

Herbal Cosmetics for Skin and Hair care

V P Kapoor

National Botanical Research Institute, Lucknow – 226 001, Uttar Pradesh, India

Abstract

The cosmetics are the utility products used extensively throughout the world for maintaining and improving general appearance of face and other parts of body e.g. mouth, hand finger, eye, hair, etc. It includes creams, powders, face pack, lotions, moisturizers, shampoo, hair oil, conditioners, nail polish, etc. Smooth, shining, healthy skin and hair certainly count for a beautiful woman or handsome man. Numerous chemical toxins, microorganisms, chemicals, infections present in atmosphere cause damage to skin. Cosmetics alone are not sufficient to take care of skin and body parts, it require association of active ingredients to check the damage and ageing of the skin. Herbal cosmetics are now emerged as the appropriate solution to the current problem. Personal care industry is currently more concentrated on herbal cosmetics as now-a-days it is a fast growing segment with a vast scope of manifold expansion in coming years. Herbal cosmetics are the preparations, which represent cosmetics associated with active bio-ingredients, nutraceuticals or pharmaceuticals. The use of bioactive phytochemicals from a variety of botanicals have dual function, (i) they serve as cosmetics for the care of body and its parts and (ii) the botanical ingredients present therein influence biological functions of skin and provide nutrients necessary for the healthy skin or hair. In general, botanicals provide different vitamins, antioxidants, various oils, essential oils, hydrocolloids, proteins, terpenoids and other bioactive molecules. A vast biodiversity and different climatic conditions of our country provide a variety of botanicals, which can be used in the formulations. Our traditional knowledge about the use of plant wealth as described in Ayurveda, Siddha, Unani and Tibetan system of medicine, is of great help to identify the phytochemicals for skin and body care preparations. Necessary efforts are required to associate the modern cosmetology with bioactive ingredients based on our traditional system of medicine leading to emergence of novel cosmoceuticals for skin and body care.

Keywords: Herbal cosmetics, Skin care, Hair care, Natural colours, Natural dyes.

IPC code; Int. cl.7 — A61K 7/00, A61K 7/06, A61K 7/13, A61K 7/48

Introduction

Now-a-days, in the whole world there is turn to return towards the use of herbal products and to adopt more natural way of life. People prefer natural food, herbal medicines and natural curing practices for healthy life. There is much craze for the vegetable products cultivated through biological/organic farming without using synthetic fertilizers and pesticides. The usage of herbal cosmetics

has been increased to many folds in personal care system and there is a great demand for the herbal cosmetics. All this happened due to the excessive use of synthetic based products, synthetic chemicals, chemical dyes and their derived products in the last one and half century; their production and usage cause human health hazard with several side-effects leading to numerous diseases. It also caused considerable environmental pollution and disturbed our eco-system.

Allopathic system alone is proving insufficient and there is need to supplement it with herbal drugs. The most appropriate way is to utilize modern as well as traditional system to look after the health of the people. Much awareness is created amongst the consumers for health and better quality lives, which led towards more use of herbal drugs, herbal cosmetics, nutraceuticals and natural dyes. The new markets are being driven by fundamental shifts in demand for herbal-based products and renewed concern about the synthetic-based products. The present paper deals with herbal cosmetics used for skin and hair care.

The beauty of skin and hair basically depends on individual's health, diet, habits, job routine, climatic conditions and maintenance. In summer, excessive heat exposure dehydrates the skin and increases melanin content. It causes freckles, wrinkles, blemishes, sunburns, pigmentation and even body pain. Extreme cold in winters also damage skin as cuts, cracks, maceration and infection are generally observed. Skin disease is common ailments of all age groups because of the infection of a variety of microorganism, chemical agents and biological toxin present in the atmosphere and also due to physical factors, malnutrition and environmental pollution. Similar problems occur with hair as hair fall and their greying at early age becomes a general feature. There are

immense opportunities to use phytochemicals ingredients in the cosmetics for the skin and hair care in accordance with the principles of both cosmetic preparation and traditional systems of medicine like Ayurveda, Siddha, Unani and Tibetan.

Cosmetics

It is not simple to define the term “cosmetic” as its scope and application to the care of different body parts is very wide. According to one definition (Harry, 1962), these are (i) the articles intended to be rubbed, poured, sprinkled or sprayed on, introduced into, or otherwise applied to the human body or any part thereof for cleansing, beautifying, promoting attractiveness or altering the appearance, and (ii) articles intended for use as a component of any such articles; except that such term shall not include soap.

The main objective (Harry, 1962) of the cosmetic application is *Decorative* to enhance the general appearance of face and other body parts to minimize the skin defects to a considerable extent. It is applied to maintain or improve the status of skin and hair. It greatly helps men and women to look more impressive, beautiful and smart to a considerably extent. Although the aim is not always achieved depending upon the selection of the quality product based on the type of skin (e.g. oily skin, dry skin, normal skin and combined skin) and hair and also due to lack of artesian skill. It requires adequate expertise and artistic skill, which could be achieved through practice.

The other objectives of cosmetic application (Harry, 1962) are *Psychological, Social and Clinical*. Psychological effect of cosmetic application is an important value, which yield mental satisfaction to user. The skillful use of cosmetics can often disguise or minimize the facial and skin defects and improve the mental level of sufferers towards the life. Grey hair is a common problem associated in middle age or even often accrues at young age, it may cause jeopardize to an individual future, specially a women. Such problem can be solved by the skillful use of hair dyes and conditioners. Social effect of cosmetics is clearly evident from the existence of numerous beauty saloons, beauty parlours and hair dresser’s saloons. Now-a-days, it becomes a routine to visit such saloons and these are available even in rural areas. As regards to clinical effects of cosmetics, there exist different opinions for action of creams and other preparations on the skin. Their application generally check the skin cracking, skin wrinkling, pre-mature ageing, minimizing effects of wind burn, sun burn, bacterial infection, etc. It is relevant to mention here that the soldiers deputed in conditions of desert areas or extreme cold are supplied with specific preparation for the their skin care.

Herbal Cosmetics

Herbal cosmetics are the preparations, which represent cosmetics associated with active bioactive ingredients or pharmaceuticals. The use of phytochemicals from a variety of botanicals have dual function, (i) they serve as cosmetics for the care of body and its parts and (ii) the botanical

ingredients present influence biological functions of skin and provide nutrients necessary for the healthy skin or hair. In general, botanicals provide different vitamins, antioxidants, various oils, essential oils, dyes, tannins, alkaloids, carbohydrates, proteins, terpenoids and other bioactive molecules.

These are also topically applied and considered more preferred with compare to cosmetics. Personal care industry is now more concentrated on herbal based cosmetics as it is a fast growing segment with a vast scope of manifold expansion in coming years. Herbal cosmetics are not considered under the preview of Drugs and Regulations of Food and Drug Administrations. Like cosmetics, these are subjected for their safety according to the existing rules of the different countries. Generally, it is not mandatory for a manufacturer to claim that how bioactive ingredients penetrate the skin or that these ingredients cause drug-like or therapeutic effect.

Cosmetic Preparations

The physical states of cosmetics preparation are broadly divided into following three categories:

Solids: Face powders, talcum powders, face packs, masks, compact powders, cake make-up, etc.

Semi solids: Creams, ointments, liniments, wax base creams, pastes, etc.

Liquids: Lotions, moisturizers, hair oil, conditioners, shampoos, cleansing milk, mouthwashes, deodorants, liniments, sprays, etc.

Cosmetics industry is a huge organized sector as numerous international and national companies are under operation for manufacturing a variety of products using most sophisticated infrastructure. Personal care system is almost dependant upon the products of these companies but some of the individuals, experts and beauty parlours prefer the use of home made recipes based on traditional system of personal care. Based on traditional system, there exist hundreds of preparations based on botanicals and natural products for instant application on the skin, hair, eye care and famous beauty parlours have launched their specific preparations.

For manufacturing cosmetics at large scale, consistence of specifications in different batches is an essential factor, which determine the quality of the finished product.

Preparation of herbal cosmetics

The preparation of any herbal cosmetics basically follows the same procedure as in the case of cosmetics. In preparation, suitable bioactive ingredients or their extracts are used along with requisite ingredients basically used for cosmetics. It requires selection of suitable emulsifying agent, appropriate ingredient composition and modified methodology to obtain desirable product of specified parameters. Association of botanicals and traditional cosmetic ingredients affects the finished products, which ultimately requires modifications in ingredient composition and formulation methods. The herbal cosmetics formulation is a sophisticated and sensitive technological

profile because it retains the bioactivity of the botanicals during excessive processing and ascertains their availability after application on skin. It is desirable that manufacturers should ensure the quality of products through systematic testing at their level. Other parameters like organoleptic characteristics, pH, viscosity, stability towards light and refrigeration should also be evaluated.

Botanicals

There exist hundreds of botanicals which contain bioactive phytochemicals for their novel action to improve the skin conditions to considerable extent without any side effects. No other ingredient can serve this purpose as well as botanicals. These become now part of every product in the market form of cosmetics. They are also well-known for their action to control scabies, itching, skin disorder, pimples, dermatitis, ringworm, skin eruptions, acne, allergic rashes, warts and other problems. Their antioxidant action has resulted their use in numerous formulations. Curcumin extracted from *Curcuma longa* Linn. rhizome possesses anti-inflammatory activity by inhibiting leukotriene formation, inhibiting platelet aggregation, and stabilizing neutrophilic lysosomal membranes. *Aloe vera* Linn. has been shown to accelerate wound healing and to protect and soothe the skin. Selection of bioactive natural products depends upon the specific herbal cosmetics and its expected performance. Manufacturers opt different botanicals for formulation work depending upon their profiles, most of which are protected under patents. The

description of some prominent botanicals used for skin care, enhancing beauty, checking ageing and curing the skin are presented in Table 1. The bioactive extract of these botanicals can be used for preparing different categories of herbal cosmetics. Similarly, some of the prominent botanicals used under traditional system of medicines for hair care are tabulated in Table 2. There is no doubt there exists hundreds of plants for skin and hair care system, some of which are not commercially feasible as regard to their easy availability and cost constraints. The plants listed under Tables 1 and 2 (Wealth of India; Kumar, 1994; D'Amelio, 1999; Scartezzini & Speroni, 2000; Chopra *et al*, 1956, 1969; Thakur *et al*, 1989) are well-known botanicals of Indian origin and generally available in plenty in the market at reasonable price.

Colouring ingredients

Love for colour is a natural instinct. Every individual has his own choice and liking for colour and nature manifests itself in a wide spectrum of colours. Colours are well-known since ancient time for colouring cloths, consumer articles and food. Addition of colours in consumer products significantly enhances the general appearance of products. The cosmetics products are generally coloured by synthetic or natural colouring agents. In herbal-based cosmetics, there is trend to use natural colouring agents because of their safe, non-toxic and eco-friendly characteristics.

Table 1 : Botanicals used for skin care

S.No.	Botanical/Common name/ Family/Distribution	Uses
1	<i>Adhatoda vasica</i> Nees (<i>Vasaca</i>); <i>Acanthaceae</i> ; Throughout India	Fresh leaves juice/extract is used for skin affection and control of scabies
2	<i>Ailanthus excelsa</i> Roxb. (<i>Maharukh</i>), <i>Simaroubaceae</i> ; Throughout India	Leaves extract checks skin eruption and useful in skin creams and lotions.
3	<i>Allium sativum</i> Linn. (Garlic), <i>Alliaceae</i> ; Throughout India	Garlic oil is a source of sulphur and useful to control sores, pimples and acne. It may be used in skin lotions and creams.
4	<i>Aloe vera</i> Linn. (<i>Ghikanwar</i>) <i>Liliaceae</i> , Indian continent	Leaves juice, its pulp or extracted material is applied on skin for smoothness, healing, controlling skin burn, sun burn and injury. Used in moisturizers, lotions, creams, hair tonic, shaving creams, etc.
5	<i>Andropogon muricatus</i> Retz. (<i>Khas</i>), <i>Poaceae</i> ; Throughout India	Powdered root paste with red sandal wood is used to cure irritated skin and allergies.
6	<i>Azadirachta indica</i> A. Juss. (<i>Neem</i>), <i>Meliaceae</i> ; Indian warmer parts	Bark, seed, fruits and leaves contain diterpenes and highly oxidized tetra-terpenoids including azadirachtin; antiseptic agent; useful in curing wounds, skin diseases, leprosy, ulcers etc.
7	<i>Buchanania lanzan</i> Spreng. (<i>Chironnji</i>), <i>Anacardiaceae</i> ; Throughout India (up to 1000 m)	Kernel powder is useful in skin ointments to cure itch, blemishes, rashes and spots.
8	<i>Butea frondosa</i> Koenig ex Roxb. (<i>Dhak</i>), <i>Fabaceae</i> ; Throughout India (up to 1200 m).	Leaves extract is useful in pimples and seed extract for fungal infection and bruises.
9	<i>Carica papaya</i> Linn. (Papaya), <i>Caricaceae</i> ; Throughout India	Milky juice of unripe fruit is a good ingredient for facial and face cream; fruit pulp make skin soft and remove blemishes.
10	<i>Cassia tora</i> Linn. (<i>Panwar</i>), <i>Caesalpinaceae</i> ; Throughout India	Leaves and seed extract are useful for skin infection, ringworm, eruption, etc.
11	<i>Citrus limon</i> (Linn.) Burm.f. (<i>Nimbu</i>), <i>Rutaceae</i> ; Throughout India	Potential source of vitamin C; oil is used in various preparation to reduce skin itching and skin nourishment, pulp left after extraction of juice is useful as a facial ingredients.
12	<i>Cocos nucifera</i> Linn. (<i>Nariyal</i>), <i>Areaceae</i> ; Hot damp region of India	Coconut oil is useful for skin itching and rashes.
13	<i>Cucumis sativus</i> Linn. (<i>Khira</i>), <i>Cucurbitaceae</i> ; Throughout India	Water extract of fruits and seeds protect skin from sunburn.
14	<i>Curcuma longa</i> Linn. (<i>Haldi</i>), <i>Zingiberaceae</i> ; Throughout India	Rhizome powder possesses anti-inflammatory and anti-oxidant properties; used extensively in facial, face creams and ointments.
15	<i>Cuscuta reflexa</i> Roxb. (<i>Akash bel</i>), <i>Convolvulaceae</i> , Throughout India	Plant extract is useful to control dermatitis, itching and ringworm.



Adhatoda vasica



Carica papaya



Citrus limon



Cocos nucifera

S.No.	Botanical/Common name/ Family/Distribution	Uses
16	<i>Cydonia oblonga</i> Mill. (Bile); <i>Rosaceae</i> ; North-West Himalayas	Seed extract is used for beautification and protection of skin.
17	<i>Eclipta alba</i> (Linn.) Hassk. (Bhringraj), <i>Asteraceae</i> ; Throughout India	Paste of herb is useful to control skin diseases and eczema
18	<i>Euphorbia thymifolia</i> Linn. (Choti dhudhi), <i>Euphorbiaceae</i> ; Throughout India	Plant extract is useful to control ringworm and skin infections.
19	<i>Jasminum grandiflorum</i> Linn. (Chameli), <i>Oleaceae</i> ; Throughout India	Essential oil extracted from flowers is used in skin creams and lotions to control skin diseases. Essential oil extracted from plant is used in creams for the protection from sunburn.
20	<i>Juniperus communis</i> Linn. (Aaraar), <i>Cupressaceae</i> ; Himalaya region (1700-4200 m)	Whole plant extract is useful in skin creams to control skin rejuvenation.
21	<i>Lavandula vera</i> DC. syn. <i>L. officinalis</i> Chaix (Lavender), <i>Lamiaceae</i> ; Jammu & Kashmir	Essential oil is used in skin anti-acne cream.
22	<i>Leucas aspera</i> Spreng. (Hul Khusa), <i>Lamiaceae</i> ; Throughout India	Juice of leaves is applied to control scabies, skin psoriasis, chronic skin, skin eruption and eczema.
23	<i>Mallotus philippensis</i> Muell.-Arg. (Kamala), <i>Euphorbiaceae</i> ; Throughout India	Flower powder is useful to control scabies, ringworm, leprous eruption, etc.
24	<i>Mangifera indica</i> Linn. (Aam), <i>Anacardiaceae</i> ; Throughout India	Plant extract possesses anti-oxidant properties.
25	<i>Matricaria chamomilla</i> Linn. (Babuna), <i>Asteraceae</i> ; Himalayan hills	Leaves extract is applied in anti-acne cream.
26	<i>Mimosa pudica</i> Linn. (Lajwanti), <i>Mimosaceae</i> ; Throughout India	Herb extract applied in skin creams and lotions to control itching.
27	<i>Momordica charantia</i> Linn. (Karela), <i>Cucurbitaceae</i> ; Throughout India	Plant extract possesses antioxidant properties.
28	<i>Ocimum sanctum</i> Linn. and other <i>Ocimum</i> spp. (Tulsi), <i>Lamiaceae</i> , Throughout India	Leaves extract is useful to control skin infection and rejuvenation.
29	<i>Phyllanthus emblica</i> Linn. syn. <i>Embllica officinalis</i> Gaertn., (Amla), <i>Euphorbiaceae</i> ; Tropical and subtropical regions of India	Fruit extract possesses anti-oxidant properties.



Juniperus communis



Mimosa pudica



Momordica charantia



Ocimum sanctum

S. No.	Botanical/Common name/ Family/Distribution	Uses
30	<i>Pistia stratiotes</i> Linn. (Water lettuce), <i>Araceae</i> ; Throughout India	Leaves extract is applied to control chronic skin disorders.
31	<i>Prunus amygdalus</i> Batsch (Badam), <i>Rosaceae</i> ; Himalayan regions (2300 meters)	Kernel extract is used in sun creams and other formulations to make the skin fair and beautification creams.
32	<i>Psoralea corylifolia</i> Linn. (Babchi), <i>Fabaceae</i> ; Throughout India	Seeds extract possesses potential to control skin diseases.
33	<i>Rosa damascena</i> Mill. (Lal gulab), <i>Rosaceae</i> ; Throughout India	Essential oil extracted from flowers is used in skin creams, lotions and ointment for beautification, smoothness and protection from sunburns.
34	<i>Santalum album</i> Linn. (Chandan), <i>Santalaceae</i> ; Dry regions of India	Paste of hardwood is used in face pack; essential oil used in preparation of creams, ointments and lotions for skin beautification and protection from sunburn; possesses anti-oxidant properties.
35	<i>Saussurea lappa</i> C.B. Clarke (Kuth), <i>Asteraceae</i> ; Himalayan hills	Roots extract is used in ointments for chronic skin diseases.
36	<i>Sesamum indicum</i> Linn. (Til), <i>Pedaliaceae</i> ; Throughout India	Seed extract is useful for skin protection and rejuvenation.
37	<i>Swertia chirayita</i> (Roxb. ex Flem.) Karst. (Cheretta), <i>Gentianaceae</i> ; Himalayas	Bark powder extract controls skin affections; possesses antioxidant properties.
38	<i>Withania somnifera</i> Dunal (Aswagandha), <i>Solanaceae</i> ; Drier parts of Himalayas	Whole plant extract is used in skin cleansing formulations and possesses antioxidant properties.
39	<i>Zea mays</i> Linn. (Makka), <i>Poaceae</i> ; Throughout India	Stigma extract is used in creams and lotions for skin rejuvenation



Prunus amygdalus



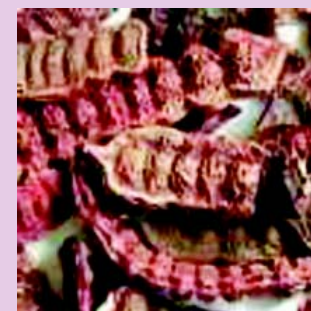
Psoralea corylifolia



Rosa damascena

Table 2 : Botanicals useful for hair care

S.No.	Botanical/Common name/ Family/Distribution	Uses
1	<i>Acacia concinna</i> DC. (Shikakai), <i>Mimosaceae</i> ; Tropical forest of India	Pods extract is used as hair cleanser and for control of dandruff.
2	<i>Arnica montana</i> Linn. (Arnica), <i>Asteraceae</i> ; Cultivated sparingly in India	Flowers extract is used in hair oil as a tonic material. It stimulates the hair follicles.
3	<i>Betula pendula</i> (Birch), <i>Betulaceae</i> ; North west India	Extract of leaves is used as anti-dandruff.
4	<i>Brassica</i> spp. (Mustard), <i>Brassicaceae</i> ; Throughout India	Seed oil is used as hair oil and useful for hair nourishment.



Acacia concinna

S. No.	Botanical/Common name/ Family/Distribution	Uses
5	<i>Calendula officinalis</i> Linn. (Marigold), <i>Asteraceae</i> ; Cultivated in India	Flowers extract is used in hair creams for smoothening effect.
6	<i>Carthamus tinctorius</i> Linn. (Safflower), <i>Asteraceae</i> ; Indian plains	Alcoholic extract is used in hair tonics.
7	<i>Centella asiatica</i> (Linn.) Urban (Mandukaparni), <i>Apiaceae</i> ; Throughout India	Whole plant extract is used for the growth and maintenance of hairs.
8	<i>Cocos nucifera</i> Linn. (<i>Nariyal</i>), <i>Areaceae</i> ; Coastal parts of India	Kernel oil is a well-established hair oil, which is used as such or as a basic raw material for preparing hair oils and tonics.
9	<i>Eclipta alba</i> (Linn.) Hassk. (<i>Bhangra</i>), <i>Asteraceae</i> ; Himalayas regions	Whole plant extract is useful for hair's nourishment and dyeing.
10	<i>Ficus racemosa</i> Linn. (<i>Bargad</i>), <i>Moraceae</i> ; Throughout India	Aerial root powder is mixed with coconut oil for massage to check falling hairs.
11	<i>Juglans regia</i> Linn. (<i>Akroot</i>), <i>Juglandaceae</i> ; Himalayas (temperate region)	Leaves and hull of fruits is used for hair dyeing.
12	<i>Lawsonia inermis</i> Linn. (<i>Henna</i>), <i>Lythraceae</i> ; Throughout India	Leaves paste is used for hair dyeing and nourishment.
13	<i>Nardostachys jatamansi</i> DC. (<i>Jatamansi</i>), <i>Valerianaceae</i> ; Alpine Himalayas	Extract of rhizome is used in hair tonics for their growth.
14	<i>Phyllanthus emblica</i> Linn. (<i>Amla</i>), <i>Euphorbiaceae</i> ; Throughout India	Fruit extract is used in oils for promotion of hair growth.
15	<i>Salvia officinalis</i> Linn. (<i>Sage</i>), <i>Lamiaceae</i> ; Cultivated in gardens	Aqueous extract is used as hair conditioner.
16	<i>Sapindus mukorossi</i> Gaertn. (<i>Ritha</i>), <i>Sapindaceae</i> ; Cultivated in India	Extract of fruit coat works as natural shampoo: used in herbal shampoo as hair cleanser.
17	<i>Saussurea lappa</i> C.B. Clarke (<i>Kuth</i>), <i>Asteraceae</i> ; Himalayas	Roots extract is used in hair dyeing.
18	<i>Sesamum indicum</i> Linn. (<i>Til</i>), <i>Pedaliaceae</i> ; Warmer regions of India	Seed oil is one of the major source of hair oils, which is used as such or a base for preparing specific hair oils.
19	<i>Terminalia bellirica</i> Roxb. (<i>Behera</i>), <i>Combretaceae</i> ; Throughout India	Seed extract and oil is good for hair dyeing preparation.
20	<i>Terminalia chebula</i> Retz. (<i>Harra</i>), <i>Combretaceae</i> ; Throughout India	Seed extract is used in hair care formulations.
21	<i>Thymus serpyllum</i> Willd. (<i>Banajwain</i>), <i>Lamiaceae</i> ; Himalayas	Whole herb extract is useful for preparing hair tonics.
22	<i>Trigonella foenum-graecum</i> Linn. (<i>Fenugreek</i>), <i>Fabaceae</i> ; Throughout India	Seed extract is used as hair cleanser.



Centella asiatica



Eclipta alba



Phyllanthus emblica



Sesamum indicum

In view of the importance of natural colours in herbal cosmetics formulation, their brief description is as follows:

Natural colours and dyes:

Natural colour or pigment in biological system is one that is synthesized and accumulated in, or extracted from living cells. In addition certain colorants such as oxidized phenol, phenolic derivatives, coumarins may be formed by the dying cells. Natural dyes may be defined as chemicals, which are obtained from vegetable and animal sources, without chemical processing. In nature numerous coloured compounds are obtained but all coloured substances are not dye. For a chemical to be defined as a dye it must possess a suitable colour, which must be fixed in dispersion or solution to a substrate itself or using fixing agent and it must not be fugitive. The applied colour should be fast to sunlight, water washing and to action of mild acid and alkali. The substrate may be textile fibre, leather, hairs, furs, foods, cosmetic or pharmaceutical base. Dyes are not confined to a particular chemical class of organic compounds, they belong to a wide range of chemical class of compounds, e.g. tetraterpenoids (carotenoids, xanthophylls), O-heterocyclic compounds (anthocyanins, flavones), tetrapyrroles (chlorophylls), quinones (naphthaquinones, anthraquinones), N-heterocyclic compounds (indigoid), etc.

Natural colorants are obtained from following categories:

1. *Vegetable Origin :*

- From root, stem, bark, wood, leaf, flower and seed of plants.

- Indigo, kachnar, catechu, tesu, lal khair, patang, ratanjot, annatto, turmeric, henna, cherry, saffron, kamala, etc.
 - There are about 300 plant species which yield colours.
2. *Animal Origin :*
 - By dye yielding insects
 - Lac, cochineal, kermes, etc.
 3. *Mineral Origin :*
 - Various inorganic metallic salts and metal oxide.

Present paper is confined to natural dyes obtained from vegetable and animal origin (Gulrajani *et al*, 1992; Kapoor, 2000, 2002a, 2002b).

Natural dyes – Chemical classification: Natural dyes represent wide range of organic groups having different chemical structures. The commercially prominent dyes can be classified to following groups based on their chemical structure (Table 3).

The following natural colours are produced by numerous companies and available in market; Annatto (Yellow/Orange), Carotene (Orange), Beetroot (Pink/Blue/Red), Chlorophyll (Green), Beta Carotene (Yellow/Orange), Chlorophyllin (Green), Capsanthin (Red/Orange), Curcumin (Yellow), Carmine (Red), Lycopene (Reddish-orange), Carminic Acid (Orange/Red), Lutein (Yellow), Anthocynin (Red/Purple), Vegetable carbon (Black).

Tannins are important complex organic compounds, which are partially covered in vegetable colour yielding materials. These are the important agrochemicals, which create affinity between adjective dyes and hairs. The main source of tannins are the bark and wood of acacia, oak, wattle, sumach khair, avaram, etc. (Kapoor, 1998; Mitra & Kapoor, 1999).

Table 3 : Classified commercial dyes

Chemical group	Prominent example	Colour
Indigoids	Indigo, tyrian purple	Blue-pink
Anthraquinones	Madder (Alizarin) Lac Kermes, Cochineal	Red class of dyes
Alpha-naphthaquinone	Henna (Lawsone)	Orange
Flavones	Weld (<i>Reseda luteola</i> Linn.) Wood of pines, Dahlia, Sunflower, Marigold, Palas, Kamala, Chrysanthemum, Tea, etc.	Natural Yellow class of dyes
Anthocyanines	Grape skin extract, <i>Bignonia chica</i> Humb. & Bonpl.	Red Orange
Betalains	Beet-root	Red to blue-red
Carotenoids	Annatto (<i>Bixa orellana</i> Linn.) Carrots Saffron	Yellow-orange Orange Jafran (yellow)
Diferuloyl – methane	Curcumin from turmeric	Yellow
Alkaloids	Berberine	Yellow
Chlorophyll	Leaves of lucerne, nettles, mulberry, green plants, pasture grasses, algae, etc.	Green

Natural colours as health cure: Besides colouring cosmetics, several natural dyes possess bioactive properties and have been used as therapeutic agents and as diagnostic tools. Some of the dyes have been reported for following curative effects: analgesics, antibacterial, antifungal, anti-leprotic, antiviral and anti-inflammatory. Turmeric has been reported to cure ulcers, wounds, eczema and inflammations and used externally in paste, oil, ointment, lotions, etc. It is used in the treatment of carminative and stomach disorder. It has also been found as potential bio-molecule for the treatment of cancer. Presently, there has been much interest in carotenoids, especially beta-carotene (carrots, mango, papaya, etc.), which besides natural orange pigment is converted in body to vitamin A and has antioxidant powers. Similarly, there is trend towards the use of anthocyanins (red grapes, red cabbage, elderberries, sweet potatoes, etc.) and betacyanins (red potatoes, beet, amaranth, etc.), which contribute positive health effect.

Conclusion

The usage of herbal cosmetics has been increased to many folds in personal care system and there is a great demand for the herbal cosmetics. Personal care industry is currently more concentrated on these herbal-based cosmetics as now-a-days it is a fast growing segment with a vast scope of manifold expansion in coming years. The use of bioactive ingredients in cosmetics influence biological functions of skin and provide nutrients necessary for the healthy skin or hair. In general, botanicals provide

different vitamins, antioxidants, various oils, essential oils, hydrocolloids, proteins, terpenoids and other bioactive molecules. There is tremendous scope to launch numerous herbal cosmetics using appropriate bioactive ingredients with suitable fatty oil, essential oils, proteins and additives. It is mandatory that adequate safety testing should be conducted according to existing rules and well-documented along with the ingredients composition. Under current scenario, Indian market contribution is very less, which could be enhanced through systematic R&D efforts but it requires active collaboration amongst scientists, technologists, cosmetic industry and Government organization.

Acknowledgement

The author is thankful to CSIR, New Delhi for providing him Emeritus Scientist position under Emeritus Scientist Project.

References

1. Chopra RN, Nayar SI and Chopra IC, Glossary of Indian Medicinal Plants, Publications & Information Directorate, CSIR, New Delhi, 1956.
2. Chopra RN, Chopra IC and Verma BS, Supplement to Glossary of Indian Medicinal Plants, Publications & Information Directorate, CSIR, New Delhi, 1969.
3. D'Amelio FS Sr, *In: Botanicals A Phytocosmetic Desk Reference* (Ed. FS D'Amelio, Sr), 1999, CRC Press, London.
4. Gulrajani ML, *In: Natural Dyes and Their Application to Textiles* (Eds ML Gulrajani and D Gupta), Department of Textile Technology, I.I.T., Delhi, 1992, 1-18.
5. Harry RG, *In: Modern Cosmeticology*, Volume One (revision Eds. JB Wilkinson, R Clark, E Green and TP McLaughlin), 1962, Leonard Hill [Books] Limited, London.
6. Kapoor VP, Natural colours: Diversified applications and prospects. *Proc Natl Sem Pharm Diversity Heterocyclic Comp*, May 31- June 1-2, 2002, IL-06.
7. Kapoor VP, Natural food colours : Present scenario and future prospects. *Proc- Natl Sem Role Rural Ind Develop*, December 7-8, 2000, Lucknow, 12-14.
8. Kapoor VP, 2002a, Role of natural colours in food industry, *Proc Sem Develop Food Process Ind Uttar Pradesh*, January, 16-17, 2002, Lucknow, Chapter No. 16.
9. Kapoor VP, 2002b, In *Advances in legume research in India*, (Eds. RR Rao and LB Chaudhry), Bishen Singh Mahendra Pal Singh, Dehradun, 2002, pp. 211-222.
10. Kapoor VP, *In: Current concept in seed biology*, (Eds. KG Mukerji, AK Bhatnagar, SC Tripathi, M Bansal and M Saxena), Naya Prokash, Calcutta, 1992, pp. 87-114.
11. Kapoor VP, Joshi H and Chaubey M, Applications of seed gums in Pharmaceutical formulations, *J Med Arom Plant Sci*, 2000, **22/4A & 23/1A**, 42-44.
12. Kapoor VP, Tannins containing plants of India; Part I: Chemical composition, classification and sources. *In: Appl Bot Abstr*, 1998, NBRI, Lucknow, **18(3)**, 205-212.
13. Kumar S, Medicinal Plants in Skin Care, Director, Central Institute of Medicinal and Aromatic Plants, Lucknow, 1994.
14. Mitra R and Kapoor VP, Tannins containing plants Part II: History, distribution, sources and uses. *In: Applied Botany Abstract*, NBRI, Lucknow, 1999, **19(4)**, 279-314.
15. Scartezzini P and Speroni E, Review on some plants of Indian traditional medicine with antioxidant activity, *J Ethnopharmacol*, 2000, **71**, 23-43.
16. Thakur RS, Puri HS and Hussain A, *In: Major Medicinal plants of India*, 1989, CIMAP, Lucknow.
17. The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products—Raw Materials Series, Publications & Information Directorate, CSIR, New Delhi, vols I-XI, 1948-1976; Revised Series IA, 1985; 2B, 1988; 3 Ca-Ci, 1992.

Suggested web sites:

- <http://www.makingcosmetics.com/index.htm>
- <http://www.kettlecare.com/index.html>
- <http://www.theherbarie.com/index.html>
- <http://www.bluvenus.com/SW/herbal/index.htm>