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A REPORT ON ALOE VERA AND TURMERIC AS HERBAL MEDICINE AND COSMETICS

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ABSTRACT

Plants has ever been an important part of human life in different ways. Number of herbals has been listed for their medicinal and cosmetics values. We can never miss out their role in the treatment of several diseases. Moreover, the plant based medicines has also being used for untreatable disease as there is no other option except them. Researchers are trying for the renaissance of the medicinal properties of herbals for different ailments. These work should brought in the notice of each concern man. Present work is therefore focused on the review of literature on Aloe vera and turmeric.

Key Words-Aloe vera, turmeric, medicine, cosmetic

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Introduction- The word 'Cosmetics' derives from the Greek (Kosmetike tekhne) meaning "technique of dress and ornament", from Kosmetikos, "skilled in ordering or arranging" and that from Kosmos, meaning amongst others "order" and "ornament". The U.S. Food and Drug Administration (FDA) which regulates cosmetics in the United States as "intended to be applied to the human body for cleansing, beautifying, promoting attractiveness or altering the appearance without affecting the body's structure or functions".

These can be grouped into following major categories[1].

1. For enhancing the appearance of the facial skin.
2. For hair growth and care.
3. For skin care, especially in teenagers. (acne, pimples).
4. Shampoos, soaps, powders etc.

Merits of herbal cosmetics

1. More convenient than synthetic cosmetics.
2. Less side effects than synthetic cosmetics.
3. Easy to formulate them.
4. Most acceptable by people [2-3].

Demerits

1. Irritation and sensitization in skin
2. Toxic effects of herbs.
3. Due to presence of heavy metal they have carcinogenic property.

Example of herbal cosmetics-

Alkanet, *Aloe vera*, Amla, Almond oil, Brahmi, Bhringraj, Bilberry, Burdock, Cade oil, Castor oil, Cocconut oil, Common ivy, Echinaceae, Eucalyptus oil, Ginkgo, Hawthorn, High mallow, Henna, Himalayan kedar, Hyssop, Lavender oil, Lemon oil, Lithospermums, Marigold, Matricaria flowers, Nagkesara, Neem, Olive oil, Primrose, Quince seeds, Rosemary oil, Rose oil, sandalwood oil, sesame oil, Senna, Turmeric, Thyme oil, Walnut, Wintergreen oil, Witch hazel etc.

Aloe vera- *Aloe vera*, pronounced (aelov vira), also known as the true aloe or medicinal aloe, is a species of succulent plant in the genus Aloe that is believed to have originated in the Sudan. *Aloe vera* grows in arid climates and is widely distributed in Africa, India, Nepal and other arid areas. Many scientific studies on the use of extracts of Aloe vera have been undertaken some of them conflicting [4-7]. Despite these

limitations, there is some preliminary evidence that *Aloe vera* extracts

may be useful in the treatment of wound and burn healing, minor skin infections, sebaceous cysts, diabetes, and elevated blood lipids in humans [6]. These positive effects are thought to be due to the presence of compounds such as polysaccharides, mannans, anthraquinones, and lectins [6,8,9]. Some common species of *Aloe vera* plants are *Aloe vera*, *Aloe barbadensis*, *Aloe arborescens*, *Aloe africana*, *Aloe albida*, *Aloe bella*, *Aloe wildii*, *Aloe decumbens*, *Aloe emenens*.

Description - *Aloe vera* is a stem less or very short-stemmed succulent plant growing to 60–100 cm (24–39 in) tall, spreading by offsets. The leaves are thick and fleshy, green to grey-green, with some varieties showing white flecks on the upper and lower stem surfaces. The margin of the leaf is serrated and has small white teeth. The flowers are produced in summer on a spike up to 90 cm (35 in) tall, each flower pendulous, with a yellow tubularcorolla 2–3 cm (0.8–1.2 in) long. Like other *Aloe* species, *Aloe vera* forms arbuscular mycorrhiza, a symbiosis that allows the plant better access to mineral nutrients in soil [10] The species has a number of synonyms: *A. barbadensis* Mill., *Aloe indica* Royle, *Aloe perfoliata* L. var. *vera* and *A. vulgaris* Lam. [11-12] and common names including Chinese Aloe, Indian Aloe, true Aloe, Barbados Aloe, burn Aloe, first aid plant [13] The species name *vera* means "true" or "genuine." Some literature identifies the white spotted form of *Aloe vera* as *Aloe vera* var. *chinensis*, [14-15] however, the species varies widely with regard to leaf spots [16] and it has been suggested that the spotted form of *Aloe vera* may be conspecific with *A. massawana* [17]. The species was first described by Carl LinnaeusCarl Linnaeus in 1753 as *Aloe perfoliata* var. *vera*, [18] and was described again in 1768 by Nicolaas Laurens Burman as *Aloe vera* in *Flora Indica* on the 6th of April and by Philip Miller as *Aloe barbadensis* some ten days after Burman in the *Gardener's Dictionary* [19].

Techniques based on DNA comparison suggest that *Aloe vera* is relatively closely related to *Aloe perryi*, a species that is endemic to Yemen [20] Similar techniques, using chloroplast DNA sequence comparison and ISSR profiling have also suggested that *Aloe vera* is closely related to *Aloe forbesii*, *Aloe inermis*, *Aloe scobinifolia*, *Aloe sinkatana*, and *Aloe striata* [21] With the exception of South African species *A. striata*,

these *Aloe* species are native to Socotra (Yemen), Somalia, and Sudan. The lack of obvious natural populations of the species have led some authors to suggest that *Aloe vera* may be of hybrid origin [22]. The natural range of *Aloe vera* is unclear, as the species has been widely cultivated throughout the world. Naturalised stands of the species occur in the southern half of the Arabian peninsula, through North Africa. (Morocco, Mauritania, Egypt) as well as Sudan and neighbouring countries, along with the Canary, Cape Verde, and Madeira Islands.The species was introduced to China and various parts of southern Europe in the 17th century [23] The species is widely naturalised elsewhere, occurring in temperate and tropical regions of Australia

Barbados, Belize, Nigeria, Paraguay and the US [23] It has been suggested that the actual species' distribution is the result of human cultivation and that the taxonomy could be doubtful too.

Chemical Properties

According to W. A. Shenstone, two classes of aloins are to be recognized: nataloins, which yield picric and oxalic acids with nitric acid, and do not give a red coloration with nitric acid; and barbaloins, which yield aloetic acid ($C_7H_2N_3O_5$), chrysammic acid ($C_7H_2N_2O_6$), picric and oxalic acids with nitric acid, being reddened by the acid. This second group may be divided into a-barbaloins, obtained from Barbados *Aloe*, and reddened in the cold, and b-barbaloins, obtained from Socotrine and Zanzibar *Aloe*, reddened by ordinary nitric acid only when warmed or by fuming acid in the cold. Nataloin ($2C_{17}H_{13}O_7 \cdot H_2O$) forms bright yellow scales. Barbaloin ($C_{17}H_{18}O_7$) prismatic crystals. Aloe species also contain a trace of volatile oil, to which its odour is due. *Aloe vera* leaves contain a range of biologically active compounds, the best-studied being acetylated mannans, polymannans, anthraquinone C-glycosides, anthrones and anthraquinones, and various lectins [8][9].

Uses- *Aloe vera* gel being used to make a dessert. Scientific evidence for the cosmetic and therapeutic effectiveness of *Aloe vera* is limited and when present is frequently contradictory [4,5]. Despite this, the cosmetic and alternative medicine industries regularly make claims regarding the soothing, moisturizing, and healing properties of *Aloe vera*, especially via Internet advertising [24-27]. Aloe vera gel is used as an ingredient in commercially

available lotions, yogurt, beverages, and some

desserts [28- 31]. *Aloe vera* juice is used for consumption and relief of digestive issues such as heartburn and irritable bowel syndrome, although it bears significant potential to be toxic when taken orally [30]. Other uses for extracts of aloe vera include the dilution of semen for the artificial fertilization of sheep[32], use as fresh food preservative [33], and use in water conservation in small farms [34]. The supposed therapeutic uses of *Aloe vera* are not exclusive to the species and may be found to a lesser or greater degree in the gels of all aloes, and indeed are shared with large numbers of plants belonging to the family Asphodelaceae. *Bulbine frutescens*, for example, is used widely for the treatment of burns and a host of skin afflictions [35]. Aloe vera juice is while, in contrast, other studies show that wounds to which aloe vera gel was applied were significantly slower to heal than those treated with conventional medical preparations [38-39]. A more recent review (2007) concludes that the cumulative evidence supports the use of aloe vera for the healing of first to second degree burns. In addition to topical use in wound or burn healing, internal intake of aloe vera has been linked in preliminary research with improved blood glucose levels in diabetics [40-42] and with lower blood lipids in hyperlipidaemic patients [42] but also with acute hepatitis (liver disease). In other diseases, preliminary studies have suggested oral aloe vera gel may reduce symptoms and inflammation in patients with ulcerative colitis [43]. Compounds extracted from aloe vera have been used as an immunostimulant that aids in fighting cancers in cats and dogs; Topical application of aloe vera may be effective for genital herpes and psoriasis [44]. However, it is not effective for the prevention of radiation-induced injuries. Although anecdotally useful, it has not been proven to offer protection from sunburn or suntan [45]. In a double-blind clinical trial, both the group using an aloe vera containing dentifrice and the group using a fluoridated dentif had a reduction of gingivitis and plaque, but no statistically significant difference was found between the two [46].

Side Effects and Cautions

Use of topical aloe vera is not associated with significant side effects. A 2-year National Toxicology Program (NTP) study on oral consumption of non-decolorized whole leaf extract of aloe vera found clear evidence of carcinogenic activity in male and female rats, based on tumours of the large intestine. Abdominal cramps and diarrhea have been

reported with oral use of aloe vera. Diarrhoea, caused by the laxative effect of oral aloe vera, can decrease the absorption of many drugs. People with diabetes who use glucose-lowering medication should be cautious if also taking aloe by mouth because preliminary studies suggest aloe may lower blood glucose levels. There have been a few case reports of acute hepatitis from aloe vera taken orally. However, the evidence is not definitive [47].

Turmeric (***Curcuma longa***) is a rhizomatous herbaceous perennial plant of the ginger family, Zingiberaceae [48]. It is native to tropical South Asia and needs temperatures between 20 °C and 30 °C and a considerable amount of annual rainfall to thrive [49]. When not used fresh, the rhizomes are boiled for several hours and then dried in hot ovens, after which they are ground into a deep orange-yellow powder commonly used as a spice in curries and other South Asian and Middle Eastern cuisine, for dyeing, and to impart color to mustard condiments. Its active ingredient is curcumin and it has a distinctly earthy, slightly bitter, slightly hot peppery flavour and a mustardy smell. In medieval Europe, turmeric became known as **Indian saffron**, since it was widely used as an alternative to the far more expensive saffron spice [50]. Erode, a city in the south Indian state of Tamil Nadu, is the world's largest producer and most important trading center of turmeric in Asia. For these reasons, Erode in history is also known as "Yellow City" or "Turmeric City".

Description- Turmeric is a perennial herb which grows to a height of about 1 m with a short pseudostem. The leaves are aromatic, light green and alternately arranged. The leaves are glabrous, elliptical-lanceolate in shape with an entire margin. The leaf apice is acuminate and the base sheathing. The length of the leaf is about 30 cm long and 10 cm board. The inflorescence is cone or oblong in shape, 10-15 cm long and 5-7 cm wide. Inflorescences are made up of light-green to whitish bracts which are layered arranged. Only one white with yellowish centred flower will blossom at every bract's axil. The rhizomes are aromatic, cylindrical and fleshy with orange-brown skin and dark-yellow to bright orange pulp.

Uses- Turmeric paste is traditionally used by Indian women to keep them free of superfluous hair and as an antimicrobial. Turmeric paste, as part of both home remedies and Ayurveda, is also said to improve the skin and is touted as an anti-aging agent. Staining oneself with turmeric is believed to improve the skin tone and tan.

Turmeric is currently used in the formulation of some sunscreens. The government of Thailand is funding a project to extract and isolate tetrahydrocurcuminoids (THC) from turmeric. THCs are colorless compounds that might have antioxidant and skin-lightening properties, and might be used to treat skin inflammations, making these compounds useful in cosmetics formulations. For the treatment of dandruff, and as hair colorants and dyes, plant extracts are used as hair growth stimulators, the mechanism of action appears to be an acceleration of blood circulation or increased nutrition to the hair follicles. Natural dyes derived from plant extracts are being used in hair colorant products; curcumin from turmeric also used in natural dye produces a range of color from yellow to deep orange [51].

For Skin Diseases - A fresh Juice from rhizome or (the aboveground and underground roots) a paste prepared from turmeric or decoction is often used as a local application as well as internally in the treatment of leprosy skin disease. In case of smallpox and chickenpox, turmeric is applied as a powder or as a paste to facilitate the process of scabbing [51].

As Dye-Turmeric makes a poor fabric dye, as it is not very light fast (it fades with exposure to sunlight). However, turmeric is commonly used in Indian clothing, such as saris. A fresh Juice from rhizome or (the aboveground and underground roots) a paste prepared from turmeric or decoction is often used as a local application as well as internally in the treatment of leprosy skin disease. In case of smallpox and chickenpox, turmeric is applied as a powder or as a paste to facilitate the process of scabbing [51].

Chemical constituent- Turmeric contains up to 5% essential oils and up to 5% curcumin, a polyphenol. Curcumin is the active substance of turmeric and curcumin is known as C.I. 75300, or Natural Yellow 3. The systematic chemical name is (1*E*,6*E*)-1,7-bis(4-hydroxy-3-methoxyphenyl)-1,6-heptadiene-3,5-dione. It can exist at least in two tautomeric forms, keto and enol. The keto form is preferred in solid phase and the enol form in solution. Curcumin is a pH indicator. In acidic solutions (pH <7.4) it turns yellow, whereas in basic (pH > 8.6) solutions it turns bright red.

A **curcuminoid** is a curcumin or a derivative of a curcumin with different chemical groups that have been formed to increase solubility of curcumins and make them suitable for drug formulation. These compounds are polyphenols and

produce a pronounced yellow color. Many curcumin characters are unsuitable for use as drugs by themselves.They have poor solubility
in water at acidic and physiological pH, and also hydrolyze rapidly in alkalinesolutions. Therefore, curcumin derivatives are synthezised to increase their solubility and hence bioavailability[52]. Curcuminoids are soluble in dimethyl sulfoxide (DMSO), acetone and ethanol,[53] but are poorly soluble in lipids. It is possible to increase curcuminoid solubility in aqueous phase with surfactants or co-surfactants [54]. Curcumin derivatives have been synthesized that could possibly be more potent than curcumin itself. Most common derivatives have different substituents on the phenyl groups [53]. There is an increasing demand of late for demethoxycurcumin and (curcuminoids) because of their recently discovered biological activity[54].

CYCLODEXTRINS

Curcuminoids form a more stable complex with solutions which contain cyclodextrin towards hydrolytic degradations[55]. The stability differs between size and characterization of the cyclodextrins that are used [52]. Dissolution of demethoxycurcumin, bisdemethoxycurcumin and curcumin are greatest in the hydroxypropyl-γ-cyclodextrin (HPγCD) cavity. The curcuminoids which have a substituent connected to the phenyl groups show more affinity for the HPγCD compound. The derivatives are usually more stable than curcumin against hydrolysis in cyclodextrin solution. No covalent bonds are present between the cyclodextrins and the curcuminoids so they are easily released from the complex by simple solvent effects[53].

SLN for cosmetics

SLN preparate has been developed for cosmetics where the curcuminoids are used in cream base. But there are some stability issues which have not been overcome yet, further studies need to be done to find a suitable formulation which can be carried out in order to prolong the stability of the curcuminoids. Nevertheless there have been improvements in formulation of some stable model cream preparations with SLN curcuminoids [53]. It is suggested that most of the curcuminoids are incorporated at the SLN surface where they are diffused into the cream matrix until a steady state is reached. At this state the curcuminoids go from the cream to the dissolution medium. A possible burst release in creams containing curcuminoids have been reported where the curcuminoids are rapidly

released in a sufficient amount from the cream into the skin and is followed by a controlled release. When SLN are prepared by microemulsion at a temperature with the range of 70-75 °C an oil-in-water microemulsion is spontaneously formed. The SLN are obtained immediately when they are dispersed in the warm microemulsion into cold water, with the help of a homogenizer. The cold water facilitates a rapid crystallization of the lipids and therefore prevents aggregation of the lipids. After freeze drying the yellow curcuminoids containing SLN were obtained and could easily be redispersed in water and the model cream. The SLN have uniform distribution and according to electron micrograph scan they had a spherical shape and smoothsurface. It has been reported that increasing the lipid content over 5-10% (w/w) increased the mean particle size and broader size distribution in most common cases. That range should there for be ideal concentration for formulation of the SLN [53].

Anti-Oxidant Activity- The curcumin derivatives demethoxycurcumin and bisdemethoxycurcumin have, like curcumin itself been tested for their antioxidant activities in vitro.[112] Antioxidants can be used to extend the shelf life for food and maintain their safety, nutritional quality, functionality and pa latability. Pure chemicals of curcumin and its derivatives are not available in the open market. Commercially available curcumin contains 77% curcumin, 17% demethoxycurcumin and 3% bisdemethoxycurcumin from the herb Curcuma longa. After the isolation of the curcuminoids, the extract which is about 75% liquor mainly contains oil, resinand more curcuminoids which can be isolated further. This isolation method was used to demonstrate the antioxidant activities of curcuminoids, where they isolated pure curcuminoids from the main liquor. One research reported that curcumin was the strongest antioxidant, demethoxycurcumin the second strongest and bisdemethoxycurcumin the least effective. Curcuminoids act as a superoxideradical scavenger as well as singlet oxygen quencher and gives the antioxidant its effectiveness[54]. Tetrahydrocurcumin, one of the main metabolites of curcumin, is the most potent antioxidant among the naturally occurring curcuminoids. The curcuminoids are capable of inhibiting damage to super coiled plasmid DNA by hydroxyl radicals. It was concluded that the derivatives of curcumin

are good in trapping the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical as efficiently as curcumin which is a well known antioxidant [54]

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