sapindus mukorossi is used in powder form. Powder is prepared from dried fruit (Figure 3). It can be used as a face pack to improve facial complexion. It is used as a hair application to make hair shiny and their beautification. It also removes dandruff and lice in hair. It can also be used to clean jewellery and washing woolen clothes. It is used in Ayurvedic preparations and Herbal Shampoos [30].



Figure 3 Fruit of *Sapindus mukorossi*

3.4. *Azadirachata indica*

Trees of *Azadirachata indica* are found throughout India (Figure 4). It is effective in skin infection, rashes and pimples, immunity booster, anti-obesity, blood purifier for beautiful and healthy skin, anti-diabetic, anti-viral, dispels intestinal worms and parasites, malaria, piles, hair disorder and oral disorders [31].



Figure 4 Tree of *Azadirachata indica*

3.5. *Acacia cancellina*

Plant *Acacia cancellina* is a small shrub-like tree, which grows in the warm, dry plains of central India. For centuries, the people who have had access to this tree have used its pods (Figure 5) like fruit to clean their hair. It is considered a superior cleanser for lustrous long hair and has been reported as promoting hair growth and preventing dandruff. It also helps in removing dandruff and lice and very effective in removing oil and dirt from hair [32-33].



Figure 5 Pods of *Acacia cancellina*

3.6. *Calendula officinalis*

Flowers of *Calendula officinalis* (Figure 6) is reported to have a remarkable antioxidant activity, anti-inflammatory activity and wound healing activity. A previous study demonstrated that the essential oil consists mainly of α -thujene, α -pinene, 1,8-Cineole, dihydrotagetone and Tmuurolol. Suspension or tincture is used topically to treat acne, reducing inflammation, controlling bleeding and soothing irritated tissue [34-35].



Figure 6 Flowers of *Calendula officinalis*

3.7. *Curcuma longa*

Rhizomes of *Curcuma longa* (Figure 7) are used in many celebrations of Hindus. Especially in Hindu wedding brides would rub with turmeric on their bodies for glowing look. New born babies also rubbed with turmeric on their forehead for good luck. Traditionally women rub turmeric on their cheeks to produce a natural golden glow. It is a deep yellow-to-orange powder that comes reduce the number of Ultraviolet B-induced sunburn cells in mice [36-37].



Figure 7 Rhizomes of *Curcuma longa*.

3.8. *Rhodiola rosea*

It is commonly known as golden root, roseroot, Aaron's rod, arctic root, king's crown, lignum rhodium, orpin rose. Roots of *Rhodiola rosea* (Figure 8) are used to increase physical endurance, work productivity, longevity, resistance to high altitude sickness, and to treat fatigue, depression, anaemia, impotence, gastrointestinal ailments, infections, and nervous system disorders. It is rich in phenolic compounds, known to have strong antioxidant properties [38-39].



Figure 8 Plant of *Rhodiola rosea*

3.9. *Daucus carota*

Root of the plant *Daucus carota* (Figure 9) belonging to family Apiaceae.

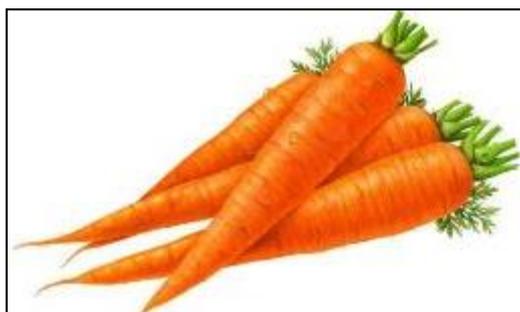


Figure 9 Roots of *Daucus carota*

It is a valuable herb since ages as due to its richness in Vitamin A along with other essential vitamins. Carrot seed oil is used as anti-aging, revitalizing and rejuvenating agent. The carrot gets its characteristic and bright orange colour from β -carotene, and lesser amounts of α -carotene and γ -carotene. α and β -carotenes are partly metabolized into vitamin A in humans [40].

3.10. *Ginkgo biloba*

Leaves of *Ginkgo biloba* (Figure 10) and nuts of the tree are used to treat various medical conditions such as poor blood circulation; hypertension; poor memory, and depression, and male impotence.



Figure 10 Leaves of *Ginkgo biloba*

In addition, it is gaining a similar reputation as an antioxidant and anti-inflammatory agent. Extract EGb 761, prepared from the tree's leaves, is a natural mixture containing flavone glycosides (33%), mostly quercetin and kaempferol derivatives, and terpenes (6%), which has exhibited the capacity to isolated from the leaves of *L. inermis* has shown significant antifungal antibiotic effect [41-42].

3.11. *Lawsonia inermis*

Leaves of *Lawsonia inermis* (Figure 11) contains a dye molecule called Lawsone, which when processed produces Henna powder. Besides lawsone other constituents present are gallic acid, glucose, mannitol, fats, resin (2%), mucilage and traces of an alkaloid. Leaves yield tannic acid and an olive oil green resin, soluble in ether and alcohol Henna helps to improve hair health [43-44].



Figure 11 Leaves of *Lawsonia inermis*

3.12. *Cocos nucifera*

Oil obtained from the part of the endosperm of the dried drupes (Figure 12) of *Cocos nucifera*. Coconut oil helps bolster your skin's protective barrier layer, trapping moisture inside and keeping skin supple and hydrated and also reduces inflammation. Coconut oil has anti-inflammatory properties, making it beneficial for irritated, chafed skin. It also increases collagen production. It is white or pearl- white unctuous mass in winter and colorless in summer [45-46].



Figure 12 Drupes of *Cocos nucifera*

3.13. *Prunus dulcis*

The oil is obtained from kernels of *Prunus dulcis* (Figure 13). It proves to be very nourishing, and softens and strengthens the hair. The almond oil also proves to be a very good cleansing agent [47].



Figure 13 Kernels of *Prunus dulcis*

3.14. *Arachis hypogea*

Oil obtained from the seeds of the *Arachis hypogea* (Figure 14) belonging to the family Leguminosae. The oil is pale yellow in colour, with a faint nutty odour. It is used in the preparation of hair oils [48].



Figure 14 Pods and seeds of *Arachis hypogea*

3.15. *Ricinus communis*

Oil is obtained from the seeds of *Ricinus communis* (Figure 15) belonging to the family, Euphorbiaceae. It is used as an emollient, in the preparation of lipstick, hair oils, creams and lotions [49].



Figure 15 Seeds of *Ricinus communis*

3.16. *Eucalyptus globulus*

Eucalyptus oil is the generic name for distilled oil from the leaf of *Eucalyptus globulus* (Figure 16), a genus of the Plant family Myrtaceae. Eucalyptus oil can help to get rid of dandruff, which in turn can help to promote healthy growth of hair [50-51].



Figure 16 *Eucalyptus globulus* tree

3.17. *Rosa damascena*

Steam-distilled rose oil obtained from flowers (Figure 17) of the plant *Rosa damascena* is commonly used in perfumery. Oil is rich in essential fatty acids and antioxidants, which are integral for tissue and cell regeneration in the skin. Typical tap water is usually in the range of pH 6.7 to 8.8, which can lower the pH of the skin. Rose water, with an average pH of 5.0, mitigates this change. When applied directly to the skin, skin care products containing rose essential oil are purported to hydrate dry skin, clear acne, reduce signs of aging, minimize the appearance of scars, and help with conditions such as eczema and rosacea. The key flavour compounds that contribute to the distinctive scent of rose oil are beta-damascenone, beta-damascone, beta-ionone, and oxide [52-53].



Figure 17 *Rosa damascena*

3.18. *Cymbopogon citratus*

Citronella Oil is one of the essential oils obtained from the leaves and stems of different species of *Cymbopogon citratus* (family- Poaceae) (Figure 18). The crisp, rich citrus or lemon like aroma of this oil drives away body odour and is used deodorants and body sprays, although in very small quantities, since it heavy doses it may give skin irritations. It can also be mixed with the bathing water to have a refreshing, body odour ending bath [54]



Figure 18 *Cymbopogon citratus*

3.19. *Olea europaea*

Fixed oil extracted from the fruits of *Olea europaea* (Figure 19), family oleaceae.



Figure 19 *Olea europaea*

The major constituents are triolein, tripalmitin, trilinolein, tristearate, monosterate, triarachidin, squalene, β sitosterol and tocopherol. It is used as skin and hair conditioner in cosmetics like lotions, shampoos etc. It is a potent fatty acid penetration enhancer [55-56].

3.20. *Helianthus annuus*



Figure 20 *Helianthus annuus*

It is the non-volatile oil extracted from sunflower seeds obtained from *Helianthus annuus* (Figure 20), family Asteraceae. Sunflower oil contains lecithin, tocopherols, carotenoids and waxes. It has smoothing properties and is considered non-comedogenic. A simple yet cost-effective oil, well tried and tested for generations in a wide variety of emulsions formulated for face and body Products [57-58].

3.21. *Tamarindus indica*

Fruits (Figure 21) contain amino acids, fatty acids and minerals of tamarind plant parts. The most distinguished characteristic of tamarind is its sweet acidic taste due to tartaric acid.



Figure 21 Fruits of *Tamarindus indica*

Besides being a rich source of sugars, tamarind fruit is also an excellent source of Vitamin B and minerals, exhibit high antioxidant capacity that appear to be associated with a high phenolic content, and thus can be an important food source [59-60].

3.22. *Santalum album*



Figure 22 *Santalum album*

Wood (Figure 22) of tree contain Alpha- and beta-santalol, cedrol, esters, aldehydes, phytosterols, squalene. It belonging to family Santalaceae. Paste of hardwood is used in face pack; essential oil used in preparation of creams, ointments and lotions for skin beautification and protection from sunburn; possesses antioxidant properties [61-62].

3.23. *Cucumis sativus*

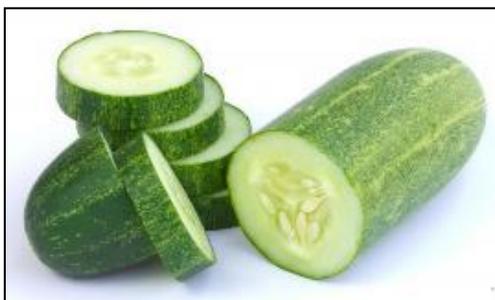


Figure 23 Fruits of *cucumis Cucumis*

Fruits of *cucumis sativus* (Figure 23) It is a rich source of vitamins and minerals essential for a healthy-looking skin. Calm and cooling, Cucumber Peel extract makes a wonderful addition to skin care products for its toning and skin tightening properties [63-64].

3.24. *Hibiscus sabdariffa*

Flowers of the plant *Hibiscus sabdariffa* are widely used in cosmetics in the treatment of hairfall. It contains calcium, phosphorus, iron, and vitamin B1 used to stimulate thicker hair growth and prevent premature greying of hair [65-66].



Figure 24 Flower of *Hibiscus sabdariffa*

3.25. *Carica papaya*

Fruits of *Carica papaya* (Figure 25) contains Papain, chymopapain, carpain, carpasemine, benzyl isothiocyanate, belongs to family Caricaceae. Milky juice of unripe fruit is a good ingredient for facial and face cream; fruit pulps make skin soft and remove blemishes [6,67].



Figure 25 Fruits of *Carica papaya*

3.26. *Ocimum sanctum*



Figure 26 *Ocimum sanctum*

The plant *Ocimum sanctum* Linn (Figure 26) finds sacred place in Indian culture. The plant is almost present in premises of every house and a person daily worship the plant. It has fresh and dried leaves of, belonging to family Labiatae. It

contains Oleanolic acid, Ursolic acid, Rosmarinic acid, Eugenol, Carvacrol, Linalool, and β -caryophyllene. Leaves extract is useful to control skin infection and rejuvenation [68-69].

3.27. *Withania somnifera*

Withania somnifera (Figure 27) belonging to family **Solanaceae** consists of the dried roots and stem bases. The main constituent is withaferine A, withanolide D, somniferine, pseudowithanine, tropine, pseudotropine, anahygrine and steroid lactones. Whole plant extract is used in skin cleansing formulations and possesses antioxidant properties [10,70].



Figure 27 Roots of *Withania somnifera*.

3.28. *Sesamum indicum* L.

The fixed oil obtained by expression from the seeds (Figure 28) of plants belonging to family Pedaliaceae. It contains Latifonin, momorcerebroside, soyacerebroside II, betasitosterol, daucosterol, D-galacitol. Seed oil is used as a base for preparing specific hair oils and it useful for skin protection and rejuvenation [71-72].



Figure 28 Seeds of *Sesamum indicum*

3.29. *Juglans regia* L.



Figure 29 Fruits of *Juglans regia*

Fruits of *Juglans regia* L. (walnut) contains Oleic acid, macadamia, linoleic acid, linolenic acid, methionine, cysteine, tryptophan, threonine. Leaves and hull of fruits is used for hair dyeing [73-74]. The plant is used as a topical remedy for

dermal inflammation and excessive perspiration of the hands and feet. It is also a common home remedy for the treatment of chronic eczema and scrofula. The leaves of this plant are used topically to treat scalp itching and dandruff, sunburn, and superficial burns as well as an adjunctive emollient in skin disorders.

3.30. *Lavandula angustifolia*

It is a flowering plant (Figure 30) belongs to the family Lamiaceae. It contains linalyl acetate, linalool, tannins, and caryophyllene, sesquiterpenoids, perillyl alcohols, esters, oxides, ketones, cineole, camphor, beta-ocimene, limonene, caproic acid, and caryophyllene oxide. Lavender flowers oil stimulates circulation in the scalp, strengthens new hair growth, and helps to balance the natural oil production of the scalp, making it a popular choice for people of all skin types [75-76].



Figure 30 Flowers of *Lavandula angustifolia*

3.31. *Citrus limon*

It is the fruit of *Citrus limon* L. (Figure 31), a small tree of the family Rutaceae.



Figure 31 Fruits of *Citrus limon*

It is a Potential source of vitamin C and d-limonene and citral. It also contains small quantities of citronellal, geranyl acetate, terpineol, a sesquiterpene and aldehydes. It is used in various preparations to reduce skin itching and skin nourishment, the pulp left after the extraction of juice is useful as facial ingredients [77-78].

3.32. *Brassica juncea*

Seeds (Figure 32) of the plant contains Quercetin, predominate, kaempferol, luteolin, apigenin indole-3-carbinol. Seed oil is used as hair oil and useful for hair nourishment [79-80].



Figure 32 Seeds of *Brassica juncea*

3.33. *Allium sativum*

It is a species of bulbous flowering plant in the onion genus *Allium sativum* (Figure 33) belonging family Alliaceae. It contains Llicin, phytoncidea, alliin, ajoene, isoalliin, methiin, alliin. Garlic oil is useful to control sores, pimples and acne. It may be used in skin lotions and creams [4,81-82].



Figure 33 Petals of *Allium sativum*.

3.34. *Trigonella foenum-graecum*

Trigonella foenum-graecum seeds and green leaves, which are used in food as well as in medicinal application. The seeds (Figure 34) are used as laxative, demulcent, stimulant etc. and medicinally in preventing wounds, arthritis, ulcer etc and also used as hair cleanser [83-84].



Figure 34 Seeds of *Trigonella foenum-graecum*

3.35. *Avena sativa* L.

Seeds oil of *Avena sativa* (Figure 35) is rich in antioxidants and natural emollient property. It also use in many lotions, creams and facial oils. It is a rich source of protein, minerals, lipids, β -glucan, avenanthramides, indole alkaloid, flavonoids, triterpenoidsaponins, lipids and sterols [85-86].



Figure 35 Seeds of *Avena sativa*

3.36. *Salvia hispanica* L.

It's commonly known as chia, is an annual herbaceous plant belonging to the Lamiaceae family. Seeds (Figure 36) are the excellent source of Omega 3 and also contains the perfect 3-to-1 ratio of Omega-3 to Omega-6 essential fatty acids. It helps to minimize the look of fine lines, wrinkles and enlarged pores, while making the skin look radiant [87-88].



Figure 36 Seeds of *Salvia hispanica*

3.37. *Adhatoda vasica* Nees

It commonly known as vasa or vasaka (Family- Acanthacea), is a well-known herbal drug in Ayurvedic, Unani and Homeopathic system of medicines. Leaves (Figure 37) contains vasicine, vasicine acetate, 2-acetyl benzyl amine, vasicinone, quinazoline. Fresh leaves juice / extract is used for skin affection and control of scabies [89-90].



Figure 37 Leaves of *Adhatoda vasica*

3.38. *Prunus armeniaca*

Fruits of *Prunus armeniaca* (Figure 38) are rich in vitamin A, beta-carotene, and other carotenoids, apricots are excellent for promoting eye health. Lutein helps to support retina and lens health, while carotenoids and vitamin E support overall vision. Apricot nutrients also help to reduce the risk of macular degeneration and cataracts. Granules of *Prunus armeniaca* tenderly shed dead cells of the skin; bring out the natural glow of the skin. It also helps in removing blackheads and prevents the reoccurring of acne. Apricot is utilized in many cosmetics for personal care of skin and body and bath products. Topical application of, Apricot Kernel Carrier Oil nourishes dry, delicate skin and treat imperfections, fine lines, blemishes, wrinkles, and different side effects of skin aging [91-92].



Figure 38 Fruits of *Prunus armeniaca*

4. Standardization of herbs or extracts used in C & T preparations

Standardization refers to the process of maintaining uniformity and consistency among the different preparations. Standardization of herbs or extracts used in C & T preparations is usually done by various analytical methods. These methods are not only limited to standardization of herbal drugs or extracts thereof, but can also be used for various pharmaceutical and C & T preparations [93-112]. These methods include high performance thin layer chromatography, HPLC, Uv-spectrophotometry, gas chromatography, etc [113-139].

5. Future prospective

As herbal C & T preparations are evidence-based system which is in used since 5000 years. In India, it is developed by guru-shishshya parampara. These preparations are more ecofriendly and easily accepted by peoples. Still there is wide scope in the research and development of such preparation that produces prolong effects. With the increase in demand and fast-growing market of herbal C & T preparations, it will helpful to develop economic condition of the country. There is urgent need to search and explore more and more herbs for cosmeceuticals values.

6. Conclusion

Thus, herbal C & T preparations are safer, their effects are long lasting and comparatively they are more affordable to the general public. Day-by-day, the demand and use of such types of preparations are going on increasing. Thus, it is concluded that these preparations can be recommended for improving the appearance and beauty of peoples and could be used regularly.

Compliance with ethical standards

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Disclosure of conflict of interest

The author declares no conflict of interest.

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