

## Indian Medicinal Plants for skin care and cosmeceuticals: A review

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### ABSTRACT



The skin protects the internal organs, works as a complete physiological organ performing a number of functions. The skin itself is complex organ and its health impact the appearance and medical status of a human being. A number of herbal products has been used and evaluated for rejuvenation and treatment of skin diseases in ancient time. This review discusses the skin ailments, skin morphology, and details of pharmaceutical formulations (Cosmeceuticals) used for the skin treatment and care. A detailed analysis of different Indian medicinal plants and their parts that are used for skin care and as Cosmeceuticals have been included.

**Keywords:** Herbal cosmetics, pharmaceuticals, herbal creams, facial, phytomedicine

### INTRODUCTION

The ancient art and inscriptions indicate the human eagerness towards its physical appearance. There have been styles in hair, ornaments, clothing and overall appearance, Though, with the

passage of time, new additions and changes have occurred, the fundamental instinct towards appearance has strengthened more. The development of cosmetics and science of cosmetic development have been ever-emerging field.<sup>1</sup> The medical and therapeutic science particularly based on herbs developed concurrently with the development of cosmetics. The mingling of therapeutic herbs and formulations as or with cosmetics have provided dual benefit and had an impact towards more acceptance of developed formulations. The medicinal benefit of herbs finds use with appearance enhancement.<sup>2</sup>

In modern settings, the markets are flooded with a different type of cosmetic materials; which serve an indicator towards widespread uses of these products and high demand for various varied cosmetic products. Though lot many cosmetics may have

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gender neutral applicability; the majority of cosmetic products have been developed with target application for the women, however, a number of cosmetics products specifically for men has also appeared recently.<sup>3</sup> Among the different types of cosmetics available, the product for skin application predominates compared to all other cosmetics.

In the human body, the skin is the largest organ. It contains many specialized cells which perform different functions. The skin consists of a superficial layer called epidermis which is composed of stratified squamous epithelium tissue. The skin helps in recognition of various sensations and pain; keeps out harmful chemicals and microbes; regulates the temperature, excretion and fluid balance; and protects the body from sunlight, pollution and radiations. In order to protect and maintain the health of the skin, various skin care products are used. Skin care products are the medicinal preparations that are applied to various external parts of the human body. It manifests beneficial topical actions and provides protection against degenerative skin conditions. Some of the skin care products are composed of synthetic ingredients/chemical substances while others are made up of natural ingredients. Due to the concern of consumers regarding the undesirable side effects of chemical and synthetic ingredients, usage of natural ingredients is becoming more popular in modern formulations. Natural skin care products deliver nutrients necessary for healthy skin and hence enhance the skin tone, texture, and appearance. Herbal extracts have several properties such as they have antioxidant capacity, pigmentation inhibition, and antimicrobial activity and hence, herbal extracts are primarily added to skin care formulations.

In beauty industry, cosmeceuticals are the fastest growing industry. These are the future generation of skin care products. Cosmeceuticals are topical cosmetic-pharmaceutical hybrids intended to improve the health and beauty of the skin. The concept of cosmeceuticals states that “cosmeceuticals are topical agents distributed across a broad spectrum of materials lying somewhere among pure cosmetics (lipstick and rouge) and pure drugs (antibiotics, corticosteroids). They partake of both categories.”<sup>4</sup>

Cosmeceuticals are either naturally derived or synthetic. All cosmeceuticals contain functional ingredients due to which they have either disease-fighting, therapeutic or healing properties. Cosmeceuticals are broadly classified into seven categories. These are Retinoids, Sunscreens, Moisturizers, Antioxidants, Hydroxy acids, Depigmentation, Proteins/Peptides, and Growth factors.

In India, the concept of the use of herbal cosmeceuticals is not new and dates back to centuries.<sup>5</sup> Recently herbal cosmeceuticals have gained much recognition and popularity in India and abroad. Cosmeceutical active ingredients are being used in various fields like cosmetics, biotechnology, pharmaceuticals and natural extracts in cosmetics formulations.

Herbal cosmetics referred as plant products of different parts along with chemicals used to moisten skin, prevent wrinkles, enhances rediance, removal of dead skin, hairs, bleaching and other colors differentially for specific hair, skin type. These kind of formulations are in immense demands along with the technical

progress in this centuries. Not all plant products are pure derivatives, rather combination with different chemical formulations like antiacne gels of various renowned brands. Herbs are the plants used in form of ointments, gels, etc for direct topical application on skin as well components of alternative medicines mostly in form of rasayanas,, tablets, powders. Pure herbal cosmetics are those which we directly taken from plant part and use it. Few botanical pure herbal cosmetics are available with high price and provide defined cosmetic benefits. Herbal cosmetics are also known as “natural cosmetics”.<sup>6</sup> This concept evolved in Ayurveda, where few herbs and floras were used to make Ayurvedic cosmetics which acted as the shield against any kind of external effects on the body. The traditional medicines which people use today are made from medicinal plants, organic matter, and minerals.

One of the best characteristics of Herbal products is that it is made up of herbs and shrubs. As they are made up of natural content hence these products are presumed to be safe for use and have no side effect on the body. Some of the natural ingredients used in natural cosmetics are saffron (Kesar), ashwagandha, sandal (Chandan), neem etc. Herbal cosmetics are free from any kind of harmful synthetic chemicals.

Herbs play a vital role in the formulation of natural products. They are used in herbal skin care products; herbal Haircare cosmetics; herbal lip care cosmetics; herbal eye care cosmetics; herbal creams, lotions and gels; herbal oils and herbal perfumes and fragrances. These products are used to improve skin health and fight various ailments. The modern development of Cosmeceuticals agglomerate the knowledge and research from field of medicinal chemistry,<sup>7</sup> nanomaterials, nanobiotechnology,<sup>8</sup> biochemistry, phytomedicine, dermatological science, and other fundamental science advances for designing of final formulations. Also, the newer advances in these science fields invariably impact the development of cosmeceuticals. Our laboratory research span in Nanobiotechnology and nanomaterials,<sup>9-16</sup> biological applications of synthetic molecules,<sup>17-25</sup> drug development<sup>26,27</sup> and drug delivery,<sup>25-36</sup> water toxicity<sup>40</sup> remediation with the help of plants and phytomedicine. The cosmeceuticals span in these fields of interest, so we focused this review on various skin infections, inflammations and other ailments and their possible remedies. It deals with the concept of cosmeceuticals and its types along with the concept of skin care in Ayurveda and how natural ingredients like herbs and shrubs are used in order to produce the natural products and why these products are reliable. The review also deals with several Indian medicinal plants, details of respective part of each medicinal plant and their contribution in the field of skin care and health.

## COMMON SKIN PROBLEMS

There are a number of skin conditions that a human being encounters. There are some common skin problems that can be caused by exposure of different environmental conditions. Skin problems are very common in the human population; approximately 6% of infected people visits to physicians whereas approximately 40% of the infected people consult to

dermatologists.<sup>41</sup> Although these are not deadly or serious problems but can lead to major impact on skin if it is not cured properly with time. The Cosmeceuticals can be of help in the treatment of these skin infections or can provide support in faster recovery. The common skin problems can have similar symptoms that need to be understood. The type of Cosmeceuticals to be used depend upon the symptoms. Thus, it is necessary to know about these skin problems specifically.

Following are the most common skin problems found in human beings:

**Acne:** it is one of the most common skin problems. Is especially found among young ones, adolescents. This disease was reported as an emerging and common problem.<sup>42</sup>



The Acne may be caused due to: (i) Oil: oil overproduction because of excessive production of the androgen hormone that leads to acne flares. (ii) Clogging of pores: because of excessive hormone levels the old skin cells becomes sticky and they clog pores as they do not get shed leading to acne. (iii) Growth of propionibacterium leading to skin inflammation

Acne treatment: Most acne treatments are topical that are applied to the skin, also known as a topical treatment. These treatments focus on killing bacteria and reduction of excessive oil. Some of the medicines used for the treatment are:- retinoid,<sup>43</sup> strebenzoyl peroxide, antibiotic, or even salicylic acid.<sup>44</sup> Acne treatment may also involve therapies that works throughout the body; such treatments are necessary when a patient is suffering from red, swollen types of acne. In this treatment, medicines are prescribed to treat acne cysts and nodules. The basic medicines prescribed include: Antibiotics (for killing bacteria and reducing inflammation), medicine that works on hormones and birth control pills (can be helpful for women). Isotretinoin<sup>45</sup> medicine is proposed to be effective for all causing factors of acne.

**Shingles:** Shingles (herpes zoster) is caused by the virus Varicella zoster,<sup>46</sup> the virus also causes chickenpox. The virus may survive in the body of individuals and can cause chicken pox<sup>47</sup>, and that is also at some later point of life, especially when the immunity of the individual is weak, then this virus gets reactivated.



Symptoms include: (i) The appearance of blistering rash that are painful and can appear anywhere on the body. (ii) Fever (iii) Headache (iv) Fatigue.

Treatment for shingles: Treatments may include medicines that are beneficial in reducing inflammation and severe pain. The Antiviral medicines are more effective when taken within the first 72 hours of having symptoms and response to slow down the progress of the shingles rash. The examples of such medicines are Acyclovir (Zovirax), Famciclovir (Famvir), Valacyclovir (Valtrex ).<sup>46</sup>

**Eczema:** There are a number of factors that cause eczema which involves Genes, environmental factors and a reaction by the immune system of the body. The most common type of eczema is Atopic dermatitis and is most common in children<sup>48</sup>. Adults suffer from allergies like dermatitis after getting in contact with certain perfumes, metal from jewelry, cosmetic agents.



Symptoms include (i) Dry and scaly skin (ii) Patches in feet, hands, and folds of skin (iii) These patches of skin may turn hard after repeated scratching.

Treatment for eczema: Topical medications like creams, gels, or ointments applied directly to the skin are helpful in relieving itching and reduce redness and swelling and also prevent the rash from spreading. Topical Corticosteroids are anti-inflammatory medications that can be very helpful in relieving symptoms of dermatitis and eczema as it suppresses the activity of some immune cells, which reduces the inflammatory process and prevent itching, redness, and swelling. Topical corticosteroids are available in different potential like some are low-potency anti-itch creams such as hydrocortisone. But such medicines are ineffective on moderate-to-severe eczema and dermatitis. They are applied directly on the skin and start showing results in few weeks.<sup>49</sup>

**Athlete's Foot:** Moist areas like shower cubicles, swimming pool lockers, moist shoes or wet socks have fungi named Dermatophytes and they lead to the development of itchy flaky skin. These disease infect in the toes of the feet and in between the digits and sometimes it gets spread on the nails whereas it can be pass from infected person to the healthy one after using wet shoes or when sharing shower cubicles.<sup>50</sup>



The attack of this bacterium can cause secondary infections because it leads to cracks and openings on the skin which can be easily attacked by the other bacteria.

**Treatment of athlete's foot:** Treatment is carried out for atleast a weeks or till few weeks until symptoms seem to get reduced. At first topical medicines are suggested but when the fungus is resistant to topical treatment, then oral antifungals - like Lamisil (terbinafine), Sporanox (itraconazole), and Diflucan (fluconazole) - can be prescribed.<sup>51</sup> In case of secondary infections oral antibiotics like augmentin (amoxicillin-clavulanate), cephalexin, dicloxacillin, and clindamycin. are prescribed to kill bacteria.<sup>52</sup>

**Vitiligo :** It is a disorder in which the melanin producing cells either stop functioning or die as a result of which patchy blotches develops on the skin which are pale due to the loss of skin color pigment synthesizing cells melanocytes lose their activity. This disease condition is not contagious, infectious or fatal. People get susceptible to damage by solar radiations gets sun burns immediately as compared to normal person. It can be hereditary. This is an autoimmune disease because the body's immune system attacks the melanocytes due to which they get lost. This can be caused due to specific mutations in the gene or because of certain chemical or even due to sunburn. Skin grafting or tattooing to mask the patchy skin is the remedy to hide such patches as there is no specific treatment of this condition.<sup>53</sup>



The process of vitiligo - the loss of pigment cells (melanocytes) cannot be stopped from any drug. But there are some drugs with light therapy which enables some restoration of the skin tone. There are certain Creams that control inflammation. For example, corticosteroid cream may help in returning color when it is directly applied on the skin regularly since very early stage of the disease. There are certain side effects of such creams as use of such creams leads to the skin thinning or the appearance of streaks or lines on skin. There are medications that may affect the immune system. Tacrolimus or pimecrolimus (calcineurin inhibitors) are present in some medicines which can cure initial phase of vitiligo only at a particular restricted area of body especially eyes, nose, forehead. Although such drugs can be used with ultraviolet B (UVB) light<sup>54,55</sup> but few studies suspects these drugs can promotes the formation of blood and skin malignancies.

**Age or Liver Spots:** Solar lentigines or liver spots are the black or brown spots that appear on exposed surfaces of the skin. These age spots appear because of exposure to sun-rays, therefore, it is recommended to use sunscreen lotions to protect skin from the sun burn to avoid such disorders. Although these spots are harmless but are mistaken with the cancerous growth.



Treatment of age and liver spots include: (i) Medications. Bleaching creams that contain hydroquinone are prescribed to use alone or with retinoids that contains tretinoin and a mild steroid may be really effective in the fading away of the spots over several months.<sup>56</sup> Use of sunscreen of at least SPF30 is mandatory with this treatment. Side effects of the treatment are temporary itching, redness, burning or dryness. (ii) Freezing (cryotherapy). To destroy the extra pigment freezing agents like nitrogen is used on the skin pigments. The treatment can lead to irritation of the skin and leads to a slight risk of permanent scarring or discoloration. (iii) Chemical peel. An acid is applied on the age spots which burns the outer layer of the skin and after this peel off of the skin, new skin forms to take its place. Several treatments may be necessary for noticeable results. Treatment can cause temporary redness whereas in some cases this may lead to a risk of permanent changes in skin color.<sup>56,57</sup>

## COSMECEUTICALS

In the modern world, where people's concern is increasing for attaining better health and good looks, the concept of cosmeceuticals is gaining wide importance. A 'cosmeceutical' is a cosmetic product which incorporates biologically active ingredient having therapeutic, disease-fighting or healing benefits on the surface of body parts applied.<sup>58</sup> Cosmeceuticals claim to contain various functional ingredients like collagen boosters, keratin strengtheners, anti-inflammatory products etc. which help in improving the texture/ functioning/ qualities of the body part to which it is applied. Though it is majorly used for skin care, other sub-types of skin care cosmeceutical contain products for Haircare, lip care and tooth care. In all these types, the basic essence of cosmeceutical of being cosmetic-drug hybrid remains common which has been described as 'topical agents distributed across broad spectrum of materials lying somewhere among pure cosmetics (lipsticks and face powder) and pure drugs (anti-inflammatory etc.). they are partaking of both products.<sup>4</sup> Moreover, modern trade sector of cosmetics and cosmeceuticals is showing more interest towards natural ingredients due to their multiple uses not only limited to enhancing beauty but also serving drug-like purposes (anti-inflammatory, anti-fungal, anti-bacterial etc.) with minimum adverse effects on body.<sup>58</sup>

## DEFINING COSMECEUTICALS- DRUG v/s COSMETIC DEBATE (RULES AND REGULATIONS)!

The word "Cosmeceutical" is composed of two words: "cosmetic" and "pharmaceutical". Thus, Cosmeceutical is a product which is a blend of both cosmetic and pharmaceutical



and to understand it, it becomes equally important to look at both these concepts separately as well as intermingled.

Personal care industries all over the world as well as in India are claiming to sell cosmetics, drugs and cosmeceuticals under the label of either drugs or cosmetics. These companies are bound by certain rules and regulations fixed by various authorities and acts of the respective nation.

**In India**, the Act concerned with defining drugs and cosmetics was passed in 1940 as Drugs and Cosmetics Act (D&C Act) and manufacturing and trading of cosmetics and drugs is regulated under the authority of Central Drugs Standard Control Organisation (CDSCO). Another Act was enacted in 2005 as Patent Act which even made this trading more flexible.<sup>59,60</sup> D&C Act defines drugs as “are the substances affecting human body functioning and have deleterious effects on microbial growth, microbes or insects which cause disease in human beings or animals, as may be approved by government through notification revised from time to time.” Cosmetics are defined by D&C Act as “any article intended to be rubbed, poured, applied on the outer body parts in order to enhance beauty, radiance of skin, coloring of hairs, exfoliating skin as well, applicable to all constituents of these cosmetics, 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.”

**United States**, being one of the most leading nation in the trade and business turnover of cosmetic and personal care industry passed an act in 1938 as Federal Food, Drug and Cosmetic Act (FD&C Act)<sup>61</sup> and has given authority to U.S. Food and Drug Administration (FDA). FDA defines drugs as “articles intended for use in the diagnosis, cure, mitigation, treatment, or prevention of disease” and “articles (other than food) intended to affect the structure or any function of the body of man or other animals” [FD&C Act, sec. 201(g)(1)]. Cosmetics are defined by FDA as “articles intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body, for cleansing, beautifying, promoting attractiveness, or altering the appearance” [FD&C Act, sec. 201(i)]. Among the products included in this definition are skin moisturizers, perfumes, lipsticks, fingernail polishes, eye and facial makeup preparations, cleansing shampoos, permanent waves, hair colors, and deodorants, as well as any substance intended for use as a component of a cosmetic product.<sup>61</sup>

Though Federal Food, Drug and Cosmetic Act (FD&C Act) has not given any official recognition to the term cosmeceuticals, still the term is gaining fame due to its intensive use by personal care industry to refer to those products which promise its customers to give desired beauty results not only by acting as cosmetic but also by altering the structure or function of the concerned body part i.e. these products are a combination of both.<sup>61</sup> For example, Himalaya Herbals company has one of its skin care cosmetic: *Himalaya Herbals Purifying Neem Face Wash* which has *turmeric* and *neem* (which have anti-bacterial and anti-fungal properties) as its active ingredients. Introduction of these herbal products which have medicinal properties has turned that cosmetic facewash into cosmeceutical. Thus,

cosmeceutical is a cosmetic product which incorporate biologically active ingredient having therapeutic, disease-fighting or healing benefits on the surface of body parts applied. Even, the personal care industry is found to be selling its cosmeceutical as ‘cosmetics’ probably because of the fear of being questioned by legal authorities and to attract customers. On the one hand, cosmeceutical is being seen as the future of skin care industry on the other hand, it is still not able to establish itself as a separate class of products. And is seen as a cosmetic-drug hybrid.

## TYPES OF COSMECEUTICALS

The trade of cosmeceuticals is getting fame day by day with a wide range of products available in the market as per the demands and needs of consumers based on appearance, healthy skin, good looks, natural beauty, skin related problems (as discussed above) and so on. The products classification of cosmetics (i.e body ‘Care’ products) is based on the body part they are applied such as:

**Skin Care:** Moisturisers, sunscreen, skin cleanser, antiacne, antiaging,<sup>62</sup> skin cleanser, lotions, oils, powders, creams, bubble baths, perfume, colognes and toilet waters, and facial products (facial kits, face powder, body powder, face packs etc.);

**Haircare:** hair growth stimulants, shampoos, conditioners, anti-dandruff shampoos and other products, hair colorants, hair gel and creams, hair removals, shaving cream, hair straighteners;

**Lip Care:** lip-sticks, lip-gloss, lip-balm, lip-volumizer;

**Nail Care:** nail polish, nail polish removers, lacquers, lacquer removers;

**Eye Care:** makeup, mascara, eyebrow pencils, eyeliner and eye shadow;

**Dental Care:** toothpastes, mouthwash, breath fresheners.

The ‘Cosmeceuticals’ classification is based on various ingredients present in the formulation and respective function of these products. The cosmeceuticals can be classified as:

### SKIN COSMECEUTICALS

Skin being largest body organ plays its important roles like maintaining body temperature, excreting waste material, giving sensory information to the brain, regulating body moisture, protecting the whole inner body from various environmental effects like heat, UV radiations, infection, injury, water loss etc. natural skin problems like skin ageing, wrinkling and other dermatological problems like wounds, pigmentation, inflammations, acne, roughness and dryness of skin etc.<sup>6</sup>

Human skin has 3 basic layers: epidermis, dermis and hypodermis or subcutaneous layer.<sup>63</sup> The outermost layer ‘epidermis’ is further divided into 5 sub-layers as: Stratum corneum, stratum lucidum, stratum granulosum, stratum spinosum and stratum germinativum or stratum basale. Stratum corneum is made up of sheets of keratin (a protein) and dead skin cells which acts as barrier to dehydration which is provided to this layer through underlying tissues. Continuous exposure to dry environment without providing the skin with some cosmetic cream or lotion can make the skin rough, dry and dehydrated. Further ignorance

can even lead to cracks in the skin layer creating the chances for skin infection. The middle layer 'dermis' is quite thicker than the epidermis and consists of 3 sub-layers: papillary layer, sub papillary layer and reticular layer. This layer basically is composed of elastin and collagen fibers providing elasticity, strength and sensitivity to the skin. The ageing process and free radical formation process due to attack of UV radiation lead to a breakdown of these fibers creating fine lines and wrinkles on the skin. The innermost layer i.e. subcutaneous layer is a fat-rich tissue of skin which retain moisture, preserve fat, generate heat.<sup>17</sup>

There have been continuous efforts to study skin and related problems along with efforts to preserve the skin in its healthier form. Cosmeceuticals for skin care products are capable of exerting physiologic changes<sup>64</sup> to the skin as they contain biologically active ingredients. They can enable to look our skin temporarily beautiful but they also lead permanent change on our skin.<sup>65</sup> Following are the examples of Skin Cosmeceuticals products:

**Moisturizers** - As discussed, stratum corneum usually get dehydrated with environmental exposure. This layer can be re-hydrated using moisturizers. These products make the dry skin lubricated, moist and smooth, improve the appearance and also control various skin conditions like aged skin, psoriasis etc. Moisturizers usually contain fats, oils, humectants, emulsifiers and preservatives. Humectants are the substances that restore water content to the epidermis and  $\alpha$ -hydroxy acids is such important group. Various ingredients used are black cohosh, soy extract, and vitamins A and E, a complex containing green tea leaf extract, and glutathione, a complex containing hyaluronic acid, and even chitin, chitosan and its derivatives act as moisturizers. Herbal moisturizers include coconut oil, jojoba oil, almond oil, sunflower oil, aloe vera etc. Moisturizers are lotions that hydrate and moisturize the skin. Moisturizers contain essential oils and herbal extracts but most of them contains drug like emollients, occlusive, and humectants. Some components present in moisturizers such as hydroquinone may be harmful to skin<sup>66</sup>

**Sunscreen products** - These products protect the skin from solar radiation and hence should cover a broad spectrum that blocks UV-A and UV-B. They work by including active ingredients (called UV filters) that remain on the surface of skin and absorb, scatter or reflect the UV radiations before it reaches the skin. The base products of sunscreen lotions include a combination of two to three active ingredients such as oxybenzone, avobenzone, octinoxate, These products also act as anti-aging products<sup>62</sup> as UV radiation are the basic cause of collagen and elastin damage promoting skin photoaging. Green tea has proved to be an effective sunscreen agent. These are considered as the most important and single formulation to protect skin from the sun and therefore suggested to use daily. These are formulated to meet individual preferences in terms of scent and texture. Adapalene and tazarotene have anti-aging and anti-acne qualities.<sup>17</sup>

**Antioxidants** - The defense system (like synthesizing glutathione or ubiquinol-10) which is natural to skin help skin fight against free radical formed due to UV penetration into the

skin. But some antioxidants like vitamin A, E, C needs to be supplied to the body through diets and cosmeceuticals. Common antioxidants include retinoids,<sup>43</sup> alpha-lipoic acid (ALA),<sup>67</sup> L-ascorbic acid (vitamin C), niacinamide (vitamin B3), N-acetylglucosamine (NAG),  $\alpha$ -tocopherol, and ubiquinone.<sup>68</sup> Herbal sources of antioxidants are aloe vera, ginkgo, carrot oil seed, tamarind, turmeric, coffee berry etc. Vitamins A, C and E: alpha liopic acid: Ubiquinone (coenzyme Q-10): idebenone: polyphenols (e.g. catechins, flavenoids): kinetin: botanicals (e.g. teas, grape seed, grape skins and stems, coffeeberry) are combining to form antioxidants to detoxify the skin. They have a topical application and improve the skin's natural antioxidant protection.<sup>69</sup> They reverse the sign of photoaging as they reduce free-radical damage by blocking the oxidative process. Thus, they also prevent skin cancer.<sup>70</sup>

**Depigmentation agents** (skin lightening agents) - Skin lightening agents are in great demands to reduce dark spots. Fairing creams have hydroquinone, ascorbic acid (vitamin-C), kojic acid, hydroxy acids, licorice extract, arbutin, mequinol, alezaic acid, soy proteins. Use of hydroquinone is questionable due to safety perspective and only 2-3% is allowed to be used in cosmeceuticals. Skin whitening is a term used for lightening the complexion of the skin through artificial means like creams, lotions, soaps and injections. Unfortunately the fascination and attraction towards fairer complexion make bleaching product need in higher amount across the world skin color. Skin lightening agents are those substances which helps to achieve lighter skin tone, includes kojic acid, ascorbic acid (vitamin C), mercury, hydroquinone, azelaic acid etc.<sup>71</sup> There are three primary categories of ingredients in Cosmeceuticals that have the capability to modify the biological function of the skin:

**Retinoids** - These are natural and synthetic derivatives of vitamin-A.<sup>43</sup> Some examples of retinoids are retinoic acid (tretinoin), retinol, retinaldehyde etc. These work as antioxidants, improve the photo-aged skin by reducing wrinkles, decreasing laxity, bleaching hyperpigmented spots, and thus, making the skin looks smoother.

**Hydroxy acids** - These are organic carboxylic acids which can be classified as *alpha-hydroxy acids* (AHAs) like glycolic acid, lactic acid, mandelic acid, malic acid, tartaric acid and citric acid and *beta-hydroxy acids* (BHAs) like salicylic acid, tropic acid and LHA (2-hydroxy-5-octanoyl benzoic acid). These are used in moisturizers, depigmentation agents, anti-acne products, anti-wrinkle products. Salicylic acid treats acne and glycolic acid peel control epidermal hyper-pigmentation. Sunscreen products usage is recommended with the use of these products as these acids shows greater sensitivity to UV radiations.<sup>176972</sup> Hydroxy Acids (alpha. beta, poly) also contains various acids like glycolic acid, tartaric acid, citric acid, malic acid, pyruvic acid and lactic acid. They can also leads the improvement of depigmentation and skin texture.

**Exfoliants** - These products help by removing supporter cells from the stratum corneum layer of the skin. Lactic acid, salicylic acid and glycolic acid are some of the common exfoliants. It is concerned that repeated use of AHAs and salicylic acid could make dermis and epidermis weak against UV penetration.

**Botanicals** - these are the products which are being used in maximum number in the personal care industry. Some of the botanicals which are found beneficial are green tea extract, neem, ferulic acid. Ferulic acid, when combined with vitamin C and E, has been shown to provide UV protecting shield. It is also supposed to act as supplement to sunscreens as its mechanism is different from sunscreens. Neem or *margosa* is an Indian botanical with antifungal, antibacterial, pain-relieving, and anti-inflammatory compounds that would treat dandruff. Similarly, Indian herbs give a rich source of Cosmeceuticals ingredients.

#### HAIR COSMECEUTICAL

Hairs are mainly composed of proteins called *keratin* and also of lipids, majorly *ceramides*. Each hair shaft consists of layers as: *medulla, cortex and cuticle*. The innermost layer is 'medulla' which is soft and fragile and is even found absent in some hairs. The 'cortex' layer is aligned along the axis of the fibre and is filled with keratin that are arranged in coiled form. Its function is to provide mechanical strength to hair and to control water uptake. Even the pigment *melanin*, responsible for hair colour is present in cortex layer. The most significant feature of aging which usually starts when humans reach in the age group of 40 i.e. graying of hairs starts with the loss of melanocytes (cells containing melanin pigment). The outermost layer, 'cuticle' is a thin structure which acts as a protective covering for the hair shaft.

Egyptians have shown the earliest signs of hair modifications and beautification by applying mud to set hairs and using Heena for hair coloring. From ancient times, limitless tonics, beautifying products, ointments, products treating hair problems like hairfall, dandruff etc. have been used. Hairs have always been considered as agents for intensifying the beauty and various cosmeceuticals used for hairs<sup>73</sup> should also make sure that these products do not harm hairs. Cosmetics can be categorized into two, one are those that work on the exocuticle on the outer scalp (shampoo, conditioners, serums, hair sprays, waxes, gels and mousses) and second, those that work on the cortex penetrate inside the hair follicles (hair colour, bleaching agents, straightening and perming agents).<sup>6</sup>

**Shampoos** which are generally used for cleaning of hairs and scalp are now also used for other additional purposes like treating oily hairs, dandruff. Haircare formulation comprising of iodopropynyl butyl carbamate, zinc pyrithione, N acyl ethylenediamine triacetate and yarrow extract is purported to clean the hair and scalp without damaging the fragile biological equilibrium of scalp and hair. Yarrow extract (*Achillea* *Azhillaea millefolium* L) has been used to treat oily hair also.

**Anti-dandruff cosmeceuticals** include active ingredients which are anti-fungal and anti-bacterial agents – zinc pyrithione, octopirox, Selenium sulfide and bifonazole and ketoconazole. Herbal products used to treat dandruff include *neem, shikakai, heena* which has lawsone extract having high vitamin C content. Heena is also used for hair dying and also for treating hair loss.

**Hair conditioning agents** which are used to impart softness, gloss and to reduce flyaway majorly contain fatty ingredients,

hydrolyzed proteins, quaternized cationic derivatives, cationic polymers, and silicones.

**Hair growth stimulants** are generally not found showing any result because of less contact time with the hairs. Amino acids, particularly arginine/L-arginine and cysteine/L-cysteine, and a minoxidil-related compound (2,4-diamino-pyrimidine-3-oxide) act as topical hair growth stimulants.

Recently, new technologies (like nanotechnology) are being praised to bring haircare products with more advanced properties of imparting more softness and other hair qualities. Argan oil is getting popularity in the market as oils provide more lubrication to hairs and prevent hair breakage.<sup>74</sup>

#### LIP CARE COSMECEUTICAL

Coloring lips is one of the ancient practice of make-up used to enhance overall beauty. Today, the personal care market provides consumers with a variety of lip shades of color, textures, lusters. To get an understanding of the lip care products, a basic idea of lips is needed. The skin of lip is quite thinner than normal skin. Whereas the corneum layer of regular skin has 15- 20 layers, corneum layer of the lip contains about only 3 to 4 layers. Also, the pinkish look of lips is due to the presence of less amount of melanin pigment. Moreover, the lip skin has no hair follicle and no sweat glands.<sup>75</sup> Therefore lips do not have any sweat and body oil in protecting the lip from the outside environment. All these features make our lips delicate part of the body and hence, their extra care should be taken while applying beauty products on the lips. Adverse environmental conditions like sunlight cause more harm to lips than other body like lip dryness, sores, swelling etc. Various lip care cosmeceuticals (lip gloss, lip balm, lipsticks) basically are made up of following common ingredients: *base, oils, coloring agents, flavouring agents*.<sup>75</sup>

Among **base**, Waxes and butter are the major ingredients used. Waxes are complex mixtures of hydrocarbons and fatty acids combined with esters. Waxes are harder, less greasy and more brittle than fats. They are very resistant to moisture, oxidation and bacteria. Commonly used wax is beeswax which is animal wax. Other natural waxes are carnauba and candelilla wax. Cocoa butter is also used as a base in lip care cosmeceuticals as it also moisturizes lips and heals chapped and dry lips.

**Oils** are used to provide suitable film on the lips. Castor oil, jojoba oil, rosehip oil, vitamin E oil, mineral oil, almond oil, cinnamon essential oil are some of the oils used in lip balm.

**Coloring agents** constitute the important ingredient for lip gloss, lipsticks. The colors should be from the list of certified dyes under the drugs and cosmetics act. Coloring agents can be naturally derived and can also be made synthetically. Beetroot, saffron, turmeric, honey etc. are some of the natural coloring agents whose extracts are used in lip care cosmeceuticals. Colorants used should be non-toxic, free from disgusting tastes and odour and should be stable i.e. unaffected by light, tropical temperatures, hydrolysis and micro-organisms.

**Flavouring agents** should not be toxic or irritating and it should have a sense of taste, touch and smell. Perfumes of fruit flavour type, as well as edibles, can serve the purpose. Commonly used flavours are apricot, strawberry, raspberry, cherry, honey,

chocolate, etc. While making lip care cosmeceuticals, care must be taken that some people might eat these products and hence, its ingredients must be formulated accordingly. The synthetic preservative, carmine (obtained from a cochineal insect) which can cause rashes and skin allergies if, ingested; and paraben due to risk of breast cancer are considered harmful to be used in lip care cosmeceuticals.

#### NAIL CARE COSMECEUTICALS

A finger nail has the function to protect the fingertip and other nearby tissues from injuries. Nails of fingers and toes are made up of tough protein called 'keratin'. The only living part of the nail is under the skin at the nail's proximal end under the epidermis from where the nail grows. Nails are often considered impermeable but actually water and other substances can penetrate into through the nails. Urea which is used as an ingredient in body lotions, salicylic acid and miconazole (fungicidal agents) etc. are some products which are permeable through nails.<sup>76</sup>

Nail polish are the products which are used to give differential colors and designing to nails the natural ingredient used is Stearalkonium hectorite. Also, it should dry fast. Base of nail polish is made up of nitrocellulose. The key ingredients in nail polishes are coloring agents either inorganic or organic (carbon-based). Inorganic pigments used include chromium oxide for greens, iron oxide for reds and oranges, and ferric ferrocyanide for blues. Organic pigments are similar to those used in food colourings, and come in a range of colours. Various chemicals like formaldehyde, toluene, camphor, xylene, TPHP, nitrocellulose plasticizers, glycol ethers, BPA, acetates, phenoxyethanol, parabens, phthalate are found harmful and against these chemicals is the emerging concept of prim and pure nail polish which are free from these chemicals.<sup>76</sup>

Nail polish remover products are generally based on acetone. Other ingredients are water, glycerine and ethyl alcohol which is used to mix acetone with glycerine. Natural nail polish remover can be made using aloe vera and lemon extract which is gluten-free, paraben-free, cruelty-free and fits the criteria of drug.

#### AYURVEDA CONCEPT FOR SKIN CARE

Ayurveda is one of the earliest systems of medicine in the world that originated in Indian subcontinent. Indian medicine system, Ayurveda, has rational and logical foundation. Ayurveda is a science or knowledge of life which describes beauty by *Prakriti* (Body constitution), *Sara* (Structural predominance), *Sanhanan* (Compactness of body), *Twak* (Skin completion), *Praman* (Measurement) and *Dirghayu Lakshmana* (Symptoms of long life). The concept of Ayurveda is based on Indian philosophy which dictates not only treatment of various health problems but also gives direction to pursue a healthy lifestyle.

#### TREATMENT IN AYURVEDA

According to Ayurveda, Skin conditions originate from deep rooted *Dosha* imbalances and it can be cured by deep *Dosha* analysis. *Dosha's* are biological energies, part of every human being that governs all mental and biological processes and provide an individual design of health and fulfilment. These

*Doshas* are based on the five elements i.e. earth, water, space, fire & air and their related properties. In Ayurveda there are three types of *Doshas*: Vata dosha (ether and air), pitta dosha (water and fire), Kapha dosha (water and earth).

Ayurveda system of medicine isn't concerned about only beauty or skin care; it also define concerns about '*Chaitanya Mann*' spirituality, healthy lifestyle, diet modification, medical intervention, personal and social hygiene. This treatment is generally based on natural ingredients, natural therapeutic products given.

#### COSMECEUTICAL IN AYURVEDA

Ayurvedic medicine system has tremendous property such as anti-ageing, wound healing, skin care, nourishment and radiant look. The treatment is based on natural ingredients including more than 700 herbs and wide variety of fruits and essential oils.<sup>77</sup> It contains formulae of herbs and natural products where the application is mostly external in the form of powder, oil, powder etc. Nowadays, Ayurveda has evolved globally, where maximum production is on women cosmetics from beauty products to eatables and drinks.

The Ayurveda uses herbs, plant products and animal products for the treatment and rejuvenation of overall health of human beings. The milk from animals particularly that of buffalows and cows find different uses. The milk and milk products have been used for skin care traditionally. The milk has been recommended and used for cleansing of skin with prominent existence of proverb '*Dudh ka dula hua*' (menas cleansed with milk) in traditional society. The curd, whey were used for cleansing of hairs. The milk is used for cleaning the face and skin particularly dry skin and gentle face washing. The protein present (mainly the hydrolysate of milk proteins) in the milk are non-irritating and serve as excellent mild cleansing materials for face and skin. The proteins and amino acids presents in milk have nutritive value for skin. The milk protein and its hydrolysis products are beneficial in products formulated specifically to soothe irritated, dry skin, as these works to hydrate and lock in moisture. Many modern cosmetics including facewash creams, bath soaps, moisturizers, and other cleansing cosmetic creams for face include the milk proteins in their formulations. Similar way, the curd and whey have used traditionally as hair wash and for face wash. The Whey protein contains glutathione, which is an antioxidant and thus scavenges free radical leading to delay in the signs of ageing.

#### AYURVEDIC COSMECEUTICAL INGREDIENTS

The Ayurvedic constituents for skin care concentrate on two main end impacts i.e. anti-aging<sup>78</sup> and wound healing. Both of these have different and specific herbal formulations.

Anti-ageing property: Ayurveda is well known for its anti-ageing property.<sup>79</sup> Where modern medicine system mainly relies on biochemical ingredients with lots of harmful side effects, Ayurveda stands with least or no side effects. Moreover, it consists of wide description over 200 herbs,<sup>80</sup> minerals and essential oils. anti-aging therapy involves two types of therapy *Urjaskara* (promotive) and *vyadhi hara* (curative). For healthy skin there are three types of *Dhatu*: rasa (nutritional fluid) that



provide nutrition to skin and tissues, blood (rakta) mainly related to liver and process detoxification of toxins, muscle (mamsa) provide fitness to skin. An effective ayurvedic anti-aging product should support all the three areas of *Dhatu* and herbal formulation constituents could be classified as:

1. *Vayasthapana* gives overall support to balance between the three *Dhatu* involves foremost herbs with anti-aging effect like *centella asiatica* (gotu-kola).
2. *Varnya* is a group of herbs that enhance the complexion of skin include ingredients like sandalwood, vetiver, Indian madder and Indian sarsaparilla.
3. *Sandhaniya* herbs helps to heal wound cut (wound or regeneration that goes slow down with aging), sensitive plants like mimosa pudica or *chiumui*, venus flytrap (*Dionaea muscipula*), bryonia dioica are the best for this treatment.
4. *Tvachaya* these herbs supports moisture balance includes gotu kola, silk cotton, vitamin A, C & E rich food and prevent aging and wrinkles.
5. *shothahara*, protecting skin from allergies, inflammatory substances. gum resin exudate of *Boswellia serrata* is best to manage inflammatory conditions.
6. *Tvachagnivardhani* to make skin radiant and glowing by enhancing skin metabolism. *centella asiatica* enhances enzymes that improve metabolism.
7. *Tvagrasyana* prevents sickness and aging of the sickness, *Phyllanthus emblica* (amalaka), vitamin C rich food, tannins and gallic acid work as an anti-aging drug.

**Wound healing property:** a wound is a case of disturbed state of tissue caused by physical, chemical, microbial, immunological insults. There are different kinds of wound for instance open wound (clearly visible), chronic wound (pathological inflammation), puncture wound (caused by object that puncturing the skin such as needle or nail), gunshot wound (caused by bullet), penetration wound (caused by any object like knife), closed wound (crash injury or blood tumor) and so on. Ayurveda heals various types of wound; Healing of wounds is one of the important areas of clinical medicines explained in many Ayurvedic texts under the heading "*Vranaropaka*". Its detailed description is found in *charaka Samhita*, where *vrana* (wound or ulcer) caused by disruption skin lining. Classical management of wounds according to *Sushruta Samhita* follows 60 therapeutic steps, starting with an aseptic dressing of the affected part and ending with the rehabilitation of the normal structure and function. These therapeutic measures were aimed not only to accelerate the healing process but also to maintain the quality and aesthetics of the healing. It has been estimated that 70% of the wound healing Ayurvedic drugs are of plant origin, 20% of mineral origin, and the remaining 10% consisting of animal products. These drugs are stated to be effective in different conditions such as *Vrana* (wounds or ulcers), *Nadivrana* (sinuses), *Vidradhi* (abscess), *Visarpa* (erysipelas), *Upadamsha* (syphilitic ulcers), *Vranajakrimi* (maggots in wounds), *Dustavrana* (septic wounds), *Vranashotha* (inflammatory changes of wounds), *Vranavisha* (cellulitis), *Ugravrana* (purulative ulcer), *Netravrana* (hordeolum or styne sepsis), *Pramehapidaka* (diabetic

carbuncle), and *Bhagandara* (fistula-in-ano). Scientific investigations have been carried out to assess the wound healing properties of some of these drugs.

## INDIAN MEDICINAL PLANTS

There are number of plants of Indian origin that find application in Cosmetics for treatment of various skin disease and conditions along with rejuvenating the skin appearance.<sup>80</sup> The selected prominent plants are as below:

### AMLA

Common Name: Amla, Indian Gooseberry.

Systematic Name: *Emblia officinalis Gaertn.*

Family: Phyllanthaceae

Amla also known as Indian gooseberry (figure 1) is an ancient ethanopharmacological and Indian ayurvedic medicinal plant. It has a lot of potential to cure diseases and problems in most of its plant parts but its fruit is used for cosmetic purposes. It contains vitamin C, minerals and amino acids, and also contains various phenolic compounds. Research reports show that amla possesses antipyretic, analgesic, antitussive, antiatherogenic, adaptogenic, antianemia, cardioprotective, gastroprotective, antidiarrheal, wound healing, antihypercholesterolemia, antiatherosclerotic, hepatoprotective, nephroprotective, and neuroprotective properties.<sup>81</sup> In an experimental study by Takashi Fujii et.al. it was found that the amla fruit extract controls the collagen metabolism that makes it effective for cosmetic applications.<sup>82</sup> A study done by Dasaroju and Gottumukkala reveals that amla fruit is a good hair tonic that can be used for enriching hair growth and pigmentation.<sup>83</sup> The Amla plant fruit is a potent plant for hair and skin care.



**Figure 1.** The Fruit of Amla

### SHIKAKAI

Common Name: Shikakai

Systematic Name: *Acacia concinna DC.*

Family: Fabaceae

Shikakai (Figure 2) is a shrublike a tree grown in Central India. It is rich in vitamin A, C, D, E and K and other antioxidants. Since ancient times its fruit has been used in powder form to cleanse hair. Shikakai fruit is known and used for the purpose of hair treatment. Shikakai enhances hair growth, prevents dandruff, removes lice, oil and dirt from hair, improves scalp health and strengthens hair roots.<sup>84,85</sup>



**Figure 2.** Fruit of shikakai

#### ALMOND

Common Name: Almond, Badam,

Systematic Name: *Prunus dulcis*

Family: Rosaceae

Almond oil is extracted from the fruit of the almond plant. It contains omega - 9 fatty acids, vitamin E and protein that promote strength of hair. It is a natural antioxidant. It also repairs hair as it improves hair's resilience capacity.<sup>86</sup>



**Figure 3.** Fruit of Almond plant and oil extracted from almonds.

#### PRIYANGU

Common Name: Priyangu

Systematic Name: *Callicarpa macrophylla Vahl*

Family: Amaranthaceae

Priyangu (Figure 4) has been used as a traditional medicine since ages. Researches show that Priyangu possesses anti-diabetic, anti-inflammatory, antifungal, antibacterial, anti-arthritis, anti-pyretic & analgesic properties. Priyangu plant bark can be used to enhance the luster on the face and has the potential to treat skin ailments.<sup>87</sup>



**Figure 4.** Priyangu plant and its Bark (inset)

#### TURMERIC

Common Name: Turmeric, Haldi,

Systematic Name: *Curcuma longa* Linn

Family: Zingiberaceae

Turmeric is an age old medicine used to cure various ailments. It has been used traditionally in India as a common recommendation for fasting the wound healing supplement and has been included in the spices for daily use. It possesses anti-diabetic, anti-inflammatory, antifungal, antibacterial, anti-arthritis, anti oxidant, anti microbial, anti carcinogenic, & analgesic properties. Turmeric has the potential of curing pimples and eczema, healing of burning wound, developing smooth skin surface.<sup>88,89</sup>



**Figure 5.** Turmeric Haldi (underground stems)

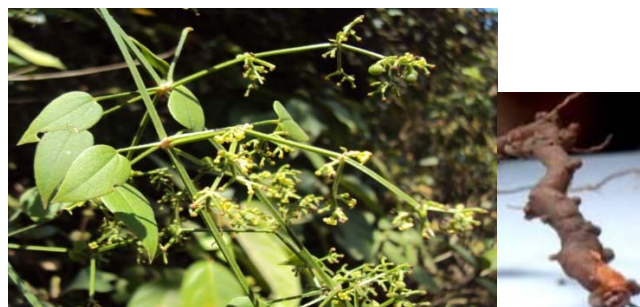
#### MANJISTHA/ INDIAN MADDER PLANT

Common Name: Manjistha, Indian Madder Plant

Systematic Name: *Rubia cordifolia* Linn.

Family: Rubiaceae

The roots of *Rubia cordifolia* plant also known as manjith are a source of a medicine. Manjistha possesses anti-diabetic, anti-inflammatory, anti ulcer, anti adipogenic, anti-HIV,<sup>34</sup> anti oxidant, anti tumor, radio protective properties. Extract from its roots and stem is used to dye hair. It works as skin protective and healing agent.<sup>90,91</sup>



**Figure 6.** Manjith (plant and roots)

#### NEEM

Common Name: Neem

Systematic Name: *Azadirachta indica*

Family: Meliaceae

Neem tree is an age old plant that is easily available near every locality in India. It has been extensively used traditionally in



India for the treatment of skin infections and wounds. Traditionally, the leaves of Neem are boiled in water to extract its ingredients and water (extract) has been used for bathing to cure the diseases. The bark of neem is rubbed on the stone with minute amount of water (sprinkle) to make a paste which is then used on wounds and cuts for healing. The Neem has antimicrobial, anti-inflammatory and antioxidant properties. It has been used to treat skin diseases. The powder of neem bark and paste of leaves can be made and applied on acne. It reduces swelling and redness of pimples due to its properties.<sup>92,93</sup>

Maan et. al. has evaluated the paste of stem bark of Neem which has been traditionally used on wound and scar for rapid healing.<sup>94</sup> The different extracts of stem bark of Neem was explored in mice model in this study. The water extract was found to be having fast wound healing property (significant increment in rate of wound contraction).<sup>94</sup>

The Neem leaves have been used for various skin infections due to their anti-bacterial, antifungal, antioxidant and antidermatophytic activity. Besides direct application of crushed leaves paste as topical agents, its extracts in different solvents has been evaluated phytochemically for biomedical applications.<sup>95</sup> The alcoholic extract of Neem leaves has been found to be effective in chronic skin disease such as eczema, ringworm infection and scabies. The alcoholic extract of leaves has been reported to be more effective in treating the ringworm infections compared to salicylic acid and benzoic acid.<sup>95,96</sup> A report by Ngo et. al. evaluated the Neem leaves for prevention of wrinkles in mice.<sup>97</sup> The topical application of neem leaf extract at 1, 10, and 50 µg/mL was investigated for its skin anti-aging effects in UVB-irradiated hairless mice. The topical application of leaves extracts was very effective in inhibiting the wrinkle formation. In the study, increased type I procollagen and elastin was observed on the skin on application of leave extract. In biochemical evaluation, the leave extract was found to modulate the biomarkers for skin aging including ROS (reactive oxygen species), AP-1 (transcription activator), MAPKs (Mitogen-Activated Protein Kinase), IL-6 (interleukin-6), MMP-1 (matrix metalloproteinase-1), and TGF-β1 (transforming growth factor) biomarkers.<sup>97</sup> TGF-β1 was found to be upregulated while ROS, AP-1, MAPKs were downregulated on application of leaves extract which gave a net result of improved procollagen formation in skin leading to



Figure 7. Neem bark and leaves

effective treatment of symptoms of skin aging such as wrinkles, thickening, water loss, and erythema.<sup>97</sup> The neem leaves extracts posses antibacterial and antioxidant properties as has been confirmed by different research studies.<sup>98,99</sup> The Neem stick is used for teeth and mouth cleaning due to their effective antibacterial properties.<sup>100</sup>

#### HENNA

Common Name: Heena, Henna

Systematic Name: *Lawsonia inermis*

Family: Lythraceae

Henna has been used cosmetically for applying on hands and feet. It possesses hepatoprotective, antioxidant, antibacterial, antifungal, antiviral, antiparasitic, and antiparasitic properties. Since years it has found its uses for various purposes. Henna plant parts can be used for various purposes, such as leaves for Hair dye, applying on hands and feet; Flowers for perfume, and Seed for Deodorant.<sup>101</sup>



Figure 8. Henna leaves, flowers and seeds (from left to right)

#### SAFFRON

Common Name: Saffron

Systematic Name: *Crocus sativus* linn

Family: Iridaceae

Saffron has been used since ages as a flavouring agent and as a potential plant for skin treatment. It possesses antihypertensive, anticonvulsant, antitussive, antigenotoxic and cytotoxic effects, anxiolytic aphrodisiac, antioxidant, antidepressant, antinociceptive, anti-inflammatory, and relaxant properties.<sup>102,103</sup>



**Figure 9.** Saffron flower

#### MANGOSTEEN

Common Name: Mangosteen

Systematic Name: *Garcinia mangostana*

Family: Clusiaceae

*Garcinia mangostana* (mangosteen) has antibacterial and anti-inflammatory properties. Mangosteen fruit peel extract can be used to treat acne.<sup>104,105</sup>



**Figure 10.** Mangosteen flower

#### GOTU KOLA

Common Name: Gotu kola, Asiatic Pennywort, Indian pennywort, Indian water navelwort, Wild violet, Tiger herb

Systematic Name: *Centella asiatica*

Family: Umbelliferae

*C. asiatica*, commonly known as “Gotu kola, Asiatic pennywort, Indian pennywort, cultivated due to its medical importance in some countries including Turkey, and it has a long history of utilization in ayurvedic and Chinese traditional medicines since centuries. It possesses antimicrobial, anticancer,

wound healing, neuroprotective, immunomodulatory, anti-inflammatory, hepatoprotective, insecticidal, and antioxidant properties. It is useful in the treatment and prevention of hypertrophic scars and keloids. It also inhibits skin aging.<sup>106</sup>



**Figure 11.** Gotu Kala leaves

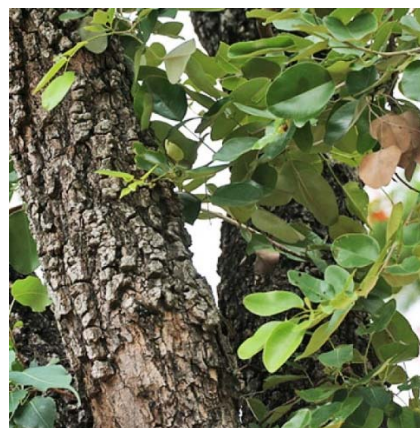
#### SANDALWOOD

Common Name: Sandal wood,

Systematic Name: *Santalum album*

Family: Santalaceae

Sandalwood plant also known as ‘Royal tree’ in Indian subcontinent, is a traditional plant used since ages. The wood of the tree is used to extract oil. Sandalwood oil is used for the prevention and treatment of warts, skin blemishes, and tumors due to viral infection.<sup>107,108</sup>



**Figure 12.** Sandalwood tree

#### ALOE VERA

Common Name: Aloe vera,

Systematic Name: *Barbados aloe*

Family: Asphodelaceae

Aloe vera plant has been used for medicinal purposes since ages in India. It has anti-microbial, antioxidant, antiseptic and anti-inflammatory properties. good moisturizer and nourishes hair, skin. It rejuvenate skin by reducing effects of aging, wrinkles increases the collagen content of the skin when directly applied, thus breaking the scar tissue and healing the skin. Aloe



vera is a herb which always proves to be beneficial in all types of skin problems either it is applied directly on the affected areas or consumed as a health drink. It is also used in the treatment of wrinkles, stretch marks and pigmentations: it prevents the cell death by increasing blood circulation on the affected areas and heals the wounds in less duration of time.<sup>109-111</sup>



**Figure 13.** Aloe vera plant leaf and gel form it

#### COCONUT

Common Name: Coconut,  
Systematic Name: *Cocos nucifera*  
Family: Arecaceae

Coconut oil extracted from dried coconut fruit has been used since ancient times for the purposes of cooking, hair treatment and skin care. It acts as a conditioning agent for skin and hair. Coconut oil has a high affinity towards hair protein that enables it to easily penetrate inside the hair shaft, hair cuticle and cortex thus preventing hair damage. Coconut oil is also helpful in recovering of atopic dermatitis that restrains the epidermal function of the skin.<sup>112</sup>



**Figure 14.** Coconut (fruit)

#### SUNFLOWER

Common Name: Sunflower, Suryamukhi  
Systematic Name: *Helianthus*  
Family: Asteraceae

Sunflower oil is extracted from the seeds of its flower. It contains active components: lecithin, tocopherols, carotenoids and waxes. It has non-comedogenic properties, i.e., it prevents blockage of pores. It is therefore, suitable for skin care.<sup>112</sup>



**Figure 15.** seeds of sunflower plant

#### BURDOCK

Common Name:  
Systematic Name: *Arctium*  
Family: Asteraceae

For centuries burdock roots have been used for medicinal purposes. Roots of the burdock plant have anti-inflammatory properties. It consists of necessary amino acids, vitamin A & is rich in phytosterols, calcium, chlorogenic acid, flavonoids, iron, inulin, lactone, mucilage, polyacetylenes, potassium, resin, tannin, taraxasterol and essential fatty acids. It nourishes the scalp and strengthens hair. It also helps in treating problems of scalp irritation and dandruff.<sup>113</sup>



**Figure 16.** Roots of Burdock plant

#### CALENDULA

Common Name: Calendula  
Systematic Name: *Calendula officinalis*  
Family: Asteraceae

Calendula is an aromatic herb that is used for medicinal purposes. It has anti-inflammatory, anti-tumorigenic, anti-microbial, & anti-oxidant properties. This oil extracted from its flower and leaves is applied on the scalp for anti-dandruff and hair strengthening purposes. This is possible because calendula oil increases the collagen production and circulation of the cells.<sup>114,115</sup>



**Figure 17.** Leaves and flower of Calendula plant

#### VETIVER/ KHUS-KHUS

Common Name: Vetiver, Khus-Khus

Systematic Name: *Chrysopogon zizanioides*

Family: Poaceae

Vetiver plant has been used in India since ages for its medicinal properties. The oil extract from the grass of the plant is used for hair restoration. The oil prevents hair loss and thinning of hair. It helps in cell regeneration and stimulates collagen formation that helps in treating scalp ailments like eczema, psoriasis, dandruff, and scalp irritation.<sup>116</sup>



**Figure 18.** Grass of Vetiver plant

#### JASMINE

Common Name: Jasmine

Systematic Name: *Jasminum officinale*

Family: Oleaceae

Jasmine plant is cultivated throughout India. The flower of the jasmine plant has many therapeutic indications: antidepressant, antiseptic, antispasmodic, cicatrisant, expectorant, emmenagogue, sedative, uterine, and antibacterial. It is used to treat skin diseases. It is also used for fading scar marks.<sup>117,118</sup>



**Figure 19.** Flower of jasmine plant

#### LAVENDER

Common Name: Lavender

Systematic Name: *Lavandula angustifolia*

Family: Lamiaceae

Lavender is one of the essential oils due to its therapeutic benefits. It helps in reducing anxiety, improving brain function, heals burns and wounds, antioxidant, insomnia, digestive issues. It has been used for cosmeceutical purposes. It has anti-fungal, anti-inflammatory, anti-microbial properties. It helps in reducing acne, restoring skin complexion, treating skin lesions, strengthening hair growth, balancing natural oil production of scalp, and improves blood circulation in the scalp upon massaging. Lavender oil has also been used in the production of perfume.<sup>119,120</sup>



**Figure 20.** Flower of Lavender plant

#### HIBISCUS

Common Name: Hibiscus

Systematic Name: *Hibiscus rosa-sinensis*

Family: Malvaceae



**Figure 21.** Flower and leaves of Hibiscus plant



Hibiscus plant is a widely cultivated shrub. The leaves and flower of the plant have anti-fungal properties. It is used as hair conditioner & stimulates hair growth. The leaf extract of the plant is used to treat dandruff and scalp infections. The extract from flower and leaves aids in treating ulcers, acne, and provide moisture to skin and scalp.<sup>121–123</sup>

#### LEMON

Common Name: Lemon, Nimbu  
Systematic Name: *Citrus limonis*  
Family: Rutaceae

Lemon fruit has been used since age for various medicinal purposes like treating indigestion, fever, dental care, haircare, skin care, curing burns, weight loss, treating respiratory disorders and cholera. It contains vitamin C, folate, potassium, flavonoids, hesperidin, calcium oxalate, & geranyl acetate. Due to its antibacterial property it is used for hydrating and cleansing skin, blackhead treatment, elbow and knee brightening, and exfoliating lips.<sup>124</sup> It also works as natural astringent.



**Figure 22.** Fruit of Lemon plant

#### ROSE

Common Name: Rose, Gulab  
Systematic Name: *Rosa rubiginosa*  
Family: Rosaceae

Rose flower extract has been used since ancient times due to its fragrance and therapeutic uses. It is anti-bacterial and anti-depressant. Rose flower extract is used for improving skin wrinkles and skin whitening. White rose extract along with gartanin derivative compound prevent melanin production that produces the whitening effect. Its extract is also used in perfume production.<sup>125</sup>



**Figure 23.** Flower of Rose plant

#### INDIAN SARSAPARILLA/ANANTMULI

Common Name: Anantmuli, Indian Sarsaparilla  
Systematic Name: *Hemidesmus indicus*  
Family: Zingiberaceae

Anantmuli plant extract has been used since ages to treat dysentery, diarrhea, skin diseases, syphilis, dyspepsia, leucoderma, diuretic, blood purification, fever and asthma. The extract of the plant has antibacterial properties that make it suitable for treating skin problems like psoriasis, eczema, and dermatitis.<sup>126</sup>



**Figure 24.** Anantmuli Plant

#### CHUIMUI/ TOUCH ME NOT

Common Name: Chuimui, Touch Me Not  
Systematic Name: *Mimosa pudica*  
Family: Fabaceae

Touch me not plant is a prickly herb. The extract of the leaves has been used for ages to balance the blood glucose levels, heal cuts and wounds. The leaf extract has anti-inflammatory, anti-oxidant, and anti-aging properties that make it suitable for treating skin conditions. The grinded leaf paste is used to treat eczema.<sup>127,128</sup>



**Figure 25.** leaves of touch me not plant

#### VENUS FLYTRAP

Common Name: Venus, Flytrap,  
Systematic Name: *Dionaea muscipula*  
Family: Droseraceae

Flower of the Venus flytrap plant is carnivorous. The extract from the flower helps in skin, hair and nail care. The extract

acts as an anti-aging agent.<sup>129</sup> It helps to get rid of wrinkles, improves elasticity and firmness, and improves pigmentation of the skin.



**Figure 26.** Flower of Venus flytrap plant

#### SALAI GUGGUL

Common Name: Guggal, Salai Guggal,  
Systematic Name: *Boswellia serrata*  
Family: Burseraceae

Since time immemorial salai guggul has been used as incense and medicines. Gum-resin is collected from the trunk of the tree by making incisions on it. It is anti-inflammatory and anti-microbial in nature. It is useful for the treatment of cancer, anti-aging agent, and healing wounds.<sup>130</sup>



**Figure 27.** Tree trunk of salai guggul plant

#### CARROT

Common Name: Carrot, Gajar,  
Systematic Name: *Daucus carota sativus*  
Family: Umbelliferae

Since ages carrot has been used as a medicinal herb due to its richness in vitamin A. Carrot seed oil is used for anti-aging, revitalizing and rejuvenating skin purposes.<sup>131</sup>



**Figure 28.** Seeds of carrot plant

#### MARIGOLD

Common Name: Marigold  
Systematic Name: *Tagetes*  
Family: Asteraceae

Marigold flower extract is used for the treatment of dry skin, eczema, itchy skin, inflamed skin and cracked skin. It has been used for the treatment of dermatosis, verrucae and hyperkeratotic lesions due to its anti-inflammatory properties.<sup>132–134</sup>



**Figure 29.** Flower of marigold plant

#### EUCALYPTUS

Common Name: Eucalyptus  
Systematic Name: *Eucalyptus globulus*  
Family: Myrtaceae

Eucalyptus oil is one of the essential oils that is produced with the help of steam distillation. It is anti-microbial, antiseptic in nature. It reduces infection and cleanses skin. It is used for



**Figure 30.** leaves of eucalyptus plant

reducing inflammation. It is beneficial for treating skin disorders due to skin homeostasis.<sup>135</sup>

#### TAMARIND

Common Name: Tamarind,  
Systematic Name: *Tamarindus indica*  
Family: Fabaceae

Tamarind fruit contains amino acids, fatty acids, minerals, vitamin B, and tartaric acid. It is a high antioxidant capacity and used as an important food ingredient. Tamarind seed husk has antibacterial properties and is used to treat propionibacterium acnes. The tamarind seed oil also has the capacity to be used for cosmetological purposes.<sup>136–138</sup>





**Figure 31.** Fruit of tamarind plant ; tamrind seed; tamarind seed husk.

#### JOJOBA

Common Name: Jojoba

Systematic Name: *Simmondsia chinensis*

Family: Simmondsiaceae

Jojoba also is known as goat nut is used widely due to its therapeutic uses. The oil extracted from the fruit has the capacity to treat many diseases. It has anti-oxidant, anti-inflammatory, anti-ageing and anti-cancer properties. It balances natural pH in skin and hair preventing dryness and aging process.<sup>139-141</sup>



**Figure 32.** Fruit of jojoba plant

#### OLIVE

Common Name: Olive

Systematic Name: *Olea europaea*

Family: Oleaceae

Olive oil is a rich in antioxidant, vitamin (A,D,E, and K ) and antibacterial contents. It works as an exfoliator, makeup remover, moisturizer, and face mask. It helps in treating wrinkles and scars on face. It enhances fatty acid penetration.<sup>142-144</sup>



**Figure 33.** Fruit of olive plant

#### MANGO

Common Name: Mango

Systematic Name: *Mangifera indica*

Family: Anacardiaceae

Mango plant has been used as ayurvedic medicine since ages. It has anti-diabetic, anti-oxidant, anti-viral, anti-inflammatory, anti-bacterial, anti-tumor, anti-microbial, anti-fungal, anti HIV, anti-plasmonic, and cardiogenic properties. The bark of the tree has astringent properties and can be used to treat skin disorders and inflammations.<sup>145-147</sup>



**Figure 34.** Bark of Mango plant

#### MUSTARD

Common Name: Mustard, Sarson

Systematic Name: *Brassica*

Family: Brassicaceae

Mustard seeds paste by crushing and mixing with water when applied on the skin can help to get rid of skin diseases. Mustard seeds are rich in vitamin A and E, calcium, magnesium, omega 3 fatty acids, iron, zinc, and protein. They also strengthen hair by preventing thinning of hair.<sup>148,149</sup>



**Figure 35.** Seeds of mustard plant

**ONION**

Common Name: Onion, Pyaj,

Systematic Name: *Allium cepa*

Family: Amaryllidaceae

Red onion (*Allium cepa*) extract has anti-tyrosinase property. It is used as skin whitening agent. Onion extract is used to care, prevent and treat skin wounds, burns, stretch marks, degenerative skin and scarred tissues. Onion extract also contains numerous sulphur compounds. It promotes new hair growth.<sup>150,151</sup>



**Figure 36.** Onion

**WOOD APPLE**

Common Name: Wood apple

Systematic Name: *Limonia acidissima*

Family: Rutaceae

The plant has been used since ages as medicinal and food sources. The fruit pulp of the plant is rich in calcium, phosphorus, iron and Vitamin C. it is used for improving the digestive system. The grinded leaves of the plant help in treating skin diseases.<sup>152,153</sup>



**Figure 37.** Leaves of wood apple plant

**BLACK PEPPER**

Common Name: Black pepper, Kali mirch,

Systematic Name: *Piper nigrum*

Family: Piperaceae

Black pepper is a flowering vine. Its fruit is dried and used as food ingredients. The plant is anti-oxidant and anti-microbial in nature. The paste of leaves of the plant is used to treat ringworms on skin.<sup>154-156</sup>



**Figure 38.** Leaves of black pepper plant

**GUAVA**

Common Name: Guava

Systematic Name: *Psidium guajava*

Family: Myrtaceae

Guava plant is of immense medicinal purpose. It has anti-oxidant, hepatoprotective, anti-allergy, anti-microbial, anti-genotoxic, anti-plasmodial, cytotoxic, antispasmodic, cardioactive, anti-cough, anti-diabetic, anti-inflammatory and antinociceptive properties. The guava leaves extract helps in treating wound, skin and soft tissue infections.<sup>157-159</sup>



**Figure 39.** Leaves of guava plant

**TULSI**

Common Name: Tulsi

Systematic Name: *Ocimum tenuiflorum*

Family: Labiatae

Tulsi plant is a holy plant that has been used for medicinal purposes since the time immemorial. Its leaves shows immunity enhancer activity, antiviral, antibacterial, antifungal properties when consumed raw or extract, with honey, black papper. Ethanopharmacologically, the tulsi eaves pounded along with *Curcuma aromatica* rhizomes are applied to cure *tinea*



*versicularis* (a fungal infection causing pigmentation of skin, discolored patches on skin) in southern India.<sup>160,161</sup> The mixture is applied on the affected parts once a day in the night till it is cured. The tulsi leaves have ketogenic and also diaphoretic properties. The leaves of the plant help in treating skin diseases.<sup>162</sup> The essential oils obtained from tulsi have shown antibacterial properties.<sup>163</sup>



**Figure 40.** Leaves of Tulsi plant

#### TOMATO

Common Name: Tomato, Tamatar  
Systematic Name: *Solanum lycopersicum*  
Family: Solanceae

The tomato plant is anti-oxidant in nature. It is rich in vitamin C, potassium, folate, and vitamin K. Tomatoes are a great source for skin care. Tomato juice extracted from the fruit of the plant can be used to treat skin irritation and scabies.<sup>164</sup> The lycopene and other natural ingredients extract from tomato fruit pulp are used in the preparation of cosmeceuticals and are natural antioxidizing agents.<sup>165</sup>



**Figure 41.** Fruits of tomato plant

#### GREEN TEA

Common Name: Green Tea, Chaay  
Systematic Name: *Camellia sinensis*  
Family: Theaceae

Green tea is extracted from tea plant C and is beneficial in the treatment of skin tumours and cancer. It contains polyphenols, which is an antioxidant and detoxifies the body. It helps in keeping the skin younger looking as it can rejuvenate old skin cells to start reproducing again.<sup>166,167</sup>



**Figure 42.** Leaf of tea

#### BHANG

Common Name: Hemp, Charas, Ganja  
Systematic Name: *Cannabis sativa*  
Family: Cannabaceae

The powder of leaves of these plants is used to treat wounds and soars. Ganja is used to reduce pain cause because of itchy skin disease. Eczema and host of other skin diseases like dermatitis, seborrhoeic dermatitis/cradle cap, varicose eczema, psoriasis, lichen planus and acne rosacea may be treated by hemp seed oil.<sup>166,167</sup>



**Figure 43.** Cannabis (hemp) plant

#### FOUR O'CLOCK FLOWER

Common Name: Marvel of peru  
Systematic Name: *Mirabilis jalapa*  
Family: Nyctaginaceae

Jalapa is beneficial in allergic diseases and asthma.<sup>168-170</sup> The cosmeceuticals containing *Mirabilis jalapa* are useful for inflammation and dry skin. In traditional medicine, it is used for treating inflammatory and painful diseases.<sup>171</sup> Singh et. al. has conducted study to evaluate the anti-inflammatory potential of aqueous extract of jalapa leaves in Wistar rats using carrageenan and formalin-induced paw edema.<sup>172</sup> The aqueous extract has shown significant inhibition of paw edema, 37.5% and 54.0% on 4<sup>th</sup> hour at the doses of 200 and 400 mg/kg, respectively, thus demonstrating significant anti-inflammatory potential of jalapa leave extracts.<sup>172</sup>



**Figure 44.** Jalapa flower

#### FENUGREEK

Common Name: Fenugreek, Greek-clover, Greek hay, Assamese

Systematic Name: *Trigonella foenum-graecum*

Family: Fabaceae

Fenugreek recognized as an significant medicinal plant and it's seeds comprises with natural oils, fats, and mucus benefit to hydrate, and moisturize the skin to be soften.<sup>173</sup> The seeds of Fenugreek, also consist of the polysaccharide galactomannan, and because of such compounds, it showed anti-inflammatory and antioxidants properties. Setiline hydrolyzed found in *trigonella foenum-graecum* schedules as immediately set up the glycation in the dermis and the keratinization in the epidermis. These activities file it to protect suppleness, firmness and elasticity to skin.<sup>174</sup> The consequential dynamic is said to stop glycation on collagen and integrin to keep cutaneous flexibility and elasticity. The seeds of Fenugreek cuts keratinocyte differentiation of the epidermis to recover cutaneous barriers. So, the assembly of the skin is well-kept-up, elasticity and firmness are heightened, and refining the look of wrinkles. The DNA microarray analysis evidenced that the active ingredients alter the expression of the genes which elaborate in the skin mechanisms of glucose release, reactive oxygen species fortification, extracellular matrix metabolism, and the hyperkeratinization process. These shielding roles are potential due to the non-nutritive secondary metabolites recognized as phytochemicals. In skin care, antioxidants shield the skin cells and slow down the aging route. They also performance as radiance promoters, to reduce the fine lines and initiated by touching base to sun light and aging.<sup>175</sup>



**Figure 45.** The plant of fenugreek

#### SEA BUCKTHORN

Common Name: Sea buckthorn

Systematic Name: *Hippophae rhamnoides*

Family: Elaeagnaceae

Sea buckthorn decreases inflammation in the skin, stop future flare-ups, assistance to fade scars, stimulate an overall more even and make skin texture smoother. This reparative technique encompasses nutritious and constituents existed in sea buckthorn such as avocado oil, macadamia oil and shea butter to honestly moisturise skin with vital fatty acids and merriment cell renewal for lenient, flatter hands. Sea buckthorn oil is just as well-known for its anti-aging benefits and for skin healing aids. Sea buckthorn maintenances oxidative damage having delightful anti-aging effects. It hydrates the skin and helps the creation of collagen, an essential protein vital for youthful skin.<sup>176</sup> The anti-aging profits of collagen are endless, from aiding to plump the skin and stop sagging to smoothing out fine lines and wrinkles. The fruit oil, on the other hand, comprises omega brilliant for back up in skin repair and regeneration, creating this oil is ideal for tricky skin.<sup>177</sup>



**Figure 46.** The plant of sea buckthorn

#### MAHARUKH

Common Name: Coromandel ailanto, Tree of heaven

Systematic Name: *Ailanthus excels*

Family: Simaroubaceae

Ailanthus bark of the plant was bitter, refrigerant, astringent and appetizer. The juice of the bark is used to cure skin diseases and worries of the rectum. The bark is bitter, astringent, bitter tonic, taste bud stimulant. It is also use as a blood cleanser in skin diseases, typhoid fevers, blood coagulation disorders, gouty arthritis, boils, carbuncle, scabies and allied skin disease, chronic bronchitis, bronchial asthma, pulmonary kochs, bronchiectasis, polyurea, diabetesmelitus, obesity, uterine disorders like dysmenorrhoea and leorrhoea. The bark and leaves have a great reputation as postnatal tonic fot the treatment of various diseases. In Ayurveda it is also used to remove the bad taste of mouth. *Arjuna myrobalans* reinforce the body's natural rejuvenation



processes. Ailanthus leaf is also a chinese herbal medicine, for external uses, they are boiled in water to make a wash to cure skin ailments, especially boils, itches, and abscesses.<sup>178</sup>



**Figure 47.** The plant of maharukh

#### CUCUMBER

Common Name: Khira, Cucumber

Systematic Name: *Cucumis sativus*

Family: Cucurbitaceae

The extract of the *Cucumis sativus* fruit has anti-inflammatory potentials, and together have properties to treat sunburns. *Cucumis sativus* fruit extract can overhaul dry and damaged skin, and generous it a softer and smoother look. The cucumber fruit extract is used in cosmetics and special care yields due to its antioxidant, anti-inflammatory, and skin-conditioning agent. In spite of this high attentiveness of water, the cucumber fruit consist of an extensive diversity of helpful nutrients, such as vitamins, minerals, amino acids, phytosterols, phenolic acids, fatty acids, and cucurbitacins. Free radicals are unsafe because they are extremely sensitive and will attempt to turn out to be additional constant by ripping electrons off all nearby molecules. This is puzzling because free radicals can act in response to significant cellular assemblies, like DNA, proteins, carbohydrates, or the cell membrane. Altogether, the destruction of cells triggered by free radicals is identified as oxidative stress.<sup>179</sup> The free radical concept of aging states that organisms age because cells amass oxidative stress initiated by free radical damage over time. Thus, utilizing ingredients that are ironic in antioxidants, alike cucumber fruit extract, the skin will be well sheltered from free radicals. Ingredients diminished inflammation tranquil any skin redness and irritation, and may assistance to combat signs of aging. Lastly, cucumber fruit extract effectively hydrates and locations of the skin due to its amusing alignment of polysaccharides,, molecules be made up of several sugar molecules organized. Even though cucumbers are high at ease of vitamin K may assistance to diminish the exterior of dark circles. Besides vitamin K is useful for the skin, it also assist to expand dark circles under the eyes in the same way it assists damages to heal when in use internally.<sup>180</sup>



**Figure 48.** The fruit of Cucumber (khira)

#### HUL KHUSA

Common Name: Chhota halkusa, Gophaa

Systematic Name: *Leucas aspera*

Family: Lamiaceae

The plant of *Leucas aspera* is found on wasteland and roadsides of India. It is used in traditional medicine for cough, cold and painful swellings and skin eruptions, and commonly known as an antipyretic and insecticide. Plant pacifies vitiated kapha, pitta, inflammation, skin diseases, worms infestation and arthritis. Medicinally, it has antimicrobial, insecticidal properties and very useful for the treatment of skin diseases.<sup>181</sup> It also eliminates toxins from the body. The powder is use superficially for skin diseases, and removing blood toxins. Plant pacifies vitiated kapha, pitta, inflammation, skin diseases, worms infestation and arthritis. The plant is testified to own wound-healing ingredients. It healed inflammation, skin diseases, worm infestation, arthritis, cough, amenorrhea, intermittent fever, migraine, and ulcer.<sup>182</sup>



**Figure 49.** The plant of hul khusa

#### CHERETTA

Common Name: Chirayata, Charaita, Chirata

Systematic Name: *Swertia chirayita*

Family: Gentianaceae

The extracted of the leaves of *Swertia chirata* have a lot of benefits for skin and thus it was used in stem cell technology, whereas it showed the properties not only to support the regeneration of skin cells, but also to help thicken and strengthen of the epidermis for younger-looking skin.<sup>183</sup> In the production of keratinocytes, the skin cells produce keratin as well as form a shielding fence in contrast to environmental toxins. This reduces consequential in thinner, more fragile skin that is less tough to

free radicals and more likely to advent fine lines and wrinkles. The ingredient of this plant backings skin tone and texture by helping the skin's ability to manage the loss of keratinocytes while boosting the production of additional keratinocytes, resulting in a thicker, stronger epidermis. The renewed skin cells outcome in surface skin is smaller amount fragile and faint, less probable to wrinkle and healthier capable to accomplish free radicals, harm skin cells, trigger wrinkles, dark spots and other secret code of aging.<sup>184</sup> Swertia chirata extract yields mainly age stimulating formulas to aid care the tone and texture of skin by associate cell turnover, revealing younger, extra resilient skin. It also benefits thicken skin, reducing the look of fine lines and wrinkles. It is especially effective around the eyes and mouth, because a thicker, stronger surface skin layer is less likely to disclose vertical wrinkles and dark circles beneath the eyes. The main aspect of it for a fit operative body lies with numerous things but it confidently consist for the cleaning of the blood. Even a slight increase in the toxin levels may affect the overall performance of the organs. Symptoms such as allergies, constant headaches, fatigue and low immunity may be a warning sign of impurities and toxins in the body. Impure blood can outcome in various health problems, especially the ones that affect the skin such as pimples, acne, dark blemishes, dull and dry skin. It has not alike its unpleasant taste, but it's value as one of the finest blood cleansing herbs is unmatched. Besides, it can also help to get rid of rashes and inflamed skin.<sup>185</sup>



**Figure 50.** The plant of cheretta

#### CORN MAIZE

Common Name: Corn, Maize, Makka

Systematic Name: *Zea mays*

Family: Poaceae

The extract of corn is very useful in healing wounds, skin irritations and stimulate the growth of healthy tissue because of its healing abilities. Cornsilk contains starch, vitamins B, silicon, freed oils, resin and mucilage, and vitamin K. It contains many natural, minerals and amino acids, as well as lutein, high in anti-oxidants.<sup>186</sup> Because of the soluble fiber contained in the corn plant, it is recognized essentially for absorption, when it was used as a dietary supplement or in cosmetics for oil absorption. *Zea mays* are found in many skin care, anti-acne and anti-aging

products. In addition to its absorption qualities, it comprises high amounts of cell regenerating ingredients and anti-oxidants. The smooth, and soft texture of it effortlessly offers a translucent sheen to facial mineral veils and foundations.<sup>187</sup> The anti-inflammatory and infection confrontation propeties are curative and acts as a very helpful stabilizer to numerous skin repair products, powders, lotions and creams. Mineral-based makeups are in the pink, natural skin protection from sun exposure, harsh radicals and toxins in the environment. They have replaced many of the traditional foundations known to make skin oily and clog pores. *Zea mays* (corn) starch lets for a natural product entitlement and offers sensorial assistance at an inferior cost than altered stiffeners. These topographies are beneficial in squeezed cosmetics claims as well as lotions and creams. The official line of high-quality, renewable and ecological vegetable-based constituents assistances formulators generate crops with separate characteristics for hair care, skin care and more with a normal bit.<sup>188</sup>



**Figure 51.** The plant with fruit of makka

#### WATER LETTUCE

Common Name: Water cabbage, Water lettuce, Nile cabbage, or Shellflower

Systematic Name: *Pistia stratiotes*

Family: Araceae

*Pistia stratiotes* is a floating, stoloniferous herb found in ponds and watercourses more or less all over India up to a height of 1000 m. The leaves are green in color, odorless, and bitter. A huge quantity of medicinal properties is accredited to the plant, and as the most important part is the leaves bearing a lot of medicinal prperties such as anthelmintic, antidermatophytic and antifungal, diuretic, antiprotease, antitubercular and emollient, antidiabetic and antimicrobial. The plant is well-thought-out antiseptic, antitubercular, and antidysentric. The leaves are used in eczema, leprosy, ulcers, piles, and syphilis. The juice of leaves boiled with coconut oil is useful outwardly in chronic skin diseases. For the therapeutic of ringworm infection of the scalp, syphilitic eruptions, infections, and wounds, *Pistia stratiotes* leaves are used. Moreover, the oil extract of *Pistia stratiotes* is used for the cure of worm infestations, tuberculosis, asthma and dysentery and useful outwardly to treat skin diseases, inflammation, piles, ulcer and burns. A unique stigmastane, 11 $\alpha$ -hydroxy-24S-ethyl-5 $\alpha$ -cholest-22-en-3,6-dione, was obtained

from the *Pistia stratiotes*. The plant also contains ascorbic acid, erythorbic acid, galactose, or glycolate. Specific activities of ascorbic acid, free oxalic acid and calcium oxalate were also observed.



**Figure 52.** The plant and fruit of water lettuce

#### CHOTI DUDHI

Common Name: Chhoti dudhi

Systematic Name: *Euphorbia thymifolia*

Family: Euphorbiaceae

Choti dudhi is also used as an antipyretic, in chronic cold, menstrual disorders, urinary tract infections, skin diseases such as leprosy, measles and other skin eruptions. It possesses antioxidant, anti-inflammatory, anti-diabetic, anti-tumor, anti-allergic, free radical scavenging, anti-anaphylactic, analgesic, sedative, anxiolytic, anti-diarrhoeal, anti-arthritis, anti-thrombocytopenic, spasmogenic, diuretic, immune-stimulatory, antihelmintic, antiviral, antimicrobial, antimalarial, larvicidal, and molluscicidal properties.<sup>189</sup> Each and every part of it, used for treating various health illnesses. The milky sap used to heal cracked lips whereas the leaves are useful in treating skin disorders. A decoction of fresh aerial parts is applied externally to treat dermatitis, measles, eczema and skin inflammations. Fresh crushed plants are applied as a plaster for healing sprains. For many years, these plants have used as medicine for numerous skin and dermatological disorders particularly cut, wounds, burns etc. Even though dissimilar treatment choices are accessible (analgesics, antibiotics, anti-inflammatory drugs etc) for curled therapeutic management, most of these remedies are answerable for undesirable side effects.<sup>190</sup>



**Figure 53.** The plant of choti dudhi

#### BHRINGRAJ

Common Name: False daisy, Yerba de tago, Karisalankanni, and Bhringraj

Systematic Name: *Eclipta alba*

Family: Asteraceae

The medicinal properties of bhringaraj are fairly widespread because of its fitness aids. It is good for the skin and also benefits in dealing with respiratory problems. A cream of bhringaraj powder can be useful for the treatment of the skin to recover and brighten the complexion. The extract of bhringaraj showed antifungal effectiveness, and use for the treatment of athlete's foot and ringworm. The traditional therapeutic carry out the uses the leaf paste to tackle boils and the plant paste to compact with eczema. The plant has numerous phytoconstituents alike wedelolactone, ursolic acid, eclalbasaponins, luteolin, oleanolic acid, and apigenin. The pharmacological actions of herbal extracts and its phytoconstituents have wide-open medicinal properties for the treatment of hepatoprotective, anticancer, anti-inflammatory, snake venom neutralizing, and antimicrobial properties. Phytoconstituents similar wedelolactone, ursolic and oleanolic acids as well as luteolin and apigenin can procedure the root of new drugs contrary to arthritis, cancer, skin diseases, gastrointestinal disorders, and liver disorders.<sup>191</sup> The key active principles be made up of of coumestans like desmethylwedelolactone, wedelolactone, oleanane, furanocoumarins and taraxastane glycosides. The alcoholic extract of the plant have antiviral activity against the ranikhet disease virus.<sup>192</sup> The leaves of bhringaraj are magnificent for treating all minor skin associated diseases and have brilliant antibacterial properties and also used for the treatment of cracked heels and minor skin sensitivities. This juice also benefits in faster therapeutic of wounds and it is greatest useful when it is garden-fresh.



**Figure 54.** The plant of bhringaraj

#### CHAMOMILE

Common Name: Chamomile, Italian camomilla, German chamomile, Hungarian chamomile, Wild chamomile or Scented mayweed

Systematic Name: *Matricaria chamomilla*

Family: Asteraceae



Chamomile is rich in flavonoids and antioxidants and thus effective in protecting the skin against free radicals cause aging. With its an earthy and mildly sweet aroma, chamomile essential oil is great for relaxing aromatherapy. Skin care products may contain a lot of healthy ingredients, but without penetration abilities to deeper layers they won't do much good. It has exceptional anti-inflammatory kinds of stuffs. It soothes and calms the skin, reduces irritation and redness. It is unlimited for very profound skin. Bisabolol comprises an enormous quantity of panthenol, pro vitamin B, which is an unlimited natural humectant that creams extremely and assistances control oil production. Bisabolol stimulates healing, has antimicrobial properties, and fades hyperpigmentation. Bisabolol is a wonderful anti-aging ingredient that helps fade and soften fine lines and wrinkles. It can inhibit the enzymes in skin responsible break down collagen, and at the same time to stimulate collagen production.<sup>193</sup> Chamomilla recutita extract is derived from the flower heads of chamomile plants and contains numerous active components such as phytosterol, azulene and bisabolol. It partakes curative, anti-inflammatory, renewing belongings. It has vitamin B-complex as an ingredient. Roman chamomile could be applied directly to the skin for pain and inflammation. It has high adaptogenic potentials, and the sense responses that how the skin feeling and helps bring the skin back into balance, promoting peace and harmony. With regards to skin care, mostly known for anti-inflammatory and skin soothing properties, and si it used as a conditioning agent and skin cell rejuvenator in cosmetic products.



**Figure 55.** The plant of chamomile

As a conditioner, it improves the look of dehydrated or damaged skin by dipping dry cracking and restoring flexibility to the skin. The plant's flowers are rich in flavonoids (namely apigenin, quercetin, patuletin and luteolin), which contribute to the ingredient's anti-inflammatory, anti-erythema (reddening of the skin) and anti-pruritic (itchiness) properties speed up the recovery of damaged skin heals. It often used as a natural treatment for various skin disorders such as eczema and psoriasis. Because of bisabolol's in height panthenol attentiveness, it can successfully stimulate and promote the skin's healing process. In adding to it has skin-soothing and healing

capabilities, and it also displays an elusive floral aroma frequently used to enhance fragrance to beautifying yields.<sup>194</sup>

#### SAGE

Common Name: Garden sage, Common sage, or Culinary sage  
Systematic Name: *Salvia officinalis*

Family: Lamiaceae

The extract of *Salvia officinalis* showed outstanding astringent, antiseptic and antioxidant qualities for preventing oxidative stress and thereby reliefs to prevent premature aging. It furthermore has great antimicrobial, antibacterial and antiviral properties. It comprises essential oil rich in thujone as well as smaller amounts of camphor, 1,8-cineole and other monoterpenes. Apart from this, it also contains phenolic acid such as rosmarinic acid, flavonoids, diterpenoids (such as carnosol and rosmanol together with triterpenes (oleanolic and its derivatives) and luteolin-7-glucoside. The rosmarinic acid in Sage has excellent antioxidant properties, and reinforced by the picrosalvin presented in the plant. In clinical tests, it was found that it prevents oxidative damage to the cell, while at the same time preventing t-BHP-induced lipid peroxidation and GSH depletion, improving the antioxidant potential of the cells certified to the rosmarinic acid and luteolin-7-glucoside.<sup>195</sup> It has excellent anti-inflammatory, antibacterial properties and showed a very positive effect in fighting acne vulgaris and seborrheic eczema while at the same time having great antimicrobial activity. The extract of it used for the treatment of different kinds of disorders including seizure, inflammation, dizziness, ulcers, gout, rheumatism, paralysis, diarrhea, tremor and hyperglycemia. The sage used to treat mild dyspepsia (such as heartburn and bloating), excessive sweating, age-related cognitive disorders, and inflammations in the throat and skin. German Commission has accepted the use of *S. officinalis* for several medical applications included inflammation and dyspepsia. On top of being an anti-inflammatory, anti-bacterial and acne treatment, rosmarinic acid is also a great regulator for melanin. Not just rosmarinic acid, but potentially it also have rosmarinic acid in combination with sage extract-help with melanogenesis.<sup>196</sup>



**Figure 56.** The plant of sage



## MENTHA

Common Name: M. balsamea Willd, Peppermint, Vilayati pudina, Poduna, Pudina

Systematic Name: *Mentha piperita*

Family: Lamiaceae

Peppermint is said to be a good analgesic to apply topically and also act as a coolant for the skin. Peppermint oil excites cold receptors on the skin and dilates blood vessels, instigating a feeling of emotionlessness and an analgesic consequence. Menthol is an up-to-date vasodilator used to boost the engagement of other newsworthy skin prescriptions. Menthol enhances the absorption of cortisone, mannitol, indomethacin, morphine hydrochloride, and propranolol. Menthol moderates oral sensations of warmth and coldness. It was reported that menthol has reduced histamine induced irritation and itching. The crucial oil version of this herb has extended fame worldwide due to its efficiency contrary to various skin, hair dilemmas and uses of this miracle oil. While the consumption of the plant compromises round about health benefits, research demonstrations having the details about several importance of mint's health assistances come from put on it to the skin, inhaling its perfume or captivating it as a pill. Mint is generally used in green salads, desserts and its tea is one more popular approach to incorporate it into the diet. It is significant to assess how the plant was used in the research for that specific drive. Five model drugs were verified using *in vitro* infusion pieces of training to examine the percutaneous penetration enrichment influence of mint oil.



**Figure 57.** The plant of mint

## ECHINACA

Common Name: Eastern purple coneflower

Systematic Name: *Echinacea purpurea*

Family: Asteraceae

The extract of *Echinacea purpurea* comprises numerous useful constituents for the defense of skin from oxidative stress and for refining hydration of skin. This learning likely to scrutinize the solidity and dermatological effectiveness of *E. purpurea* cream and gel.<sup>197</sup> A powerful anti-aging, and immune system-boosting created to capitalizes on all of the gifts of echinacea to give your skin a fresh, youthful feel. Pair it with an active calm face moisturizer or use it alone to feel echinacea's benefits for the skin. Green envy, a sole patent-protected optional of echinacea *purpurea*, includes from head to foot concentration of the

phytochemical cichoric acid, a influential natural antioxidant that welfares safeguard and harmless the skin by excluding the enzymes responsible for the break down process of the collagen. This plant is the source of all pharmacy products. One of the reasons *Echinacea purpurea* is frequently added to skin care products as it holds healthy proteins and oils to bolt in hydration. Additionally, *Echinacea purpurea* is believed to have natural anti-inflammatory properties and thought use to cure ward off pore-clogging bacteria because it has anti-microbial components. With that being said, some readings point out that *Echinacea* could boost immune function, relieve pain and reduce inflammation. *Echinacea* also use as a topical disinfectant to treat skin infections and to provide natural analgesic benefits to soothe burns and insect bites. *Echinacea* use to make healthy syrups, skin tinctures, hair masks and baked goods. After taking into consideration the many benefits of the *Echinacea* plant, it's no surprise that many skin care, beauty and makeup brands have begun to implement this powerful additive into their formulas. Generally speaking, *Echinacea purpurea* is usually safe for those with sensitive skin. It's also enriched with beneficial antioxidants that nourish the skin and protect it from damage caused by pollution, free radicals and possibly even damaging ambient blue light. Formulated with *Echinacea Green* and *Echinacea Purpurea*, this is a two-in-one makeup remover and cleansing balm gently and thoroughly dissolves away makeup and sunscreen while refining the skin's surface, leaving behind a younger-looking complexion. This *Echinacea* makeup remover also features sunflower oil, ginger root oil, Moringa tree extract and papaya tree extract for extra healing power. Additional vitamins, anti-oxidants and sun protectors are built into the formula to ensure that the skin looks good to feels great after application. The uses a unique triple hyaluronic acid complex to improve the skin's natural hydration and reduce the appearance of wrinkles. Together with extras like vitamin C, the ingredients in this excellent anti-aging product leave skin bright, even and radiant. It will also help to reduce the appearance of freckles, dark spots and sun damage. Similarly, a cream comprising *Echinacea purpurea* extract was revealed to recover eczema signs and healing the skin's thin, defending outer layer. However, echinacea extract appearances to have a little shelf life, creating it stimulating to pool into cost-effective skin care yields.<sup>198</sup>



**Figure 58.** The plant of echinacea

**COMFREY**

Common Name: Comfrey, Black root, Boneset, Common comfrey, Consolida, Consound, Knitbone, Slippery root

Systematic Name: *Symphytum officinale*

Family: Boraginaceae

Comfrey is beneficial and use to treat the skin-wounds, muscle soreness, ulcers, bruises, rheumatoid arthritis, varicose veins, gout, and fractures.<sup>199</sup> The comfrey is not new-fangled, comfrey salves, balms and creams are existent all over the place for centuries. Scrapes, cuts, bites, burns, rashes and sores are among the many hundreds of conditions adversely affect skin and for virtually all of them, there is comfrey.<sup>200</sup> This recovers and enhances skin appearance and pacifies in cases of itchy and dry skin. The comfrey has a particularly potent skin-healing agent, just because of allantoin, used extensively in cosmetic preparations, particularly those for sensitive skin. It assists wound overhaul, speeds up skin healing, and owns anti-inflammatory action. Allantoin is the theme of many patents, and is both derived from comfrey and manufactured in the research laboratory for the preparation for shampoos, toothpastes, skin care lotions, and anti-acne preparations. Allantoin is an essential compound in cosmetic manufacturing.<sup>201</sup> Yet another compounds, such as caffeic acid, chlorogenic acid and rosmarinic acid, are there in comfrey having validate benefits for the skin. These compounds benefit to shield the lipid linings of skin cells, reduce inflammation, and show anti-cancer activity. The comfrey roots and leaves consist of allantoin, a constituent that assists to propagate new skin cells, along with other constituents that shrink inflammation to maintain skin healthy are there in the extract. Allantoin boosts the growth of new skin cells, while rosmarinic acid benefits to get rid of pain and inflammation. But comfrey may be appropriate for short-term use on skin and wounds.<sup>202</sup>



**Figure 59.** The plant of comfrey

**GARDEN THYME**

Common Name: Jangli ajwain

Systematic Name: *Thymus vulgaris*

Family: Lamiaceae

Ultraviolet radiation is the key ecological influence upsetting the functioning of the skin. The thymus vulgaris leaf extract comprises polyphenols and thymol, planned for the deterrence of UV-induced skin damage. After the end of irradiation, supernatants were composed for assessment of the lactate dehydrogenase activity<sup>203</sup> it applied to the skin, thyme is testified to get rid of bites and stings, neuralgia, rheumatic aches, and pains. The application of thymol to the skin with atopic dermatitis has a direct physiological response. Besides this, these inhibiting inflammatory compounds as cytokines, thymol used for the treatment of shrink the swollen dermal and epidermal skin layers specific of dermatitis. In addition, thymol was able to prevent secondary infections caused by the bacteria *Staphylococcus aureus*.<sup>204</sup> This all, too common complication take place when swollen tissues permit *S. aureus* to move from the surface of the skin and establish reservoirs beneath in the skin. According to the reported research, thymol's anti-inflammatory and antibacterial effects may have a place in the management of chronic atopic dermatitis.



**Figure 60.** The plant of garden thyme

**SPEEDWELL**

Common Name: Spiked speedwell, Blue veronica

Systematic Name: *Veronica spicata*

Family: Plantaginaceae

Lavender-flowers bloom in a variety of colors to deep purple to pinks and beyond, speedwell is as pretty as it is beneficial. Speedwell can be found throughout Europe and the United States and is both cultivated and also found in the wild in grassy open spaces. This plant is rich in vitamins, tannins, and aucubin, an iridoid glycoside found in medicinal plants that have been reported to show an anti-inflammatory effect. The extracts made from speedwell help to treat eczema. This is also used as skin ointments for irritations, such as summer rashes. Speedwell can



also be applied topically to the skin to benefit and boost the skin's general health and also use in the treatment of common skin conditions including eczema and psoriasis. The plant contains antioxidant, anti-inflammatory and antimicrobial compounds ideal for the skin to have a younger look and tackling a variety of skin complaints such as diuretic, liver-protective actions and anti-inflammatory.



**Figure 61.** The plant of speedwell

#### CHICKWEED

Common Name: Chickweed

Systematic Name: *Stellaria media*

Family: Caryophyllaceae

There are no guidelines for the appropriate use of chickweed. Chickweed creams are frequently vended as anti-itch creams and can be useful for to the numerous medical problems to skin day-to-day schedule. However, anybody avoid applying the poultices to open wounds as they will not only sting but may pass contaminants through breaks in the skin. Its emollient qualities soothe itching and irritation of eczema or psoriasis. An infusion may be added to bath water for soothing relief of inflamed skin. It also provides relief to swollen and painful hemorrhoids.<sup>176</sup> A strong distillation may be use to a skin wash or bath stabilizer to lull itching and reddened skin. Rub on the skin after the mixture has sufficiently cooled. Chickweed is fabled to treat a wide spread spectrum of settings in folk medicine, ranging from asthma and indigestion to skin disorders. Traditional chinese herbalists practice chickweed on the inside as a tea to pleasure nosebleeds. Chickweed had used for externally for skin diseases, boils, scalds, burns, inflamed or sore eyes, erysipelas, tumors, piles, cancer, swollen testes, ulcerated throat and mouth, and all kinds of wounds. An outside claim of chickweed is identified to yield a healing effect on skin sores of dissimilar categories, as well as decrease inflammations locally. Chickweed is used for boosting metabolism, healing inflammations, producing an expectorative effect and open-handed relief from cough and respiratory diseases. Several severe skin problems like eczema and minor sores identical bug bites are also considered as cases of chickweed application. The stomach and bowel dysfunction, swollen testes, sore-throat, and various types of wounds are effectively treated by rub on chickweed.<sup>205</sup>



**Figure 62.** The plant of chickweed

#### LIQUORICE

Common Name: Mulethi

Systematic Name: *Glycyrrhiza glabra*

Family: Fabaceae

Mulethi was occasionally used for the treatment of itchy throat. The soothe and hydrate skin persistent by the use of skin care encompasses licorice extract to retain skin-ointment. The root of Licorice comprises licochalcone, an ultimate source which was generally used for the treatment of oily skin.<sup>206</sup> The glycyrrhizin, natural therapies for skin disorders, an vigorous in the licorice root having a solid anti-inflammatory actions equivalent to cortisol and steroids. The steroids are commonly used as drugs for the treatment of inflammatory dermatologic conditions, such as eczema and psoriasis.<sup>207</sup> For centuries, the root of Licorice has used for the treatment of wide variety of inflammatory skin disorders (eczema, psoriasis, contact dermatitis, seborrheic dermatitis, psoriasis) and other illnesses written off as inflammation and itch. The licorice root extract is an assembled ingredients used in numerous skin care products to ease the discoloration or pigmentation. The glabridin, a vigorous constituent in licorice root, has exposed to owns anti-inflammatory property constrains tyrosinase, an important enzyme answerable for creation of pigmentation. Liquiritin is additional on the go ingredient, which does not prevent tyrosinase but it benefits in disperse and eliminate melanin and pigments in the skin.<sup>208</sup> The inflated distinction on likely cures for skin disorders to control over it's clinical interpretations, make contacts licorice and inflammatory skin dermatoses.<sup>209</sup> A natural skin easing is different from chemical hydroquinone, licorice extract comprises an active compund named as glabridin, having tyrosinase, the enzyme responsible for pigmentation during sun light interaction. It can also relief by diminishing the dark pigmentation follow-on from scars. The syrupy juice from the herb's root consist of beneficial plant sterols, to stimulate skin elasticity, wrinkle formation and fight inflammation. Glycyrrhizin assistances to combat numerous skin disorders answered back to topically use of the hydrocortisone. Licorice extract can also benefit to cure soothe irritation caused by some skin-care products and medications. The inflammation is the body's natural attempt to protect itself by expelling infection and irritants from the body, and it shows up on skin in the form of

symptoms such as redness, rashes, itching and swelling. Fading of dark spots reliable by the use of licorice extract over time has been known for fading dark spots, blemishes and lighten skin. It can also reverse the darkening of scars, and persist in tissues during an injury not completely healed.<sup>210</sup> The glabridin is an ingredient comprising five flavonoids that act to depigment, or lighten, skin while hindering an enzyme damaged skin to darken. Potent antioxidants, for the preventing skin complications in licorice extract fight skin-damaging free radicals.<sup>211</sup>



**Figure 63.** The plant of licorice

#### CHAKRA FOOL

Common Name: Star anise

Systematic Name: *Illicium verum*

Family: Schisandraceae

For good gleaming skin, anethol is a key constituent of star anise oil and it's aroma create significant impact on skin. So it is a very good source and remedy for soft, smooth, and glowing skin. The detoxifying properties existed in it, are very useful to get healthy and shiny skin. When the star anise oil tarnished on the skin, speedy relief occurred from spots, acne, and spoiled skin. Because, it has strong sebum-normalizing properties to counteract the excessive production of sebum and the accumulation power in the excretory duct of the sebaceous glands. It has also antibacterial activity against propionibacterium acnes, and the gram-positive bacterium existing in the pilosebaceous unit released on the skin surface during the secretion of sebum.<sup>212</sup> Some of the specific activities reduce the inflammatory response triggered by the abnormal accumulation of bacteria in the pilosebaceous unit, whereas it also reduce oxidative stress.<sup>213</sup> This play a key role to free the skin from excessive sebum production, counteract cutaneous inflammation and reduce the number of comedones. Star anise has titled as phenomenon spice because of it's capabilities to shrink the prominence of rational lines and wrinkles. It also squeeze and nature the skin, fixed it and create an appealing look. What's more, you can initiate to realize outcomes in one week. It is a home-based therapy that is easier and economical to formulate, entirely natural and extraordinarily operational. For upgrading the thorough anti-aging regimen, add a few drops of frankincense oil to this cleanser. Frankincense oil is a powerful astringent to protect skin cells. It is identified for it's anti-aging assets to lessen acne blemishes and dark marks,

whereas tightening the skin. Be sure to keep an eye on this toner with star anise anti-aging facial moisturizer for best outcomes.<sup>214</sup>



**Figure 64.** The plant of chakra fool

#### FIGWORT

Common Name: Common figwort

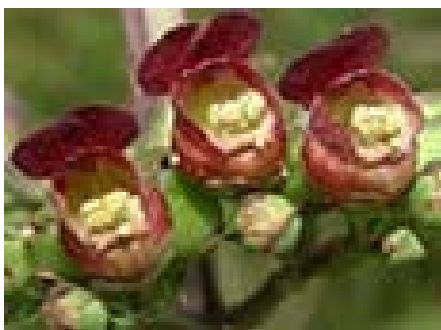
Systematic Name: *Scrophularia nodosa*

Family: Moraceae : Scrophulariaceae

*Scrophularia nodosa* effectively used as drug for the treating of skin disorders, to detoxify body from toxic substances, for swellings, and for swollen lymph nodes. The extract of this herb has also significant uses for the treatment of inflammation, infected wounds, blisters, boils and bruises. The core ingredients of plant extract and cuttings are amino acids (alanine, isoleucine, lysine, phenylalanine, threonine, tyrosine, valine), Iridoids (aucubin, harpagosides, harpagide, catapol), flavonoids, phenolic acids (caffeic, ferulic, vanillic). This plant exhibited medical properties a like nalgescic, anti-inflammatory, lymphatic, detoxifier, alterative, circulatory stimulant, cardio-active (inotropic), hepatic stimulant, laxative, mild diuretic, vulnerary, anti-rheumatic. Thus, this plant has a lot of medical uses specific for skin conditions like eczema and/or psoriasis. This plant can be used for both internally, topically and for any chronic skin disorder (especially those accompanied by eruptions, itchiness and irritation). The contents existed in it's extract will stimulate entire body detoxification, recover metabolic functions, and cure rheumatism and gout. When applied topically, this herb is also of assistance for quickening the healing wounds,<sup>215</sup> burn injuries and hemorrhoids. The common figwort also owns mild diuretic properties, and used for the treatment of ejecting worms. The entire figwort plant holds anodyne, alterative, diuretic, anti-inflammatory propeties and to some extent it show purgative as well as tonic properties.<sup>216</sup> It could, therefore, be indorsed to cure infected eczema and other skin infections but also for any disorders wherever the infection have switched over to inflate lymph nodes. The juice of the fresh root is as an 'excellent sweetener of the blood' if taken in small quantities for a long time where the action of a herb is well-



thought-out to get well the function of an organ, and this mention could imitate an anti-inflammatory action.



**Figure 65.** The plant of figwort

#### APRICOT

Common Name: Khubani, Apricot

Systematic Name: *Prunus armeniaca*

Family: Rosaceae

Apricot oil obtained from dried seeds is used for healing damaged skin.<sup>217</sup> It reduces wrinkles, maintain skin elasticity, removes blackheads, used as skin moisturizer and help in improving skin tone.<sup>218</sup>



**Figure 66.** Fruit of apricot

These plants are grown or found in different parts of India. A summary of the general location of occurrence depending upon climatic conditions and summary of respective part used in cosmeceuticals is listed in the table 1.

**Table 1:** Summary of cosmeticeutical plants

Name	Part used	Regions found in
<i>Emblica officinalis</i> Gaertn Amla	Fruit	Uttar Pradesh, Tamil Nadu, Rajasthan, Madhya Pradesh
<i>Acacia concinna</i> DC Shikakai	Fruit	Central India
<i>Callicarpa macrophylla</i> Vahl Priyangu	Bark	Jammu & Kashmir, Uttar Pradesh, Bihar, Andhra Pradesh, Bengal, Assam, the sub-Himalayan tracts, Manipur, Meghalaya, and Tripura
<i>Curcuma longa</i> Linn Haldi	Underground stem	Andhra Pradesh, Tamil Nadu, Orissa, Maharashtra, Assam, Kerala, Karnataka and West Bengal
<i>Rubia cordifolia</i> Linn	Roots	Himalayas

Manjistha			
<i>Azadirachta indica</i> Neem	Bark and leaves	Throughout India	
<i>Lawsonia inermis</i> Henna	Leaves, flowers and seeds	Gujarat, Madhya Pradesh, Rajasthan	Punjab
<i>Crocus sativus</i> linn. Saffron	Stigma	Jammu & Kashmir and Himachal Pradesh	
<i>Garcinia mangostana</i> Himalayan berry	Fruit	Nilgiri hills, the southern districts of Tinnevely and Kanya-Kumari in Tamil Nadu, and Kerala.	
<i>Centella asiatica</i> Gotu Kola	Leaf	Meghalaya and other northeastern states.	
<i>Santalum album</i> Sandalwood	Wood	Karnataka, Gujarat, Rajasthan, Andhra Pradesh, Madhya Pradesh, and Maharashtra.	
<i>Aloe vera</i> Aloe vera	Leaf	Rajasthan, Andhra Pradesh, Gujarat, Maharashtra and Tamil Nadu.	
<i>Cocos nucifera</i> Coconut	Fruit	Kerala, Karnataka, Tamil Nadu, Andhra Pradesh and also Goa, Orissa, West Bengal, Pondicherry, Gujarat, Maharashtra and the island territories of Lakshadweep and Andaman and Nicobar.	
<i>Prunus dulcis</i> Almond	Fruit	Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, and Kerala.	
<i>Helianthus</i> Sunflower	Seeds	Karnataka, Andhra Pradesh, Maharashtra, Bihar, Orissa and Tamil Nadu.	
<i>Arctium</i> Burdock	Roots and stem	Kashmir	
<i>Calendula officinalis</i> Calendula	Leaf and flower	All over India	
<i>Jasminum officinale</i> Jasmine	Flower	Coimbatore, Madurai, and Dindigul (Tamil Nadu); Bangalore and Maharashtra.	
<i>Lavandula angustifolia</i> Lavender	Flower	Shimla and Himachal region	
<i>Hibiscus rosa-sinensis</i> Hibiscus	Leaf and flower	Assam, Kashmir, Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Tamil Nadu	
<i>Citrus Limonis</i> Lemon	Fruit	Andhra Pradesh, Maharashtra, Tamil Nadu, Gujarat, Rajasthan, and Bihar.	
<i>Rosa rubiginosa</i> Rose	Flower	All over India	
<i>Hemidesmus indicus</i>	Whole plant	Eastern and southern parts of India	

Indian Sarsaparilla/Anantmuli		
<i>Mimosa pudica</i> Chui mui	Leaf	Assam, Bihar, Kerala, Madhya Pradesh, Maharashtra, Manipur, Mysore, Odisha, Rajasthan, Tamil Nadu, West Bengal
<i>Dionaea muscipula</i> (Venus flytrap)	Flower	Maharashtra, Kerala
<i>Boswellia serrata</i> Salai guggul	Gum- resin from trunk of tree	Andhra Pradesh, Gujarat, Madhya Pradesh, Jharkhand and Chhattisgarh
<i>Daucus carota</i> <i>subsp. Sativus</i> Carrot	Seeds	Karnataka, Punjab, Uttar Pradesh, Tamil Nadu, and Andhra Pradesh.
<i>Tagetes</i> Marigold	Flower	All over India
<i>Eucalyptus globulus</i> Eucalyptus	Leaf	Tamil Nadu, Andhra Pradesh, Gujarat, Haryana, Mysore, Kerala and in the Nilgiri Hill.
<i>Tamarindus indica</i> Tamarind	Fruit, seed and seed husk	Tamil Nadu, Maharashtra, Karnataka, Andhra Pradesh, Madhya Pradesh and Orissa.
<i>Simmondsia</i> <i>chinensis</i> Jojoba	Fruit	Maharashtra, Gujarat, Rajasthan.
<i>Olea europaea</i> Olive	Fruit	Jammu & Kashmir, Himachal Pradesh, Rajasthan and Uttar Pradesh.
<i>Mangifera indica</i> Mango	Bark	Uttar Pradesh, Andhra Pradesh, Maharashtra, Karnataka, Bihar and Gujarat.
<i>Brassica</i> Mustard	Seeds	Rajasthan, Uttar Pradesh, Haryana, Madhya Pradesh, and Gujarat.
<i>Allium cepa</i> Onion	Tuber	All over India
<i>Limonia acidissima</i> wood apple	Leaves	Maharashtra, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka, Madhya Pradesh and the western Himalayas.
<i>Piper nigrum</i> Black Pepper	Leaves	Kerala, Karnataka, Tamil Nadu, Andaman and Nicobar Islands, Arunachal Pradesh and Pondicherry.
<i>Psidium guajava</i> Guava	Leaves	Uttar Pradesh, Bihar, West Bengal, Maharashtra, Chhattisgarh, Tamil Nadu, Karnataka, Madhya Pradesh, Gujarat and Andhra Pradesh.
<i>Ocimum tenuiflorum</i> Tulsi	Leaves	All over India.
<i>Solanum</i> <i>lycopersicum</i>	Fruit	Maharashtra, Bihar, Karnataka, Uttar Pradesh, Orissa, Andhra

Tomato		Pradesh, Madhya Pradesh and Assam.
<i>Trigonella foenum-graecum</i> Methi	Seed	Uttar Pradesh, Rajasthan, Madhya Pradesh
<i>Hippophae rhamnoides</i> Sea-uckthorn	Fruit	Indian Himalaya regions
<i>Ailanthus excels</i> <i>Simaroubaceae</i> Maharukh	juice of the bark	Gujrat, Uttar pradesh, Karnataka, Tamilnadu
<i>Cucumis sativus</i> Khira	Fruit	All over India
<i>Leucas aspera</i> Hul Khusa	crushed leaves	India
<i>Swertia chirayita</i> Cheretta	use the parts that grow above the ground to make medicine	All over india
<i>Zea mays</i> Makka	Corn kernels	Uttar Pradesh, Rajasthan, Madhya Pradesh, Haryana, Uttarakhand
<i>Pistia stratiotes</i> Water lettuce	Leaves	Lakes in the Hills
<i>Euphorbia thymifolia</i> Choti dhudhi	extract	Uttar Pradesh, Rajasthan, Haryana, Bihar
<i>Eclipta alba</i> Bhringraj	Leaf. roots	Uttar Pradesh, Madhya Pradesh, Haryana
<i>Matricaria chamomilla</i> Camomile	Flower Extract, Flower Oil, Flower Powder	Uttar Pradesh, Rajasthan, Madhya Pradesh, Haryana
<i>Salvia officinalis</i> sage	hydroethanol ic leaf extract	Rajasthan, Madhya Pradesh
<i>Mentha</i> Mint	Leaf	All over india
<i>Echinacea purpurea</i> Echinacea	extract	Uttar Pradesh, Uttarakhand
<i>Symphytum officinale</i> Comfrey	leaf, root, and root-like stem	Uttar Pradesh, Rajasthan
<i>Thymus vulgaris</i> Garden Thyme	leaf extract and thymol	Uttar Pradesh, Rajasthan
<i>Veronica spicata</i> Speedwell	extracts	South India regio, hill area
<i>Stellaria media</i> Chickweed	liquid extract, variety of powders, teas, and dried herbs, Seeds,	All over india



Leaves		
<i>Glycyrrhiza glabra</i> Licorice	Stem, root	Central India
<i>Illicium verum</i> chakra fool		Karnataka, kerela
<i>Scrophularia nodosa</i> Figwort	Fruit	All over india
<i>Prunus armeniaca</i> Apricot	Seed	Himachal Pradesh, Jammu & Kashmir, Uttar Pradesh and some extent of north eastern hill region.

These are commonly used plants for cosmeceuticals as have been discussed in above sections. There may be selective more plants that are used for specific treatment or skin condition. The current collection of plants would serve the purpose of further evaluation and exploration in toning up the different skin conditions and as skin cosmeceuticals.

## CONCLUSION

In conclusion, the Cosmeceuticals lie in-between or cover both field of the cosmetics as well as of therapeutic drug compounds. The plant can serve excellent source of ingredients that serve the purpose of both; and products for skin care have emerged as the prominent area of development. The fundamental ethnopharmacology and Ayurvedic medicinal knowledge can serve as the basis for development of new Cosmeceuticals for skin care and treatment. A number of medicinal plants of Indian origin have been known or reported for the treatment of skin ailment or skin rejuvenation. This collection of compounded information and knowledge would lead and provide a ray of direction towards progress in development of Cosmeceuticals. The detailed phytochemical evaluation of these individual plants will further enhance their potential applicability in cosmeceuticals or as cosmetic alone or as pharmaceuticals.

## CONFLICT OF INTEREST

Authors declare no conflict of interest.

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