

Available online at [www.pharmaresearchlibrary.com](http://www.pharmaresearchlibrary.com)

Pharma Research Library  
**International Journal of Medicine and Pharmaceutical Research**  
2013, Vol.1 (3): 308-317

ISSN 2321-2624



Review Article

Pharma Research  
Library

**Herble Drug and Excipient used in Cosmetic Preparation for the  
Enhancement of Beauty**

D.k. Sanghi and Rakesh Tiwle\*

Shri Laxmanrao Mankar Institute of Pharmacy, Amgoan, Gondia, Maharashtra, India- 441902.

\*E-mail: rakesh\_tiwle@rediffmail.com

**Abstract**

The concept of beauty and cosmetics is as ancient as mankind and civilization so, they are very conscious about beauty because of that they use various beauty products that have herbs to look charming and young. Cosmetology, the science of alteration of appearance, the cosmetic preparations were used for the purpose of worship and sensual enjoyment. Indian herbs and its significance are popular worldwide. The recent interest of consumers in herbal cosmetics has been stimulated by the decline of faith in plant remedies and modern cosmetics were natural and thereby superior to man-made synthetic cosmetics, the motto of the present review, article is to cosmetics importance in the world, at the same time importance of herbal drugs in cosmetics in this article we are discussing lot's of herbal drug like Sunflower oil, Coconut oil, Aloe, Henna, Neem, Multani Mitts(Fullers Earth), Tulsi (*Ocimum sanctum*), Green Tea, Turmeric, Amla, Almond oil, Eucalyptus Oil etc. These are the chemical constituent give the better elegance and good therapeutic value. In this article microbial limit also mentioned as per the international specifications.

**Key words:** Herbal cosmetics, Plant extracts, Cosmetics, Hair and skin care products, antioxidants.

**Introduction**

Natural cosmetics grow in a worldwide market. In India herbal treatment is a medicinal system. 'Traditional' use of herbal medicines implies substantial historical use, many products that are available as 'traditional herbal medicines'. In many developing countries, medicinal plants in order to meet health care needs. The demand and need for herbal cosmetic is increasing day to day because of their credentials and less side effects.<sup>1</sup> According to the guideline of World Health Organization (WHO) assess of quality of herbal medicines<sup>2</sup>. Many herbal cosmetics preparation can be manufacture small scale cottage industries and<sup>3</sup> these preparations are not subjected to aseptic conditions during preparation, storage and transport etc, required for pharmaceutical preparations.<sup>4,5</sup> The manure and slurries which is obtain from animal source it is generally having a pathogenic organisms, hence there is a chances of increasing microbial growth a number of organisms from naturally occurring herbs, aerobic sporulating bacteria

frequently predominate, handling, harvesting, and production may cause additional contamination and microbial growth, thereby deteriorating the cosmetic preparations.<sup>6,7</sup> It is quality approval of products poor quality control, standardization, etc.<sup>8,9</sup> Now it's time to think about the scientific approach to this problem. The main purpose of this study is to determine microbial quality of herbal cosmetics. Herbs can be categories for cosmetics in three forms total extracts, selective extracts or single molecules purified from extracts. Total extracts (e.g. aloe vera gel, teas, plant extracts etc.)<sup>10</sup> These antioxidant botanicals are generally classified into three categories depending upon the nature of their constituents as carotenoids, flavonoids and polyphenols. Flavonoids, impart the UV protection and metal chelating properties. The polyphenols is a large class and contains various molecules like rosmarinic acid (rosemary)<sup>11</sup>.

### Herbal Drug and Formulation used in Dry Skin Treatment

#### Rice bran wax

In Indian cultures rice wax is used for beauty treatments and skin problems it is extracted from the inner husk of rice, rice bran oil contain vitamin E.<sup>54</sup> which is having a high antioxidant and exfoliating properties, making it ideal for use in scrubs and facial skincare cosmetic products. For cosmetics, rice bran wax can be derived from this natural oil to serve as an emollient for smoother application and finish, and the expanding properties of rice allow it to help lengthen the appearance of lashes.

#### Sunflower oil

Sunflower oil is the non-volatile oil compressed from sunflower (*Helianthus annuus*) seeds. Sunflower oil is commonly used in food as frying oil, and in cosmetic formulations as an emollient. Shown in figure no 1. Sunflower oil was first industrially produced in 1835 in the Russian Empire. It is the non-volatile oil expressed from sunflower seeds obtained from *Helianthus annuus*, family Asteraceae. Sunflower oil contains tocopherols, lecithin, carotenoids and waxes. In cosmetics, it has having a smoothing properties.



Figure no. 1 Sunflower oil

#### Coconut oil

Coconut oil obtain from the fruit or seed of the coconut palm tree *Cocos nucifera*, belongs to family *Arecaceae*. It is having a melting point of coconut oil is 24 to 25 °C (75-76 °F) and thus it can be used easily in both liquid or solid forms and is often used in cooking and baking. It is a excellent as a skin moisturizer and softener shown in figure no 2.<sup>12</sup> A study shows that extra virgin coconut oil is effective and safe when used as a moisturizer, with absence of adverse reactions and it prevent from protein loss and wet combing hair.<sup>13</sup>



Figure no. 2 Coconut oil

**Aloe**

*Aloe* /'æloʊ/, also *Aloë*, is a genus containing about 500 species of flowering succulent plants. The most commonly known as Aloe vera, or "true aloe", A native of southern Africa, the aloe Vera plant has fleshy spiny-toothed leaves and red or yellow flowers. It is an ingredient in mainly used in formulation cosmetics because it heals moisturizes, and softens skin. Simply cut one of the aloe vera leaves to easily extract the soothing gel aloe vera tree and its formulation is shown as below figure no. 3,4.



Figure no. 3 Aleo vera cream.



Figure no. 4 Aleo plant.

**Herbal Drug and Formulation Dandruff Treatment**

In the dandruff problem Ayurveda has play a tremendous role there are lot's of natural medications apart from these medicine a very common herbs like Neem, Kapoor (naphthalene), and Henna, Hirda, Rosary Pea, Sweet Flag, Cashmere tree and Mandor etc.

**Henna**

Henna (*Lawsonia inermis*, also known as hina, the henna tree, the mignonette tree, and the Egyptian privet)<sup>48,49</sup> it contain a dye molecule called Lawsons, which when processed becomes Henna powder. Henna has a natural affinity with the proteins in our hair, making it able to "stain" the colour onto the hair shaft.<sup>14</sup>



Figure no. 5 Heena

**Neem**

The herb, *Azadirachta indica*, family Meliaceae has been found that it having a properties of a blood purifier, beauty enhancer etc. Neem gum is used as a bulking agent and for the preparation of special purpose food.<sup>50</sup> It is used for a number of medicinal purposes. Neem oil is used for preparing cosmetics such as soap, neem shampoo, balms and creams as well as toothpaste. Some areas where it can be uses in the treatment of common cosmetic problems are skin cleanser.<sup>15</sup>



Figure no.6 Neem Plant



Figure no. 7 Neem face wash

**Tulsi (*Ocimum sanctum*)**

Holy basil, called Tulsi in India, is ubiquitous in Hindu tradition. Perhaps its role as a healing herb was instrumental in its "sacred" implication.<sup>37</sup> Tulsi has been used for thousands of years in Ayurveda for its diverse healing properties. It is mentioned in the Charaka Samhita.<sup>51</sup>



Figure no. 8

**Multani Mitti (Fullers Earth)**

It is Mother Nature's own baby powder.<sup>38</sup> Clay was one of the earliest substances to be used as a beauty mask to draw oils from the skin, natural moisturizers for hairs, teeth, gums and hair, To remove pimple marks, treating sunburn, helps unclog pores, to cleanse the skin of flakes and dirt. Multani mitti is comes under the facial cosmetic preparation used in cakes for beautifying the cheeks. Multani mitti powder is shown in figure no 9.



Figure no. 9 Multani mitti powder.

**Herbal Drug and Formulation Skin Protection****Green Tea**

Green tea is tea made solely with the leaves of *Camellia sinensis* belonging to family Theaceae. It protects against direct damage to the cell and moderates inflammation, according to research from the Department of Dermatology, Columbia University, New York. Studies suggest that the catechins in green tea are some 20 times stronger in their antioxidant powers than even vitamin E. Whether applied topically or consumed as a beverage or dietary supplement, green tea is a premiere skin protectant. Men, women and children need to position this super shield on their side against the ravaging effects of the sun.<sup>16</sup>



Figure no. 10 Green tea leaf

**Turmeric**

Turmeric, *Curcuma longa* is a rhizomatous herbaceous perennial plant of the ginger belongs to family Zingiberaceae.<sup>52</sup> Turmeric is used in many celebrations of Hindus festival. 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.



Figure no 11. Turmeric

### Herbal Drug and Formulation Hair Problems

#### Amla

Amla is obtained from the plant *Embllica Officinalis*, Family Euphorbiaceae. Amla is rich in vitamin C, tannins and minerals such as phosphorus, iron and calcium which provides nutrition to hair and also causes darkening of hair.<sup>17</sup> It consists of calcium, phosphorus, iron, vitamin B1, riboflavin, niacin and vitamin C, used to stimulate thicker hair growth and prevents premature graying of hair.<sup>18</sup> Amla grows throughout India and bears an edible fruit. 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 is used in eye disease, hair fall problems etc.



Figure no. 12 Amla



Figure no. 13 Marketed Amla oil

#### Almond oil

The almond oil is obtained from *Prunus dulcis*. It contains about 78% of this fat. This oil contains very small amounts of super-unsaturated Omega-3 essential fatty acids. It proves to be very nourishing, and softens and strengthens the hair. The almond oil also proves to be a very good cleansing agent. Almond oil has been used for many centuries, even before it's spread as a commercial agro-product.

#### Essential Oils

It is extracted from plants for natural fragrances and volatile, liquid aroma compounds from natural sources, usually plants. Essential oils contain mainly volatiles as terpenoids, benzenoids, fatty acid derivatives and alcohols. The FDA and other authorities recognize essential oils generally as safe. Although essential oils are widely used in cosmetics their actual mode of action is not fully understood. The uses of essential oils are determined by their chemical, physical, and sensory properties, which differ greatly from oil to oil. Each of the individual chemical compounds that can be found in oil contributes to the overall character. Essential oils can be used in several ways for cosmetic purpose like Inhalation, Massage, Baths, Compresses, Steam treatments, Room Fragrance etc.<sup>19</sup>

#### Common properties of essential oils.<sup>20</sup>

**Fragrance:** perfumery is the main use of essential oils in cosmetics although synthetic fragrances are more stable and have better longevity.

**Hair care:** essential oils are used as conditioning Anti-dandruff & permanent waving agents.

**Skin care:** essential oils are the ideal to topical active ingredients for any skin care product since they can penetrate the skin and bind the membranes of skin cells. Essential oils can thus have sustained effects in the skin. Co-preservatives: many essential oils have antibacterial activity and are added as supportive agents to preservatives.

### Rose oil

The rose oil, produced from the petals of *Rosa damascena* and *Rosa centifolia*, family Rosaceae. Steam-distilled rose oil is known as "rose otto" while the solvent extracted product is known as "rose absolute". It is used more commonly in perfumery. The key flavor compounds that contribute to the distinctive scent of rose oil are beta-damascenone, beta-damascone, beta-ionone, and oxide.



Figure no. 14 Rose oil.



Figure no. 15 Rose leaf

### Eucalyptus Oil

Eucalyptus oil can be obtained or distilled from the leaf of *Eucalyptus*, 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. Just mix about 9 to 10 drops of eucalyptus oil with shampoo and then gently massages scalp for a for a few minutes, after which rinse it off with water. Massaging scalp with eucalyptus oil can stimulate blood circulation and thereby, making hair healthy and beautiful.<sup>21</sup>



Figure no 16. Eucalyptus leaf

### Citronella oil

This oil can be obtained from the leaves and stems of different species of *Cymbopogon* family Cardiopteridaceae, as shown in figure 5. 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. Other essential oils which are used in cosmetics include anise oil, coriander oil, grapefruit oil, jasmine oil, palma rose oil, sandalwood oil.



Figure no. 17 Citronella oil.

### Herbal Drug and Formulation Antioxidants

Antioxidants, may be either exogenous or endogenous,<sup>22</sup> Now, there is a growing interest toward natural antioxidants of herbal resources.<sup>23,25</sup> Epidemiological and in vitro studies on medicinal plants and vegetables strongly supported this idea that plant constituents with antioxidant activity are capable of exerting protective effects against oxidative stress in biological systems.<sup>26-29</sup> Free radical formation is controlled naturally by various beneficial compounds known as antioxidants.<sup>30</sup> In addition to fruits and vegetables, herbs of no particular nutritional value can also constitute an important source of antioxidants.<sup>31</sup> The leaves from black and green tea (*Camellia sinensis*), long used amongst western and Asian populations, respectively, constitute an important source of potentially health-protecting antioxidants.<sup>32,33</sup>

#### Tamarind

Tamarind or *Tamarindus indica*, family Fabaceae, is widely growth in tropical regions and has long been supplied as an *important* nutrition source and traditional medications.<sup>53</sup> Tamarind seed has activity of radical scavenging<sup>34</sup>, lipid peroxidation reducing<sup>35</sup> and anti-microbial activitie.<sup>36</sup> Its antioxidant activity is appropriate for anti-wrinkle cosmetics.



Figure no. 18 Tamarind

#### Vitamin C

It prevents free radical damage due to its property of donating free radicals. It is beneficial in boosting immune system. The main source of Vitamin-C is carrots, peaches, sweet potatoes, oranges, broccolis, etc.

#### Vitamin E

Both plants and animals serve as a source of vitamin E. It has been found beneficial against certain types of cancer & cardiac problems. It is known as '*scavenger of free radicals*'. Vitamin E is mainly present in nuts, whole cereal grains, almonds, vegetable oils etc.

#### Assessment of Microbial Quality of Commercial Herbal Cosmetics

The demand for natural herbal cosmetics is increasing day by day in our life.<sup>39</sup> People do have misconceptions that these herbal cosmetics, beautifully packed in fashionable containers are safe for use. In India many herbal cosmetics are prepared in cottage industries. These preparations are not subjected to aseptic conditions during preparation, storage and transport etc, is required for pharmaceutical preparations.<sup>40, 41</sup> Various herbal cosmetic samples were purchased from local market of Karad Taluka of Satara district (India) for assessment of microbial quality.<sup>42</sup> These included Emollient cream, Almond cream, Beauty cream, Cleansing lotion, Chandan cream, Shampoo, Utana, Mehendi, Face powder etc. Pharmacognostically evaluated for their genueness as per standard laid down in pharmacopeia.<sup>43</sup> the determination of microbiological contamination was established for microbial load viz total bacterial count, total fungal count and specific pathogen (E.coli, Salmonellaspp, Staphylococcus aureus, Pseudomonas aeruginosa) in the commercial drug samples. The methodology applied for the studies are as follows as per prescribed W.H.O GUIDELINE. Here some example I am enlisting in that Botanical Name, fungal growth total fungal count and specific pathogen is shown in table no 1.

Table no 1. Microbial limit as per the international specifications.<sup>44</sup>

S. No	Botanical Name	Comm ercial Name	Part taken for study	Total bacterial count(Cfu/gm) Who limit <b>105/gm</b>		Total yeast Mould count(Cfu/gm) Who limit <b>103/gm</b>		Presence of pathogenic bacteria			
				Result	Inference	Result	Inference	E.coli	Salmon ella spp	Staphyl ooccus aureus	Pseudomo nas aeruginosa
1	Zingiber officinalis	Sunthi	Rhizom e	3×105	Beyond limit	2.6×104	Beyond limit	Absent	Absent	Absent	Absent

2	Boerhaavia diffusa	Punrava	Whole plant	5×105	Beyond limit	1.4×104	Beyond limit	Absent	Absent	Absent	Absent
3	Glycyrrhiza glabra	Mulathi	Root	2×105	Beyond limit	8.7×104	Beyond limit	Absent	Absent	Absent	Absent
4	Terminalia arjuna	Arjuna	Stem bark	5.9×104	Beyond limit	1.9×104	Beyond limit	Absent	Absent	Absent	Absent
5	Terminalia chebula	Harhar	Fruit	1.8×105	Beyond limit	1.3×104	Beyond limit	Absent	Absent	Absent	Absent

### Herbal Excipient in Cosmetic Preparation

Herbal excipient play a very important role in the cosmetic products which are used to protect skin against exogenous and endogenous harmful agents and enhance the beauty and attractiveness of skin.<sup>45</sup> The use of cosmetics not only developing an attractive external appearance, but towards achieving longevity of good health by reducing skin disorders<sup>46</sup>

### Herbal Gel of Stevia Extract

Herbal gel of stevia extract is a growing demand for herbal cosmetics in the world market and they are invaluable gifts of nature. Therefore, we tried to make an herbal gel containing Stevia extract at two different concentrations (2.5% and 5.0%) and tested them for all the physicochemical parameters of gel.<sup>47</sup> Our study indicated that the developed herbal formulation consisting 2.5% Stevia extract was comparatively better than other one after the stability study however, both formulations were non irritant and did not show any toxicity.

### Curcuminoid Based Herbal Face Cream

Curcuminoids from *Curcuma domestica* Val. (turmeric) it has been incorporated in the formulation. Pharmacognostical standardization of turmeric has been done as per Indian Herbal Pharmacopoeia [IHP]-2002 to ensure the genuinity of the crude turmeric rhizomes. It includes taxonomical authentication, morphological characterization, powdered drug microscopy, identification tests of turmeric powder and quantitative standards - that are foreign organic matter(0.43%), alcoholic soluble extractive (7.36%), water soluble extractive (20.32%), total ash(8.46%), acid insoluble ash (0.76%) and loss on drying (12.52%). All the quantitative standard values are in compliance with IHP-2002. Turmeric rhizome powder has been extracted with methanol and curcumin content in the methanolic extract has been quantified spectrophotometrically. It has yielded 3.79 g of curcumin per 100 g of turmeric rhizome powder. Stearic acid cream base has been used to incorporate standardized methanolic extract in isopropyl alcohol, triethanolamine, almond oil, light liquid paraffin oil, moisturizer conditioner and cetyl alcohol. Evaluation of formulated cream with parameters type of emulsion, ashing at 600 °C, pH, the some cosmetic product based on the herbal constituent.

### Useful Cosmetic Herbs

Aloe Vera Linn (Ghrita Kumari/Kumari), Buchananla Lanzan Spreng (Chironji), Cucumis Sativa Linn (Kheera), Datura Stramonium Linn. (Dhatura), Eclipta alba Hassk (Bhringraj), Foeniculum Vulgare Mill (Saunf), Glycyrrhiz Glabra Linn. (Mulathi), Hibiscus ros sinensis Linn. (Jasut/China Rose), Impatiens balsamina Linn.(Gul Mehandi), Impatiens Linn. (Gulmendi), Indigofera Linn, Inula Linn, Ipomea Linn, Ipomoea obscura (Linn.) etc.

### Common Cosmetic Herbs, Active Constituents and Its Applications

Acacia Concinna (PODS) (Shikakai), Achillea millteffolum (WH) (Millefoil), Allium cepa (Bulbs) (Onion), Aloe vera(exudate) (Aloe), Althea officinals (W/H) (Marsh Mallow), Ammi magis (Seeds) (Greater Ammi), Agnelica archangelica (Roots) (Angelica), Angelica keiskel (Leaves) (Angelica), Apium graveolens (Fruits) (Celery), Arctium Lappa (Roots) (Burdock) Amica montana (W/H) (Amica), Artemesia abrotanum (Southern Wood), Azadirachta Indica (leaf & bark) (Neem Tree), Betula Aiba (Sap) (Beech), Betula alba (Bark) (Beech), Bidens cemua (W/H) (Burr marigold), Borago officinalis (W/H) (Borage), Camellia sinesis (Leaves) (Tea), Carum carvi(Caraway), Centella asiatica (whole herb) (Gotukola), Citrus limonum (Lemon), Cucumis Sativa (Fruit) (Cucumber), Curcuma longa (Rhizome) (Turmeric), Daucus carota (Rhizome) (Carrot), Embiica officinallis (fruits) (Amla).etc

### Acknowledgement

The authors would like to acknowledge the assistance provided by kind cooperation of Secretary Shri Keshavrao Mankar Bhavabhuti Shikshan Sanstha "Shri Laxmanrao Mankar Institute of Pharmacy" Amagoan, Gondia Maharashtra, INDIA.

### Reference

1. Michael Armstrong et al, A survey of microbiological contamination in cosmetics and toiletries, J.Soc. Cosmet.Chem. **1993**, 25,563-575
2. Akerele O. Nature's medicinal bounty: don't throw it away. World Health Forum. **1993**, 14, 390-395.
3. WHO, Regulatory situation of herbal medicine: a worldwide review. World Health Organization, Geneva, **1998**.
4. Baird RM. Contamination of non-sterile pharmaceuticals in hospitals and community environments. In: Hugo WB, Russel AD (eds.) *Pharmaceutical Microbiology* .5th edition Blackwell scientific London. **1992**, 391-402.
5. Beveridge EG. Microbial spoilage and preservation of pharmaceutical products. In: Hugo WB, Russel AD (eds.) *Pharmaceutical Microbiology* .5th edition Blackwell Scientific London. **1992**, 369-390.
6. Bensky D, Gamble A and Kaptchuk T. *Chinese Herbal Medicine Materia Medica*, Seattle Eastland Press, **1993**, 331-332.
7. Marcus DM, Grollman AP, Botanical Medicines, N Engl J Med, 347(25), **2002**, 2073-2076.
8. Barnes J, Mills S.Y., Abbot N.C., et al. Different standards for reporting ADRs to herbal remedies and conventional OTC medicines face to face interviews with 515 user of herbal remedies, Br J Clin Pharmacol, **1998**, 45:496-500.
9. Schulze J, Raasch W, Seigers C.P., Toxicity of kava pyrones, drug safety and precaution –a case study, Phytomed, **2003**, 10, 1-6.
10. Draelos. Z.D Botanical antioxidants, Cosmetic Dermatol, **2003**, 16(10), 41-42
11. Glaser DA, Anti-ageing products and cosmeceuticals. Facial Plast Surg, *Clin N Am*, **2004**, 12, 363-372.
12. Fife, Bruce. Coconut Cures. Piccadilly Books, Ltd. 2005, 184–185. ISBN 978-0-941599-60-3.
13. S. Aarti, R. B. Mohile. *J. Cosmet. Sci.*, **2003**, 54, 175-192.
14. <http://www.reviveholisticbeauty.com> (Accessed on 8 Dec. 2010)
15. <http://library.thinkquest.org> (Accessed on 15 Dec. 2010)
16. L. effingwell, C. John. Leffingwell & Associates, **2006**, 06-08.
17. C. Kaur, HC Kapoor. *Int. J. Food Sci. Tech.*, **2002**, 37, 153-162.
18. N. Adhirajan, T. Ravi Kumar, N. Shanmugasundaram, M. Babu. *J. Ethnopharmacology.*, **2003**, 88, 235-239.
19. [www.plushfolly.com](http://www.plushfolly.com) ( Accessed on 20 Dec.2010)
20. Klaassen, Curtis D.; Amdur, Mary O.; Casarett, Louis J.; Doull, John (1991). *Casarett and Doull's toxicology: the basic science of poisons*. New York: McGraw-Hill. ISBN 0-07-105239-9.
21. JM. Cesquini, MA Torsoni, GR Stoppa, SH Ogo. *Biomed. Pharmacother.*, **2003**, 57, 124-129.
22. RA Larson. *Phytochem.*, **1988**, 27, 969-978.
23. G. Gazzani, A. Papetti, G. Massolini, M. Daglia. *J. Agric. Food Chem.*, **1998**, 46, 4122.
24. YS Velioglu, G. Mazza, L. Gao, BD Oomah. *J. Agric. Food Chem.*, **1998**, 46, 4113-4117.
25. G. Cao, ER Sofic, RL Prior. *J. Agric. Food Chem.*, **1996**, 44, 3426-3431.
26. MA Eastwood. *J. Med.*, **1999**, 92, 527-530.
27. G. Block, B. Patterson. *Nutr. Cancer.*, **1992**, 18, 1-29.
28. AR Ness, JW Powles. *Int. J. Epidemiol.*, **1997**, 26, 1-13.
29. M. Percival. **1997**, 15, 351-4.
30. CP Warren. *Lancet.*, **1999**, 353, 9153, 676.
31. K. Higashi-Okai, M. Yamazaki, H. Nagamori, Y. Okai. *J. Uoeh.*, **2001**, 23, 335-344.
32. JV Higdon, B Frei. *Crit Rev Food Sci Nutr.*, **2003**, 43, 89-143.
33. P. Siddhuraju. *Lwt.*, **2007**, 40, 982-90.
34. T. Tsuda, M. Watanabe, K. Ohshima, A. Yamamoto, S. Kawakishi, T. Osawa. *J. Agric. Food Chem.*, **1994**, 42, 2671-4.
35. M. de, DA Krishna, AB Baneerjee. *Phytother. Res.*, **1999**, 3, 616-8.
36. Burne, et al. *New York Academy of Sciences.*, **1987**, 498, 153-160.
37. Conn, P.F.; Lambert, C.; Land, E.J.; Schalch, W.; Truscott, T.G. Carotene-oxygen radical interactions. Free Radical Res. Commun. **1992**, 16(3), 401-408.
38. Lavender [online], Available from: <http://www.sniffingmoose.co.uk/page10.html>
39. Michael Armstrong et al, A survey of microbiological contamination in cosmetics and toiletries, J.Soc. Cosmet.Chem. 25,563-575.
40. Baird RM. Contamination of non-sterile pharmaceuticals in hospitals and community environments. In: Hugo WB, Russel AD (eds.) *Pharmaceutical Microbiology*. 5th edition Blackwell scientific London. **1992**, 391-402

41. Beveridge EG. Microbial spoilage and preservation of pharmaceutical products. In: Hugo WB, Russel AD (eds.) *Pharmaceutical Microbiology*. 5th edition Blackwell Scientific London. **1992**, 369-390.
42. Anonymous 1990-2008. *The Ayurvedic Pharmacopeia of India, Part I, Vol I, VI*, Ministry of Health and Family Welfare, New Delhi.
43. Anonymous. *Quality control methods for medicinal plant materials*. World Health Organisation (WHO) Geneva. **1998**.
44. Nandna Khurana, Rajeev Kr. Sharma, Seema Bhaduria. Microbiological Quality Assessment of Some Commercial Herbal Drugs. *International Journal of Pharmaceutical Quality Assurance*; 3(4);15-17. Available online on [www.ijpqa.com](http://www.ijpqa.com).
45. S. Saraf, C.D. Kaur, *Pharmacogn. Rev.*, **2010**, 4(7), 1-11.
46. H.S. Datta, R. Paramesh, *J. Ayurveda. Integr. Med.*, **2010**, 1(2), 110-113.
47. Kuntal Das, Raman Dang, Manjunath U Machale, Formulation and Evaluation of A Novel Herbal Gel of Stevia Extract. *Iranian Journal of Dermatology*, **2009**, 12(4).
48. Baileyfirst L.H.; Bailey, E.Z. *Hortus Third: A concise dictionary of plants cultivated in the United States and Canada*. New York: Macmillan. **1976**. ISBN 978-0025054707.
49. "Henna". *HowStuff Works*. Retrieved 5 May **2013**.
50. S. Zillur Rahman and M. Shamim Jairajpuri. *Neem in Unani Medicine*. Neem Research and Development Society of Pesticide Science, India, New Delhi, February **1993**, 208-219. Edited by N.S. Randhawa and B.S. Parmar. 2nd revised edition (chapter 21), **1996**.
51. NIIR Board, National Institute of Industrial Research (India). *Compendium of Medicinal Plants*. **2004**. National Institute of Industrial Research. p. 320. ISBN 978-81-86623-80-0.
52. Chan, E.W.C. *et al.*; Lim, Y.Y.; Wong, S.K.; Lim, K.K.; Tan, S.P.; Lianto, F.S.; Yong, M.Y. (2009). "Effects of different drying methods on the antioxidant properties of leaves and tea of ginger species". *Food Chemistry* **113** (1): 166–172.
53. Doughari, J. H. (December 2006). "Antimicrobial Activity of Tamarindus indica". *Tropical Journal of Pharmaceutical Research* **5** (2): 597–603.
54. Bhalekar M, Lavhale Manish, Sini Krishna. Formulation And Evaluation Of Rice Bran Wax As Ointment Base. *Ancient Science of Life* Vol: XXIV (1) July, August, September – 2004.