This review describes the use of some natural products in cosmetic preparations, due to their low mammalian toxicity, with a brief description of the major use, plant parts used, the actives responsible for effect and the benefits of such products. Their use in skin care; such as dryness, eczema, acne, free-radical scavenging, antiinflammatory, antiaging and skin protection effects are explained, and also the use in hair care as hair growth stimulants, hair colorants, and for hair and scalp complaints such as dandruff. Essential oils when incorporated into finished products impart many benefits such as a pleasant aroma in perfumery, shine or conditioning effects in hair care products, emolliency and improving the elasticity of the skin. Copyright © 2003 John Wiley & Sons, Ltd.

**Keywords:** cosmetics; hair care; skin care; essential oils; natural.

**INTRODUCTION**

According to the consumer products (Safety) Regulations 1989; a cosmetic product refers to ‘any substance or preparation intended for application to any external surface of the human body (that is to say, epidermis, hair system, nails, lips and external genital organs), or to the teeth or buccal mucosa wholly or mainly for the purpose of cleaning, perfuming or protecting them, or keeping them in good condition or changing their appearance or combing body odour or perspiration except where such cleaning, perfuming, protecting, keeping, changing or combating is wholly for the purpose of treating or preventing disease’ (Dweck, 1996).

Novel ‘bioactive’ ingredients are derived from the sea, the earth and the plant kingdom. Popular ingredients include Chinese herbs, vitamins, minerals, antioxidants, enzymes, hormones and a multitude of ‘naturals’. The use of plants is as old as mankind and in the coming years, the market will see many new products containing natural oils and herbs. Plants were once the main source and foundation of all cosmetics, before methods were discovered of synthesizing substances with similar properties. However, the pharmaceutical industry also uses a number of plants for drugs that are not suitable for use in cosmetic products. The 1989 Cosmetic Safety Act listed forbidden plant materials such as belladonna (*Atropa belladonna*), and foxglove (*Digitalis purpurea*) etc (Dweck, 1996).

The use of plant extracts in cosmetic formulation is increasing, mostly because of the poor image that animal-derived extracts have acquired during the past few years. This is due, in part, to news reports regarding bovine spongiform encephalitis (BSE). Some animal-derived products need to be replaced, but synthetic chemicals cannot always do this well. Natural molecules derived from plant extracts offer a particularly exciting avenue for further research. Plant extracts, however, are often ill-defined as to the method of extraction, plant-to-solvent ratio and the content of active ingredients. Moreover, the stability of the colour, odour, transparency and/or active ingredients with time is also often a limiting factor. Plant extracts are different in several respects from purified therapeutic agents. Firstly, they are more dilute than the pure chemicals that are familiar to us; secondly herbs often contain additional active principles that may be closely related both chemically and therapeutically to the constituent primarily responsible for its effects.

Herbal ‘total extracts’ as well as ‘selective extracts’ are used in cosmetics. Total extracts are applied mainly according to the historical tradition of their use. On the other hand selective extracts are employed more by reason of investigation into their specific activity. Some selective extracts are introduced for different areas of use: licorice for skin irritations; ginkgo as a free radical scavenger; bearberry for skin lightening (complexion); walnut for skin tanning; and wheat germ for stimulating cell proliferation (Marks, 1997). Wherever possible, the selection of plant materials has been restricted to those materials where strong ethnobotanical use has been reported. In many cases, the data released by raw material suppliers are unverified and often very difficult to substantiate from official (ethnopharmaceutical, pharmacognosy or phytotherapeutical) texts (Dweck, 1997b).

It has been said that ‘there is a plant for every need on every continent’. Remarkably, this statement appears to be true. For instance looking at natural resources to make soap, soapwort (*Saponaria officinalis*) will be found in Europe; yucca (*Yucca glauca*) in southern USA; soapnut (*Sapindus indica*) in India; endod (*Phylolacca dodecandra*) in Africa and soap bark (*Quillaja saponaria*) in South America. It is interesting to note how these plants differ with the parts used varying from tree bark to berries.
SKIN CARE

Skin forms a remarkable protective barrier against the external environment, helping to regulate temperature and fluid balance, keeping out harmful microbes and chemicals and offering some protection against sunlight. Skin is a living organ that consists of epidermis, dermis and subcutaneous layers. The dermis is a connective-tissue layer that contains many elastin and collagen fibres, as well as an abundance of blood vessels and specialized nerve endings. The epidermis consists of two main parts: the stratum germinativum and the stratum corneum, the outermost layer ‘horny layer’, which comes in direct contact with the environment. This horny layer is not simply a collection of dead cells, but a complex organism that is a part of a homeostatic system, and all phenomena occurring at this layer, including the use of cosmetics, are transmitted to the epidermis and the inner skin, and the disturbance of the homeostatic balance, which accompanies aging and rapid changes in the external environment, clearly affects the epidermis and dermis (Trangono, 2000).

Natural remedies have been used for centuries for treating skin conditions and a wide variety of dermatological disorders, including inflammation, phototoxicity, psoriasis, atopic dermatitis and alopecia areata. Although they are currently widely accepted by patients, their scientific respect among dermatologists in particular is limited. The alternative medications seem promising, although their true effects are unknown, so further investigations must be performed to assess clinical benefit. Herbal drugs for topical application also deserve consideration because of their widespread use and ill-defined benefit/risk ratio (Hoermann and Korting, 1994). Human skin manifests conditions ranging from simple dryness to severe erythema and scaling. These indications are sometimes accompanied by pruritis, inflammation and also may exhibit an associated oedema that further increases discomfort. Herbal materials to alleviate these symptoms have presumably been selected by a process of ‘trial and error’. However, scientific study shows that plants possess a vast and complex arsenal of phytochemicals that not only calm, restore and heal the skin, but also stand up to the scrutiny of clinical trial and pharmacological testing (Passi, 2002; Orthoefer, 2002; Dweck, 1997a).

A cosmetic formulation, including active principles of strictly natural origin, is designed to protect the skin against exogenous or endogenous harmful agents, as well as to balance again the dermal homeostasis lipids altered by dermatosis and ageing. It is characterized by a lipid composition which is close to human sebum. This is obtained from the Castor bean, Ricinus communis (Euphorbiaceae). The seeds contain 50% of the fixed oil, which is a viscous fluid, almost colourless when pure, possessing only a slight odour. The oil acts as a barrier agent to protect against harsh climate, and is soothing to the skin. Castor oil forms a clean, light-coloured, transparent soap, which dries and hardens well and is free from odour (Matsumura, 2001). Ricinoleic acid and its many derivatives have skin smoothing and moisturizing qualities, and improve various skin conditions such as rough skin and acne (Miyahara and Sanbe, 2002). Hydrogenated castor oil and/or its esters, are useful as vehicles or carriers, emollients and solubilizers for toiletry, cosmetic, hair and skin care formulations, and are useful for cleansing and conditioning the skin (Sato, 2002).

Cocoa butter. Cocoa butter, from Theobroma cacao (Sterculiaceae) is particularly soothing after windburn or sunburn. It is used medicinally as a vehicle in suppositories and pessaries. Cocoa butter contains triglycerides consisting mainly of oleic, stearic and palmitic acids, and about three quarters of the fats are present as mono-unsaturates. Cocoa butter is used widely as an emollient and in various topical cosmetic preparations, and has been reported to be a source of natural antioxidants (Dweck, 1997b).

Mango. A part from its popular edible fruit, Mangifera indica (Anacardiaceae) also contains kernels that yield a valuable emollient oil rich in oleic, stearic acids and triglycerides, and is used in cosmetics (Aikawa, 2002). Mango kernel oil has been investigated for its suitability as an ointment base, and has been observed to release drugs at a remarkably greater rate than the standard paraffin-base ointment formulation. Mango leaves are claimed to possess antibiotic properties and are used in India to relieve the pain of scorpion stings, while the unripe fruit is claimed to help heal a wide variety of skin eruptions, ranging from leprosy and sores to boils (Dweck, 1997b).

Coconut oil. All parts of Cocos nucifera (Arecaceae) are useful. The oil from the nuts is valued as an emollient and used as an ingredient in remedies for skin protection of the skin hydration, and producing softening effects to skin and hair preparations is achieved using seed oils rich in fatty acids and triglycerides that reduce transepidermal water loss. Those plants with antiinflammatory properties often have a high level of flavonoids; those that are used to firm and tone the skin are rich in tannins which have an astringent effect; and for skin healing in the case of infections the use of plants with a number of antimicrobial and antifungal biocides is beneficial.

Dry skin treatment

The binding of water in the stratum corneum can become compromised and ineffective. In this case it is helpful to reduce the transepidermal water loss by applying occlusive films. There is no reason why mineral oil or petrolatum should not be used; however, the benefits of a natural vegetable oil may be preferred.
infections. Coconut oil (or butter) is extracted from mature coconuts that have fallen to the ground. It is stable at high temperatures (up to 76.6 °C). Modified coconut oil containing polyunsaturated fatty acids in the form of mono-, di- and triglycerides, is useful as a constituent of a barrier lipid mixture in cosmetic and pharmaceutical formulations to protect and prevent drying of the skin. Coconut oil was formerly the main ingredient in marine soaps because coconut oil soap was, unlike other soaps, not readily precipitated by salt solutions. However, because of its alkali laureate content some coconut oil soaps can irritate the skin (Dweck, 1997b).

**Sunflower oil.** Sunflower seeds from *Helianthus annuus* (Compositae), contain polyunsaturated fats, rich in triglycerides of linoleic acid, an essential fatty acid needed by the body to maintain good skin condition. Studies indicate that cutaneous application of the sunflower oil increases the linoleic acid levels of the skin, lowers transepidermal water loss, and helps to eliminate Scaly lesions common in patients with essential fatty acid deficiency. Sunflower oil is used for psoriasis, and on bruises (Dweck, 1997d). A new sunflower-hybrid oil with excellent oxidative stability and a high oleic acid content, can be used as a natural and functional raw material in cosmetic preparations (Brown et al., 1993).

**Olive oil.** Since ancient times people have used *Olea europaea* (Oleaceae) fruit and oil; the ancient Greeks used to bathe with olive oil. It has been used to moisturize dry skin, and as a lip balm, shampoo, hand lotion, soap, massage oil and dandruff treatment (Bruneton, 1999). Olive oil contains fatty acids, triglycerides, tocopherols, squalene, carotenoids, sterols, polyphenols, chlorophylls, volatile and flavour compounds. The extracts of mixtures of olive fruits, leaves and stems show antiinflammatory and active oxygen scavenging effects (Tehara and Hachimaki, 2002).

The antiinflammatory effect is exerted by both unsaponifiable and polar compounds (De la Puerta et al., 2000), while the free radical-scavenging effect of virgin olive oil is due to the presence of polyphenols (Perricone, 2001; Manna et al., 1999). It is applied topically to treat skin damage, such as contact dermatitis (particularly diaper area dermatitis), atopic dermatitis, xerosis, eczema (including severe hand and foot eczema), rosacea, seborrheoa, psoriasis, thermal and radiation burns, other types of skin inflammation and aging (Perricone, 2001). When the oil is topically applied after UVB exposure it can effectively reduce UVB-induced skin tumours, possibly via its antioxidant effects (Budiyanto et al., 2000). Adverse cutaneous reactions to topically applied olive oil are seldom reported, but olive oil is considered in general as very weakly irritant (Kranke et al., 1997).

**Eczema**

Eczema or atop dermatitis is a skin condition characterized by redness, swelling, scaling and itching.

**Turmeric.** Turmeric is the processed rhizome of *Curcuma longa* L. (Zingiberaceae). The rhizome is the portion of the plant that is used medicinally; it is usually boiled, cleaned and dried, yielding a yellow powder. The major component is curcumin, which is responsible for most of the biological activities. The literature indicates a great variety of pharmacological activities of turmeric or curcumin, such as antibacterial, antiparasitic, anti-HIV (human immunodeficiency virus effects) (Mesa et al., 2000; Mazumder et al., 1995). It appears to have a good potential as a wound healing powder when applied externally to septic and aseptic wounds (Phan et al., 2001), due to proven anticarcinogenic (Ozaki et al., 2000; Aruna and Sivaramakrishnan, 1996; Huang et al., 1991, 1988), antioxidant and inhibition of lipid peroxidation (Phan et al., 2001; Sciartezzini and Speronti, 2000; Unnikrishnan and Rao, 1995; Pulia Reddy and Lokesh 1994; Sreejayan Rao, 1994) and antiinflammatory properties with few toxic effects (Rao et al., 1982). It is also used for prevention, treatment or control of psoriasis and other skin conditions such as acne, wounds, burns, eczema, sun damage to the skin and premature aging, due to inhibiting the activity of phospholipase kinase (Heng, 1999).

In Ayurvedic medicine, turmeric is used for the treatment of sprains and swellings caused by injury (Ammon and Wahl, 1991). The people of Samoa sprinkle the powdered rhizome on newborn infants to help heal a recently cut umbilical cord, to prevent nappy rash from occurring and to keep the skin soft and resilient. The powder is also used as a paste or poultice to treat skin ulcers and to help heal extensive skin eruptions (Shah, 1982; Uhe, 1974).

**Acne, spots and pimples**

Acne is a skin condition that affects sweat glands and hair follicles, causing inflammation, black heads, white heads and pustules. If blemishes are deep they can leave scars and pitting, which can be distressing and disfiguring.

**Artemisia.** *Artemisia vulgaris* and *Artemisia absinthum* (Compositae) are used traditionally in Philippines for skin diseases and ulcerative sores. The entire plant is made into a decoction and is used as a wash for many kinds of wounds and skin ulcers. The dried leaves, cut into small fragments, are used to help induce more rapid healing of wounds, and are used in eczema, herpes and prurulent scabies (Dweck, 1997b). Water extracts from *A. campestris* L. have antioxidant effects (Aniya et al., 2000).

**Basil.** Its Greek name, *Basileus*, means ‘king’, indicating its ‘royal’ position among the herbs, and *Ocimum sanctum* (Labiatae) is a powerful medicinal plant. The fixed oil possesses both antiinflammatory and antitulcer activities, and the linolenic acid present has the capacity to block both the cyclooxygenase and lipooxygenase pathways of arachidonate metabolism, which could be responsible for the antiinflammatory activity of the oil (Singh and Majumdar, 1999; Singh and Majumdar, 1997). Since antibacterial activity at fairly low dilutions is known to be present in this family, and in different basil species (Koga et al., 1999; Lachowicz et al., 1998; Sivropoulou et al., 1996), basil oil from *O. gratissimum* leaf is used as an antibacterial treatment for acne.
(Orafidiya et al., 2002). O. basilicum has also mildly antiseptic and antimicrobial activities (Lachowicz et al., 1998).

**Pea.** Pisum sativum (Leguminosae) has been used in the treatment of acne. The seeds contain proteins, lecithins, carbohydrates, fats and salts, and are nutritive and antidermatoses. They are claimed to have effects on many types of skin complaint, and for example face masks made from crushed peas are used in cases of acne and on wrinkled skins (Dweck, 1997c).

**Pumpkin.** Fatty acids isolated from Cucurbita pepo (Cucurbitaceae) seed oil, have been used in medicine for their antifungal properties, and include mainly linoleic, followed by oleic, palmitic and stearic acid (Nesterove et al., 1990; Akhtar et al., 1980). The people of Central America and India rub the oil extracted from the seeds of pumpkin on herpes lesions, venereal sores, acne vulgaris and stubborn leg ulcers which refuse to heal up. Pumpkin leaves are also applied as a poultice on sprains and pulled ligaments. The roots are made into an infusion and used on syphilitic sores, herpes lesions, pimples and blackheads (Morton, 1981).

**Onion.** The common red onion, Allium cepa (Liliaceae), has been used traditionally for its beneficial effects when used externally as a poultice for acne, boils, abscesses and blackheads to draw out the infection, decrease inflammation and speed healing. Studies have found that onions possess antiallergic and antinfiammatory effects due to the presence of flavonoids (quercetin and kaempferol) (Griffiths et al., 2002; Dorsch, 1996; Dorsch et al., 1990; Dorsch and Ring, 1984; Middleton, 1984), and in addition, onion juice has antimicrobial (Dorsch, 1996; Arunachalam, 1980) and antifungal effects (Conner and Buczak, 1984). In Africa, onion juice is applied to burns and scalds to prevent blistering and infection, and in East Africa the skin of the onion has been used as a dressing on facial and body sores (Dweck, 1997c).

**Antiaging skin treatment**

The primary environmental factor that causes human skin aging is UV irradiation from the sun (Fisher et al., 2002). Changes due to aging in the skin, in which degenerative changes exceed regenerative changes, are characterized by thinning and wrinkling of the epidermis together with the appearance of lines, creases, crevices and furrows, especially accentuated in lines of facial expression. The reason for the readily apparent surface morphological alterations is the result of changes in the underlying dermis, characterized by the loss of collagen and elastin fibres, with lessened support of epidermal layers, and lessened circulatory perfusion. Many so-called ‘antiaging’ actions of topically applied materials are nothing more than transient hydrational/moisturizing effects, which, while lessening the prominence of undesirable surface defects and blemishes, do nothing to alter the dermal losses. True ‘antiaging’ actions would require evidence for the reversal of the regenerative/degenerative balance, exemplified by increased collagen and elastin synthesis, thereby restoring toward normal the regenerative/degenerative equilibrium.

**Ginseng.** Ginseng is an important traditional drug used for more than 2000 years. Korean ginseng, Panax ginseng C.A. Meyer (Araliaceae), is physically and chemically different from ginseng grown in other countries. Studies reported that it can activate the skin’s metabolism (Tanaka and Okada, 1991), reduce keratinization (Kim et al., 1989), provide moisture and soften (Curri et al., 1986; Gezzi et al., 1986), alleviate wrinkling and enhance skin whiteness. The major effects are thought to be due to enhanced skin nutrition as a result of stimulation and increase in blood circulation and cell proliferation, resulting in increased metabolism which leads to an ‘antiaging’ effect (Lee et al., 1997). Many studies indicate that the ‘antiaging’ activity is due to free radical scavenging action of the ginseng saponins (ginsenosides) and inhibition of lipoperoxidation (Pan et al., 1993; Liu and Xiao, 1992; Choi and Byun, 1986; Choi and Oh, 1985; Choi and Oh, 1984).

**Free-radical scavenging effects**

Most plant extracts that scavenge free radicals contain phenolic derivatives, such as tannin and flavonoids. The number and location of the phenolic hydroxyl group on these chemicals are important factors determining the level of scavenging activity (Pietta, 2000; Pathak et al., 1991).

**Tea.** Camellia sinensis (Theaceae) yields both black (red) and green tea. Black tea results from tea leaves that have undergone a fermentation process, while to produce green tea, the leaves are steamed immediately after harvest and then dried. Tea contains more than 500 chemical compounds, including tannins, flavonoids, amino acids, vitamins, caffeine and polysaccharides. The amount of vitamin C in 100 g of green tea is about 100 mg, which is similar to that found in lemons. In black tea, however, more than 90% of the vitamin C is destroyed during the fermentation process. Green and black teas contain similar amounts of vitamin B6 (nicotinic acid), vitamin E and vitamin K (Pietta et al., 1998; Lee et al., 1997). Tea flavonoids (polyphenols) have proven antiinflammatory, antioxidant, antiallergic, antibacterial and antiviral effects, while the tea tannins have antiseptic and antioxidant effects (Katiyar and Elmets, 2001; Schreiner et al., 1999). Tea root extract contains saponins that possess antiinflammatory and antioxidant effects (Sur et al., 2001).

**Green tea.** The major active ingredients in green tea are the polyphenols. Catechins are the most important polyphenols in green tea; others include flavandiols, phenolic acids and flavonoids. Green tea is now the subject of a lot of attention for its proven antioxidant properties (Katiyar and Elmets, 2001; Miyazawa, 2000; Pietta et al., 1998; Mitscher et al., 1997; Fourmoue et al., 1996), for its ability to repair UV photo-damage and phototoxicity (Elmets et al., 2001; Katiyar and Elmets, 2001; Zhao et al., 1999a; Lee et al., 1997). It is useful also for the prophylaxis, treatment and/or care of dry skin conditions, by stimulating the formation of ceramides and sphingolipids in the skin and thus reinforcing the lipid barrier (Schreiner et al., 1999), and its antiinflammatory and anticarcinogenic potential can be exploited against a variety of skin disorders (Katiyar et al., 2000).
Black tea. Black tea extracts contain polyphenols in a lower amount, and show a rather weaker protective effect against free radicals than green tea, but are still considered to be a good antioxidant (Halder and Bhaduri, 1998; Yokozawa et al., 1998). Using both oral and topically applied, standardized black tea extracts showed a decrease in photochemical damage to the skin. Studies indicate that when green tea is oxidized to black tea, the extracts remain beneficial in preventing the early signs of UV B–induced phototoxic effects, namely, sunburn and skin thickness (Zhao et al., 1999b).

Grape seed. The seeds of Vitis vinifera L. (Vitaceae) and its many varieties contain polyphenolic proanthocyanidins, which in turn can bind to each other to form oligomers known as procyanidins. These procyanidins are strong antioxidants (compared with vitamin C and E), by inhibition of lipid peroxidation (Yu et al., 2001; Pietta et al., 1998; Bagchi et al., 1997; Bombardelli and Morazzoni, 1995; Maffei et al., 1994), facilitate wound healing and protect collagen and elastin from degradation (Maffei et al., 1994). Grape seed extracts show tyrosinase-inhibiting activity, and are useful in antiaging and skin-lightening cosmetics (Tokutake and Yamakoshi, 2001; Lee et al., 2000).

Antiinflammatory effects

The inflammatory response is a common feature in many diseases, and its control is of relevance in the treatment of these pathologies. There are several herbal drugs used for their antiinflammatory properties.

Red clover. The antiinflammatory effect of Trifolium pretense L. (Fabaceae) is employed traditionally for multiple skin conditions such as psoriasis, eczema, acne and rash. Isoflavones from red clover flower applied topically offer protection from UV irradiation in hairless mice after UV exposure, reducing the inflammatory oedema reaction, and suppression of contact hypersensitivity induced by moderate doses of solar-simulated UV radiation. Lotions containing equol (an isoflavone from red clover) more readily protect the isoflavone from red clover flower applied to the formulation of creams, lotions, soaps, lipsticks and other preparations designed to be spread onto the skin or hair; since it is an effective, non-greasy lubricant. Screening of the oil revealed that it has a significant antiinflammatory activity of chamomile extract by inhibiting leukotriene synthesis and additional anti-inflammatory properties, and so reduce itching and improve the speed at which damaged skin heals by local administration. Alpha bisabolol (levomenol) and chamazulene contribute to the antiinflammatory activity of chamomile extract by inhibiting leukotriene synthesis and additional anti-oxidative effects (Safahyi et al., 1994; Wagner et al., 1986). Both German and Roman chamomile are considered safe, although some allergies have been reported, mainly in people who are sensitive to the pollen of the flowers or to the Compositae family (Carle and Gomaa, 1992).

Fenugreek. Trigonella foenum-graecum L. (Fabaceae) is a fragrant herb whose seeds have been used medicinally all through the ages, by Egyptians, Greeks, Romans and among others, for medicinal and culinary purposes. The seeds possess antioxidant effects (Ravikumar and Anuradha, 1999), and contain a mucilage which has emollient properties. In traditional use, fenugreek treats severe skin inflammations, chapped lips and mouth ulcers (Dweck, 1997a).

Jojoba. Jojoba oil (Buxus chinesis or Simmondsia chinesis (Link.) C. Schneider, family Buxaceae), provides a broad spectrum of fatty acids such as oleic, linoleic, linolenic and arachidonic, as well as triglycerides which have good compatibility with the natural sebum in the skin (van Boven et al., 2000; van Boven et al., 1997). Jojoba oil is derived from the cold-pressed, peanut-sized seed of this desert shrub. When the seeds are expressed, they yield about 50% of liquid wax known commonly as jojoba oil, which is a rich extract used in cosmetic preparations, not only acting as a humectant, but creating a protective film over the skin that keeps in moisture (Dweck, 1997d). Jojoba oils and hydrogenated jojoba oils may be useful in the preparation of future skin care products (Arquette et al., 1998), as in the formulation of creams, lotions, soaps, lipsticks and other preparations designed to be spread onto the skin or hair; since it is an effective, non-greasy lubricant. Screening of the oil revealed that it has a significant analgesic, antipruritic, antiinflammatory, antioxidant, antibacterial and antiparasitic properties (Bruneton, 1999; van Boven et al., 1997).

Licorice root. Glycyrrhiza glabra L. (Fabaceae) has been widely used as a drug all over the world. The root contains 5%–10% glycyrrhizin, a sweet tasting substance with poor solubility in blood compared with saponins in general. Licorice is a good antiinflammatory agent (Lee et al., 1997), due to the presence of glycyrrhetic acid which is mainly used topically for its antiinflammatory properties, and for the symptomatic treatment of moderate inflammation without secondary infection (Olukoga and Donaldson, 1998). Licorice is also used for skin irritations and in cosmetics for acne and sunburn (Marks, 1997).

Skin protection

Aloe vera. One of the most widely used herbal preparations for the treatment of various skin conditions is aloe gel obtained from Aloe vera (L.) Burm. f. or Aloe barbadensis Miller. (Asphodelaceae). This is the mucilaginous gel obtained from the cells making up the
inner portion of the leaf, and should not be confused with the bitter yellow latex or juice that is derived from the pericyclic tubules occurring just beneath the epidermis of the leaves. The use of aloe gel and preparations containing it has become widespread and consequently a large industry has developed (Bruneton, 1999; Reynolds and Dweck, 1999). Little is known about the identity and stability of the ingredients responsible for these or most of its other effects. Aloe's benefits can be attributed at least partly to its nutrients, since it contains proteins, carbohydrates (including mucopolysaccharides), vitamins (including B1, B2, B3, B6, C, and folic acid) and minerals. These nutrients, although beneficial individually, may work synergistically to soothe, heal, moisturize and regenerate the skin (Davis et al., 1989a; Zawahry et al., 1973).

Aloes gel can be applied topically as an emollient for burns, sunburn and mild abrasion, and for inflammatory skin disorders (Davis et al., 1994a,b; Shelton, 1991). It has antibacterial, antifungal, antiviral (Reynolds and Dweck, 1999; Klein and Penneys, 1988), antioxidant, antihistamine and antiinflammatory effects (Davis et al., 1994a; Udupa et al., 1994; Heggers et al., 1993; Davis et al., 1989b). More speculative is the presence of salicylates, implicating an aspirin-like effect (Klein and Penneys, 1988). Aloe gel is also described in the popular literature as a cleanser, anaesthetic, anti-ptic, antipyretic, antirpiritic, nutrient, moisturizer and is said to promote cell proliferation. Extracts of A. vera possess activities that reverse the degenerative skin changes seen with aging by stimulating the synthesis of collagen and elastin fibres (Davis et al., 1994a). No sunscreen activity was found, but the effects of exposure were less deleterious following gel application up to 48 h after exposure and the gel restored the activity of various epidermal cells that were reduced by UV exposure (Strickland et al., 1994).

Aloe gel is used externally for its wound healing properties and is supported by clinical investigation. The action of the gel as a moisturizing agent is still a popular concept and may account for much of its effect (Reynolds and Dweck, 1999; Wenker 1999; Davis et al., 1994a; Heggers et al., 1993; Shelton, 1991; Meadows, 1980). Acting by various mechanisms, Aloe vera may keep the wound moist and at the same time allow oxygen to penetrate the wound, adding to regeneration (Davis et al., 1994a,b; Davis et al., 1989a; Zawahry et al., 1973). Thus Aloe sooths, cools and seals in moisture, due to its high water and mineral content which make it ideally suited for use as a skin cream, and it can be found in a number of commercial beauty aids and suntan lotions. Its softening powers have recently been found to be helpful in breaking down calluses and blisters (Davis et al., 1989a; Zawahry et al., 1973).

Polysaccharides are a group of gel constituents to which activity has been ascribed (Reynolds and Dweck, 1999; Agarwala, 1997; Davis et al., 1994a,b), and many studies suggest that the mucopolysaccharides are responsible for the wound-healing activity of Aloe gel because they act as a growth factor and stimulate fibroblasts (connective-tissue cells) to produce more collagen, which in turn increases the remodelling of the wound and fills in the wound area (Davis et al., 1994a,b; Davis et al., 1989a; Zawahry et al., 1973). There have been a few reports of contact dermatitis and burning sensation following topical application of A. vera gel to demabraded skin, but these reactions could be due to anthraquinone contaminants (Reynolds and Dweck, 1999; Hoermann and Korting, 1994; Shelton, 1991; Hunter and Frumkin, 1991).

**Oats.** People have been eating Avena sativa L. (Graminae) and oat products since the first century, but the therapeutic uses of oats are sparsely documented (Paton et al., 1995). Today, for a specific application, cosmetic chemists obtain better benefits by using oat fractions than by using entire oatmeal. These materials are safe and non-irritating, and have excellent cosmetic stability. Derived from natural renewable resources, they protect and repair the skin and hair from damaging environmental effects such as UVA/UVB irradiation, pollution, smoke, bacteria and free radicals and reduce discomfort, irritation and inflammation of the skin. They also help to repair damage from other chemicals such as AHA (alpha-hydroxy acids), surfactants and bleaches (Hart et al., 1998).

**Oatmeal** has a history of cosmetic use in facial masks and as an additive in bath soaps to relieve irritation or itching. It has been suggested for the treatment of geriatric dermatosis, eczema and sunburn because of its hypoallergenic properties (Meister, 1963). **Bran** is described as colloidal oatmeal, and the FDA agrees that there is sufficient evidence supporting the general recognition of colloidal oatmeal as a safe and effective skin protectant based on its ability to impart both soothing, moisturizing and an antiirritating effect. Such properties may prove useful in skin treatment products, such as facial masks, facial scrubs and soap-free skin cleansers (Paton et al., 1995). Data from clinical studies indicate that oat extract serves as a powerful antioxidant against UV and chemically induced irritation. In vitro studies show that oat extract can significantly reduce the damage associated with UVA/UVB irradiation (Hart et al., 1998). **Oat flour** has a moisturizing effect due to its lipid content and its hydrating characteristics. The use of oat oil as an ingredient in personal-care products is a natural extension of the historical use of oatmeal and oatmeal fractions for improving the skin. Prepared from native oats, its ability to emulsify large quantities of water in oil makes it a powerful vehicle for hydrating and moisturizing epidermal layers. The scientific literature suggests that oats contain a number of naturally occurring antioxidants, and these are present in oat oil. Phenolic and hydroxyphenolic compounds have been identified in the extracted oil, in addition to tocopherol isomers (Dull, 1997). **Hydrolysed oat protein,** due to its low molecular weight, will penetrate the hair shaft and form a thin protective film on hair and skin (Hart et al., 1998). It is incorporated in baby cleansing products (shampoos, lotions, moisturizing baby bath, etc.), because of its moisturizing and antiirritant effect (Loncar, 1996). **Oat β-glucan** is a linear unbranched high molecular weight polysaccharide, which can alleviate extrinsic signs of aging, protect against UV damage, stimulate metabolic activity, activate collagen synthesis, and improve the tensile strength of hair (Hart et al., 1998). A combination of the β-glucan and the hydrolysed oat protein is used to moisturize and soothe the skin and to reduce redness from abrasion. Oat flour is a natural emulsifier that also helps impart body to the cream, and the β-glucan builds viscosity and moisturizes the skin (Paton et al., 1995).
Cucumber. Cucumber or Cucumis sativa Linn. (Cucurbitaceae), is cooling, healing and soothing to irritated skin, whether caused by sun, or the effects of a cutaneous eruption. In cosmetic preparations for the treatment of hyperpigmentation, both cucumber extract and lemon extract are used. These two ingredients do not appear to interfere with each other, and instead provide increased lightening capabilities (Majmudar and Rogers, 1999). Reports indicate the presence of antioxidant enzymes and superoxide dismutase in the peeled pericarp of cucumber (Kim et al., 1998a), while peroxidase (I) activity in fresh cucumber fruit was highest in the skin, followed by pericarp and then carpel tissues (Miller et al., 1990). Although it is frequently used in cosmetic products, more studies are needed to assess its healing and antioxidant effects.

Dandruff treatment

Dandruff is a major problem, yet little is known about the underlying mechanism and subsequent biochemical changes that occur in the scalp skin and lead to its manifestation. The characteristic flaking and scaling of the scalp experienced by dandruff sufferers suggests that the desquamation process is impaired. Dandruff is also associated with a dramatic decrease in free lipid levels, with significant decreases in ceramides, fatty acids and cholesterol. Thus the epidermal water barrier is impaired in the scalp of dandruff sufferers, and the perturbed barrier leaves sufferers more prone to the adverse effects of microbial and fungal toxins, and environmental pollutants, thus perpetuating the impaired barrier (Harding et al., 2002).

Traditionally Sage (Salvia officinalis L.) is an old favourite for dandruff, loss of hair and greasy hair and skin. An extract of sage massaged into the scalp can control dandruff, falling hair or loss of hair if the papilla is dormant and not destroyed. Rosemary is claimed to be a conditioner for greasy hair, a rinse and a tonic that gives body and sheen to hair, and infused fresh or dried rosemary and sage can be used as a daily rinse for dandruff treatment. Thyme or Thymus vulgaris L. (Labiatae) is also claimed to inhibit dandruff, and used in a scalp rub it prevents hair falling out, and rinses containing rosemary and thyme promote natural hair health. In folk medicine Garlic or Allium sativum L. (Liliaceae) lotion can help to control dandruff. It has been used since ancient times as a vegetable with many properties, including antiseptic, tonic, antioxidant, antiinflammatory (Agiga and Seki, 2000), antibacterial and antifungal effects (Ankri and Mirelman, 1999; Hughes and Lawson, 1991). Garlic should not be placed directly on the skin since it may cause blisters and a burning sensation in some people or contact dermatitis and allergic reactions in others (Siegens, 1992). English Walnut or Juglans regia L. (Juglandaceae), leaves are used in traditional medicine for external applications such as eczema, acne, loss of hair, scalp itching, peeling and dandruff; and as an adjunctive emollient and antinflammatory and antiallergic action and analgesic effects (Yonenaga, 2001; Ali et al., 1995).

Sage has been regarded as a healing herb for many centuries, and there are now over 500 species of Salvia, the species officinalis being the most important for culinary purposes. Salvia officinalis L. (Labiatae) also called ‘common sage’, ‘true sage’ or ‘garden sage’ is used as a lotion to improve the condition of hair and skin. Claims of its use, alone or with rosemary, to maintain the sheen of dark curly hair, and to strengthen and stimulate hair growth have been made (Dweck, 1997b). The major S. officinalis constituents responsible for the effect on hair are the tannins, saponins, as well as borneol and camphor (Boiceanu et al., 1986).

Rosemary or Rosmarinus officinalis Linn. (Labiatae) is an aromatic herb surrounded by tradition and legends but with important culinary, medicinal and cosmetic properties. In folk medicine it is used to stimulate growth of hair as a rinse. The most important constituents of rosemary are thought to be caffeic acid and its derivatives such as rosmarinic acid; these compounds have antioxidant effects (Aruoma et al., 1996).

HAIR CARE

Plant materials can be used as hair growth stimulation, hair colorants and dyes, and in a number of hair and scalp complaints such as dandruff.

Hair growth stimulants

Recently, various plant extracts have been patented for use in hair-growth or hair-tonic products, and for the prevention of alopecia. The patents claim that the effects are due to stimulation of the hair follicle or scalp metabolism, possibly due to an acceleration of blood circulation, activation of dermal papilla, antitestosterone action, or increased nutrition to the hair follicles through accelerated blood flow, but the mechanisms are not yet clear (Lee et al., 1997; Kameyama, 1995).

It was discovered that proanthocyanidins extracted from grape seeds promote proliferation of hair follicle cells in vitro and that they possess remarkable hair-cycle-converting activity from the telogen phase to the anagen phase in vivo (Takahashi et al., 1998). Studies suggested that Ginkgo biloba leaf extract also promotes hair regrowth, through combined effects on proliferation and apoptosis of the cells in the hair follicle, thus suggesting potential as a hair tonic (Kim et al., 1998b; Kobayashi et al., 1993). Other plants such as henna, aloe, rosemary and sage are claimed to have effects on hair growth, but still need more study and clinical trials to substantiate their folk medicine use.

A. vera L. or A. barbadensis gel is used traditionally for hair loss, and for improvement in hair growth following alopecia (Grindlay and Reynolds, 1986). Aloeninf is the major constituent responsible for promoting hair growth without irritating the skin (Inaoka et al., 1988). Aloe vera has been cited as a treatment for brittle hair, but with no evidence to substantiate this claim.

Henna or Lawsonia alba L. (Lythraceae) has been cited as a growth accelerator and was used in an ancient Egyptian formula to cure the loss of hair (Dweck, 1997b). The incidence of contact dermatitis appears to be extremely rare with the use of henna (Garcia et al., 1997), since henna leaf extracts have mild antinflammatory and antiallergic action and analgesic effects (Yonenaga, 2001; Ali et al., 1995).

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itch-relieving treatment in skin disorders; as a trophic protective agent for cracks, abrasions, frostbite, chaps and insect bites to treat sun burns and for nappy rashes (Bruneton, 1999). *Juglans nigra* refers to the Black walnut, whose bark is used for dandruff and other scalp problems.

**Hair colouring**

Vegetable dyes can usually be recommended to patients sensitized to oxidative dyes, due to their low allergenic power (Garcia *et al.*, 1997). The use of natural dyes on the hair has not made great progress and this is due firstly, to the fact that natural dyes are not very stable in solution, and are prone to oxidation, discolouration, pH colour shift and fading. Secondly, a single natural dye may not give the right colour, and only henna or walnut seem to be suitable to colour the hair. However, many shades can be obtained by mixing with the leaves of other plants.

The leaves of *Lawsonia inermis*, known as henna, has been applied since ancient times for decorating and dyeing hands and feet, to impart shades of dark red, and for the treatment of certain skin disorders. The compound lawson, a brown powder isolated from the leaves, is responsible for the red colour in henna. It is used as a staining agent, due to the strong binding of lawson to the hair, probably upon reaction of thiol groups with keratin (Ali and Sayeed, 1997). If the hair is dyed with henna and then treated with a hot decoction of *Allium cepa* (onion) skin, a coppery colour will be obtained. The incidence of contact dermatitis from using henna appears to be rare but possible (Garcia *et al.*, 1997). A dull golden yellow colour is obtained using apigenin, a flavonoid which occurs widely in plants, with regard to how they interrelate with the human body.

Physiological benefits

Many essential oils have antinflammatory effects, such as bisabolol, found in chamomile and the volatile oil of turmeric (Purohit and Kapner, 1994; Rao *et al.*, 1982). Essential oils also possess bactericidal effects, such as the essential oils of *Artemisia afra*, *Pteronia incana* and *Rosmarinus officinalis* (Mangena and Muyima, 1999; Baratta *et al.*, 1998a,b; Fyfe *et al.*, 1998; Tassou *et al.*, 1995; Deans *et al.*, 1992; Deans and Ritchie, 1987), antiviral (Hayashi *et al.*, 1995), antioxidant (Deans *et al.*, 1992) and anticancer activities (Aruna and Sivaramakrishnan, 1996; Hallat *et al.*, 1995). Buchbauer and Jirovetz (1994) surveyed the uses of fragrances and essential oils, and found that physiological effects on humans included brain stimulation, anxiety-relieving sedation and antidepressant activities, as well as increasing the cerebral blood flow.

Psychological benefits

Traditional aromatherapy often divides aromatic oils into those which are *yin* (passive, calming) and those which are *yang* (active, stimulating). Although
this is neither a scientific nor exclusive definition, in balance, every oil is considered either more stimulating nor more calming (Purohit and Kapsner, 1994). Studies describe the effects of odours on memory and mood, since the fragrance compounds are absorbed by inhalation and are able to cross the blood-brain barrier and interact with receptors in the central nervous system (Buchbauer and Jirowetz, 1994; Purohit and Kapsner, 1994).

**Cosmetic benefits**

Studies have documented that the preservative system in a cosmetic can be augmented by using a blend of natural essential oils having antibacterial properties, but the efficacy of the oils differs and depends both on the type and concentration of the oil, as well as the test microbial strain (Mangena and Muyima, 1999; Purohit and Kapsner, 1994; Muenzing and Schels, 1972). Essential oils are used in perfumes, skin formulations and hair care products to provide conditioning and a pleasant aroma and shine (Purohit and Kapsner, 1994). Cosmetics can also contain essential oils as cooling agents (e.g. menthol, camphor, mint and eucalyptus oil) and menthol derivatives (e.g. menthyl lactate, menthoxypropandiol, menthyl hydroxybutyrate, menthoxyfuran and menthyl glucoside) which give a long-lasting refreshing feeling to the skin (Ito and Nagai, 1994).

**Safety guidelines**

Most essential oils are generally recognized as safe by the Food and Drug Administration (FDA) of the United States, and are classified as natural products. Recommendation on usage levels of essential oils are given by the Flavour and Extract Manufacturers Association (FEMA), the British Essence Manufacturers Association (BEMA), the International Organization of Flavour Industries (IOFI), the Research Institute for Fragrance Materials (RIFM), the International Fragrance Association (IFRA), the International Federation of Essential Oils and Aromas Trades (IFETAT) and the British Essential oil Association (BEAO). The International Standards Organization (ISO) has also issued guidelines for the safe handling of essential oils, which covers packaging, marking and labelling requirements (Barel et al., 2001; Korwek, 1986).

**Perfumery**

Perfumery is the main application of essential oils, concretes, absolutes and other resinoids from plants. The word perfume is derived from the Latin words 'per'flum' which literally means 'through smoke', as this was how these early fragrances were perceived. Historically, a very simple method of obtaining perfume was to soak flower petals in fat, to produce a perfume saturated in fat, known as pomade (Barel et al., 2001). The admiration of flower fragrance rapidly turned volatile substances into a high-impact commercial commodity. For many years, research into floral fragrance focused on its chemical elucidation, coupled with chemical synthesis to produce the large quantities demanded by the perfume and food industries. Flower extracts such as rose, tuberose, narcissus, gardenia and Lavandula officinalis absolutes and concretes are used for perfumery, cosmetics and as therapeutic fragrances. Perfumes are heavily used in two main categories of products which are toiletries (including personal care products, fine fragrances, cosmetics, bath products, deodorants, hair products, etc.), and household products (including air fresheners, laundry products, washing liquids, surface cleaners and disinfectants).

Perfumery ingredients of natural origin come from essential oils. Essential oils themselves can be considered as creative fragrances, as they contain hundreds of perfectly blended ingredients which, when added to a fragrance composition, improve the odour. Although modern fragrance compounds rely heavily on the impact and longevity that can be achieved with synthetics, many successful fragrance compounds still contain significant quantities of naturally occurring essential oils (Barel et al., 2001).

**Hair care**

Essential oils when incorporated in a hair care product will impart shine and conditioning effects. They are used in a patented permanent waving systems; since certain oils possessing ethenolically unsaturated bonds, incorporated into the neutralizer formula, attach to the hair during reformation of disulfide (cystine) bonds. This helps to provide not only hair conditioning and improvement in the hair texture, but also a longer lasting pleasant aroma, which eliminates the negative odour of the perm lotion (Purohit and Kapsner, 1994). The hair can also be enhanced by the use of a few drops of essential oils in the final hair rinse or added straight to a mild shampoo. Oils such as rosemary, West Indian bay and chamomile all help to condition and encourage healthy hair growth; lavender can be used to repel lice and fleas; while bergamot and tea tree can help to control dandruff.

**Aromatic skin care**

Skin problems are often the surface manifestation of deeper conditions, such as a build-up of toxins in the blood, hormonal imbalance or nervous and emotional difficulties. In this area the versatility of essential oils is particularly valuable because they are able to combat such complaints on a variety of levels. Since essential oils are soluble in oil and alcohol and impart their scent to water, they provide the ideal ingredient for cosmetics and general skin care as well as for the treatment of specific diseases. Essential oils are effective when used topically; they are made up of very small molecules that actually penetrate through the skin, and act by means of their lipophilic fraction reacting with the lipid parts of the cell membranes.

**Citrus oils**

When fruits are juiced, the peel oils from the rind are pressed and collected. These oils, whether they are from...
oranges, grapefruits, tangerines, lemons or limes are complex mixtures of acids, alcohol, aldehydes, esters, ketones and hydrocarbons. These components possess pleasant flavour and fragrance and are used to impart aroma and taste to a variety of products. The ‘Citrus spp.’ is a genera within the Rutaceae family which are among the leaders in the world market for essential oils, and are widely used in personal perfumes, where they are used pure or, more frequently, combined with synthetic molecules. The citrus by-products are natural, biodegradable and relatively non-toxic. For all those reasons, the Food and Drug Administration (FDA) gives d-limonene and citrus oil a ‘generally recognized as safe’ (GRAS) classification. Given the versatility and composition of citrus oils, they can be adapted to the cosmetic industry. Among different types of citrus oils and aromas collected during the juice processing, only cold pressed oil, folded oil and food grade d-limonene are currently used in the cosmetic industry (Boelens, 1991). D-limonene is found in all citrus fruit peel oils, and is used in a wide range of cleaning applications (Dellutri, 1986). Oxidized citrus oil (R-limonene), is a frequent skin sensitizer, since d-limonene oxidizes on air exposure and during handling and storage (autoxidation) and allergenic oxidation products are formed (Matura et al., 2002; Skold et al., 2002).

There is evidence that a compound isolated from lemon (Citrus limonum (L.) Burm. f.) oil, which is called Lem1, is endowed with a strong antioxidant activity and that it is capable of inhibiting free radical-mediated reactions, evaluated by both in vitro and in vivo biochemical systems (Calabrese et al., 1999). Sweet orange (Citrus sinensis [L.] Pers.) oil is composed largely of terpene hydrocarbons which is a source of flavour and fragrance compounds (Shen et al., 2002), it has more than 90% limonene and although it is primarily used in flavours, it does find a use in Eaux des Cologne and soap fragrances. Grapefruit (Citrus paradisica Macf.) oil is chemically similar to orange oil but it has a distinctive smell which is largely attributed to a ketone called nootkaton. Grapefruit oil does not find very wide use in perfumery (Barel et al., 2001).

Chamomile oil

It has been mentioned before that the ability of chamomile to reduce inflammation is one of its most highly prized features due to the presence of flavonoids. It is safe for skin care, and it is also credited with a gentle analgesic effect. Its effects as anti-inflamatory, anti-erythema and anti-pruritic, at the same time as being gentle, soothing and anti-septic (Safahey et al., 1994; Carle and Gomaa, 1992; Wagner et al., 1986; Aggag and Yousef, 1972), may help in whitening age spots, take the soreness out of a boil, minor wound, burn, or an insect bite, or used for dry skin, windburn, sunburn, or even chronic skin conditions such as acne and psoriasis (Carle and Gomaa, 1992).

Geranium oil

Pelargonium graveolens (L.) L. Her. ex Ait (Geraniaceae), obtained through steam or water plus steam distillation of shoot biomass, is extensively used in the fragrance industry and in aromatherapy (Rao et al., 2002). Geranium oil is a cleansing, toning and sharpening oil and is so helpful with those problems that come with greasy, over-oily skin, acne, congested skin and eczema. Care should be taken since there is the possibility of contact dermatitis in hypersensitive individuals. It is a very important component of high grade perfumes due to its strong rose-like odour (Parameswaran et al., 2000).

Lavender oil

Essential oils distilled from members of the genus Lavandula have been used both cosmetically and therapeutically for centuries. It is extensively employed in all types of soaps, lotions and perfumes, with the most commonly used species being Lavandula angustifolia, L. latifolia, L. stoechas and L. x intermedia. Among the claims made for lavender oil are that it is antibacterial, antifungal and effective for burns and insect bites (Cavanagh and Wilkinson, 2002; Boelens, 1995). This oil in the herbal tradition is said to encourage cell growth and so should be used to help with mending and regeneration in all kinds of skin ailments: bites, stings, boils, burns, stretch marks, rashes, spots, cold sores, sunburns (Bruneton, 1999). Lavender oil inhibits immediate-type allergic reaction in mice and rats. Topical and intradermal lavender oil inhibited the ear swelling response in mice and passive cutaneous anaphylaxis in rats. Peritoneal mast cells were also inhibited from releasing histamine or tumour necrosis factor in vitro when lavender oil was applied (Kim and Cho, 1999).

Tea tree oil or ti-tree oil

The name was given because early settlers in Australia brewed its leaves to make a drink, and now the essential oil of Melaleuca alternifolia Cheel (Myrtaceae) is distilled from these leaves. Tea tree oil is employed in personal care products, cosmetics, hair preparations and skin creams (Priest, 1999) and it has applications in the treatment of many infections (Weseler et al., 2002; Saller et al., 1998; Carson and Riley, 1995). Many studies and clinical trials had confirmed the efficacy of tea tree oil as a natural preservative for pharmaceutical and personal care products, and as an antifungal (Weseler et al., 2002; Hammer et al., 1998; Nenoff et al., 1996), antiseptic (Budhiraja et al., 1999), antiviral and topical antibacterial agent (Cox et al., 2000; Shapiro et al., 1996; Carson and Riley, 1995; Carson et al., 1995; Carson and Riley, 1994). Tea tree oil is useful in the treatment of dandruff caused by the yeast Pityrosporum ovale as a result of its antifungal properties (Satchell et al., 2002) and it can control hypersensitivity responses in the form of swellings, due to its anti-inflammatory effect (Brand et al., 2002). It is widely employed in skin care for the treatment of sores, blisters, spots, rashes, warts (Carson and Riley, 1995), burns (Faoagali et al., 1997) and acne (Carson and Riley, 1994; Bametson et al., 1990).

The allergic potential of low concentrations of tea tree oil is presumed to be low on healthy skin (Fritz et al., 2001). In rare cases, tea tree oil can cause an
allergic skin response in susceptible individuals; the symptoms – reddening and itching of the skin at the location where oil was applied – usually subside within a few hours of washing off the oil. There is evidence that tea tree oil is a mild to moderate irritant at concentrations of 75% or above, and minimal or non-irritant at 50% or below. Research has shown the need to control oxidation to limit the para-cymene content as this dramatically increases and causes the oil to be more skin irritant.

Black cumin

The essential oil of Nigella sativa L. (Ranunculaceae) seeds showed that thymoquinone, carvacrol, t-anethole and 4-terpineol demonstrated radical-scavenging properties (Burits and Bucar, 2000). The seed various oils and oil have antibacterial, antifungal, (Morsi, 2000; Khan, 1999; Toppozada et al., 1965), anticarcinogenic (Hailat et al., 1995), analgesic and antiinflammatory properties (Al-Ghamdi, 2001; Khan, 1999; Mutabagani and El-Mahdy, 1997). The low toxicity of N. sativa fixed oil, evidenced by high LD50 values, suggests a wide margin of safety for therapeutic doses of N. sativa fixed oil (Zaoui et al., 2002).

REFERENCES

Aikawa Y. 2002. Topical preparations containing mango seed oil (Zaoui et al., 1995), analgesic and antiinflammatory properties (Al-Ghamdi, 2001; Khan, 1999; Mutabagani and El-Mahdy, 1997). The low toxicity of N. sativa fixed oil, evidenced by high LD50 values, suggests a wide margin of safety for therapeutic doses of N. sativa fixed oil (Zaoui et al., 2002).

CONCLUSION

Natural ingredients are everywhere and are continually gaining popularity, and the use of plant extracts in cosmetic formulation including active principles of natural origin can protect the skin against exogenous or endogenous harmful agents, and help to remedy many skin conditions. In addition, natural products can be used in hair care, and as hair colorants or dyes. Aromatic plants and oils have been used for thousands of years, as incense, perfumes, cosmetics, and for their medicinal and culinary applications. Essential oils impart many benefits, such as a pleasant aroma, especially in perfumes and to impart shine or conditioning in a hair care product, and for emolliency or improving the elasticity of the skin.

In the future, it is possible that many new plants, extracts and oils of commercial significance will be identified, and many ethnobotanical uses and claims of many widespread herbs will be proven, new isolation and extraction techniques will be shown to give higher quality products. But this requires the multidisciplinary cooperation of botanists, preparative chemists, analytical chemists, toxicologists and biologists to assess cosmetic, rather than just pharmaceutical, activity.


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