

Obtaining Cosmetic Raw Materials from the Natural Resources of Turkey and Getting Them to the Industry

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Abstract

The flora of Turkey has a wide variety of plant species due to its geographical location and it is composed of approximately 12,000 taxa, of which one third is endemic. Many plants have been used for cosmetic purposes since ancient times, especially for today, in the cosmetic industry, the demand for natural and non-harmful sources has increased, rather than synthetic substances. Considering these two conditions, it is observed that there are many plants in our country and this diversity finds a lot of space in the cosmetics industry. Due to an increasing number of natural cosmetic products for consumers, in this paper, it is aimed to create a source of guidance for domestic suppliers/manufacturers by utilizing the diversity of natural resources and to increase the diversity of domestic natural products used in the industry. Besides this, in terms of raw materials for cosmetic products, easier, sustainable and to reach in the short term as well as economically important plants are given in this paper. Cosmetic products and / or raw material manufacturers will improve the quality of cosmetic raw materials and cosmetics products that they are producing in line with this information and thus, cosmetic raw materials and products originating from our country will be appreciated in the world.

Key Words: Phytocosmeceuticals, Natural Resources, Cosmetic Industry

1. Introduction

Health and beauty are two concepts that are inseparable. The beauty, vitality and firmness of the skin is primarily related to how it is fed. Having a shiny clean skin, preventing hair and skin disorders depends on proper nutrition, effective digestion and absorption of nutrients by the body. Regular and balanced diet is a prerequisite for maintaining and maintaining the health of the body, soul and skin. If there is a deficiency in the body of the human body, its reflections on the skin. It can be seen in the form of acne, dulling, drying, flaking, oiling. Minor changes in nutritional habits create significant changes in the skin. Our nutrition habits are manifested in hair as in many diseases. Having healthy hair is directly proportional to the nutrients we receive. For example; in the absence of vitamin A, the scalp becomes thicker, fat and sweat accumulation occurs in the lower parts, hair dries and dandruff occurs. Lack of group B vitamins can lead to excessive fat haired skin, oily dandruff, baldness and premature whitening. A wide range of minerals in the minerals as well as the textural structure of the skin and the formation of connective tissue all over the body also adversely affects. In order to help the cells to be fed and cleaned, it is necessary to take from the fruits, vegetables, grains, legumes and animal foods in each of our daily lives to the needs of the body. Balanced nutrition keeps

skin cells strong and viable. For example, omega-3, -6 and -9 fatty acids are essential oils and strengthen skin cells, making the skin look younger, preventing wrinkles. The lack of these oils causes the skin to dry out and quickly age. Because of the regular circulation of omega fatty acids, more oxygen is transported to the skin. They are also effective in eliminating skin problems such as acne, blackheads caused by the lack of vitamins A, D and E.

Cosmetic products have entered in our daily lives as look beautiful and well-groomed, fulfilling the social needs of society, and our unchanging needs with the purpose of being recognizable in social life. Today, women, men, individuals of every age group and every socioeconomic / sociocultural segment use more than one cosmetic products in line with their needs. Unlike medications, we make contact with cosmetics every day. To be successful in cosmetic products and market requires new sources and different formulations by evaluating some risks and opportunities. As well as consumers demands, ease of application, feeling emotionally, product's odors, maximum performance of the product, the aesthetic success of the product etc. are very important. New cosmetic raw materials, modern carrier systems and new applications are being developed every day. Most of the cosmetic companies spend a lot of money on research and development in order to provide more effective and safer products to consumers and to obtain new cosmetic raw materials. Cosmetic market in Turkey is growing by 10% every year, the share of natural products in this market is known to be about 5%. Only about 10% of the products are placed on the market in Turkey as Turkey origin. Among these products, the largest share belongs to hair care products. According to the Cosmetic Product Notification System, a total of 522,733 cosmetic products, 174.300 of which are domestic, are in the market in Turkey. Most of the manufacturing companies have ISO 9000 and ISO 14001 certificates. Imports of cosmetic ingredients in Turkey is up to \$ 1.1 billion in 2015, imports from Germany, France and Italy have done. Our exports reached 695 million dollars. The most exports were made to Iraq, Iran and France.

Solutions for our physical and mental wellbeing must be looked for in nature. Therefore, using plant-based ingredients in the production of cosmetics and personal care products is very prominent and needed. As well as the existence of natural resources in all countries of the World, being sustainable and sustainable are quite important. The current review highlights importance of herbal cosmetics, the herbs used in them and their advantages.

2. Biodiversity in Turkey

The plant world has witnessed the existence of an incredible number and variety of genera and species in the process of evolution lasting hundreds of millions of years, and human beings have used plants for various purposes throughout history. Turkey is located in three phytogeographical regions: European-Siberian, Mediterranean, the Black Sea region, and their transition zones. Its climatic and geographical features change within short intervals of space due to the country's position – a bridge between two continents. Turkey's biological diversity can be compared to that of a small continent: the country's territory consists of forests, mountains, steppe, wetlands, coastal and marine ecosystems and different forms and combinations of these systems. This extraordinary ecosystem and habitat diversity has produced considerable species diversity. Turkey has a wealth of flora species. A comparison with the continent of Europe is sufficient to illustrate such wealth. While there are 12,500 gymnospermous

and angiospermous plant species in the entire continent of Europe, it is known that about 12,000 such species are present in Anatolia alone, with one third of them are endemic. Eastern Anatolia and Southern Anatolia among the geographical regions, and the Irano-Turanian and Mediterranean regions among the phytogeographical regions, are rich in endemic plant species. Because of its geographical structure and different ecological conditions, our country is in a position where the most important gene or origin center of the world overlaps. Turkey is located at the intersection of two of the world's 8 gene centers (Mediterranean and Near East). These two regions have a key role in the emergence of cereals and horticultural crops. There are 5 micro-gene centres in the country in which more than 100 species display wide variation and which are the origin or centre of a large number of important crop plants and other economically important plant species, such as medical plants. These centres offer very important genetic resources for the future sustainability of many plant species cultivated around the world. Turkey's wealth of biological diversity needs to be studied and conserved taking into consideration ecosystems, species, genes and biological functions, and their significance for agriculture, forestry and industry.

3. History of Herbal Cosmetics

Since ancient times, women are used in various sources in order to change their appearance. In the archaeological excavations carried out in Ancient Egypt, small bowls mixed with the paints on the face during the period when the goods were put into the grave together with the dead and ointment containers that still retain the beautiful smell after thousands of years, BC. It was proof that cosmetics were widely used in the 4000s. These beauty products are usually prepared by the priests, obtained from fragrant plants, seeds and oils. Formulas of herbal cosmetics made with thyme, geranium, cedar wood, styrax, amber, musk, gum, resin and various flowers, leaves and roots were kept very secretive. Cosmetic construction was therefore a very important art. It is understood that eye make-up was very important in Ancient Egypt from the paintings and tombs found in those periods. Egyptian women painted their eyes green with ivory, bronze, wood or bone made tiny bar, they also painted their eyelashes. The make-up materials were considered sacred and the make-up around the eyes was believed to protect the evil eye. In addition, the eye make-up was protected from the harmful effects of the sun. Women in Mesopotamia rode their eyes, dyed their hairs and nails with henna leaves. The ancient Greeks used fragrant ointments and nail paints, as well as contributed to the cultivation of lilies and various plants. The Romans, influenced by Greek culture, began to wonder about various perfumes and cosmetics. Red paints were used to color the lips and cheeks, and whitewash was used to whiten the teeth. The Arabs used various spices and started henna burning and riding traditions. Meanwhile, with the Crusades, cosmetic products started to spread to European countries. Milk bath was a very important beauty tool among the nobles. In 1770, a draft law was introduced with the cosmetics industry, which became widespread in England. In France, perfume and beauty materials became an industry. Cocoa and vanilla creams from Spain were used to whiten and soften the face. In general, cosmetic products started to be used by women between the years of 1920-1930 and there were also developments in the cosmetic industry. However, the conscious use of cosmetic substances is known that it started with World War II.

4. Terminology

Cosmetic products: Any substance or mixture intended to be placed in contact with the various external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or with the teeth and the mucous membranes of the oral cavity with a view exclusively or mainly to cleaning them, perfuming them, changing their appearance and/or correcting body odours and/or protecting them or keeping them in good condition. For example, makeup products, bath products and so on.

Cosmeceuticals are cosmetic-pharmaceutical hybrid products intended to improve the health and beauty of the skin by providing a specific result, ranging from acne-control and anti-wrinkle effects, to sun protection. Cosmeceuticals have medicinal benefits which affect the biological functioning of skin depending upon type of functional ingredients they contain. These are cosmetic products that are not just used for beautification but for different skin ailments. These products improve the functioning/texture of the skin by boosting collagen growth by eradicating harmful effects of free radicals, maintains keratin structure in good condition and making the skin healthier.

According to the Cosmetic Law No. 5324 dated 24/03/2005 and the articles 6 and 10 of the Regulation on Cosmetics published in the Official Gazette dated 23/05/2005 and numbered 25823, the definition of "At least 95% of their composition is of natural content, however, it is cosmetic products that prove that this content meets the requirements of being natural but does not need to be organic" expresses natural cosmetic product. **Organic/Ecological Cosmetic Product:** At least 95% by weight of organic / ecological cosmetic ingredients obtained from organic production are finished cosmetics which prove that they meet the requirements of being organic from raw materials to finished products in accordance with the principles of organic farming.

5. Natural Resources Used in Cosmetics

- Lichens
- Plants
 - Gymnosperms
 - Angiosperms
 - 1. Monocotyl Plants
 - 2. Dicotyl Plants
- Marine resources

6. Herbal Preparations Used in Cosmetics

In cosmetic products, plants, can be found as plant extracts, essential oils, aromatic waters, squeezed extracts, aqueous extracts, tinctures, resins, gums and the like, vegetable oils-lipids, waxes, mucilages, plant carbohydrates and purified plant components.

Extracts: Generally, liquid, solid or semi-solid preparations obtained from herbal drugs by extraction.

Essential oils: The secondary metabolites, which are obtained by distillation from plants or herbal drugs, contain terpenic, aromatic compounds, volatile acid, aldehyde, straight-chain hydrocarbons in their structure, usually in the form of liquid at room temperature. The most important group of active substances used in cosmetics.

Aromatic waters: Products obtained during the production of volatile substances in the structure of the plants and carrying volatile substances as a small part. Generally, it can also be expressed as the remaining aqueous parts during the water vapor distillation.

Tinctures: Preparations from various parts of plants using maceration, percolation, or other suitable validated method with appropriate concentration of alcohol.

Resins: Secondary metabolites which are naturally found in the plants as physiologically or with a pathological factor, softened by heating, amorphous, water-insoluble, dissolved in organic solvents such as alcohol, ether, darkened colors when oxidized in the air, solid or semi-solid products carrying various compounds of the terpene class in complex form.

Gums: They are often pathological products of plants, amorphous, or when they come into contact with water, they are much or less soluble in colloidal solutions or gel-forming polysaccharide macromolecules. They have adhesive properties.

Mucilages: These are natural amorphous substances of plants which have polysaccharide structures and non-adhesive substances that form water-swelling viscous and colloidal solutions

Balsams: Products obtained from plants and contained resin; oleoresins containing benzoic acid, cinnamic acid and their esters.

Tars: These are products with a complex structure obtained by dry distillation from woody tissues.

Vegetable oils-lipids: These are the natural compounds that are esters formed by fatty acids. They are insoluble in water but soluble in apolar organic solvents.

Wax: It is hydrophobic cuticle formed with cutin on the surface of fruits and leaves. Limits water loss, controls the gas exchange.

7. Herbal Products

There are numerous herbs available naturally having different uses in cosmetic preparations such as skincare, hair care etc.

According to European Council Cosmetic Products Experts Board, the classification of plants and herbal preparations used in cosmetic products were classified in 3 categories:

Category A: Plants and herbal preparations which can be used in cosmetic products-Safe accepted ones, with enough data

Category B: Plants and herbal preparations which cannot be evaluated-Not recommended because of not having enough knowledge, who have different opinions and findings

Category C: Plants and herbal preparations not recommended for use in cosmetics-Health risks and those not recommended

8. Herbal Resources Growing in Turkey Used in Cosmetic Products

-Achillea millefolium L. - Asteraceae (Civan perçemi, Yarrow): Yarrow is grown in the Northern and Eastern Anatolia. Part used: Flowers. Active principles: Essential oils, flavonoids, cyanogenetic heterocycles, coumarin, tannins, mucilage, vitamins and phytosterols. Intended cosmetic effects: Skin cleansing, soothing, refreshing, purifying and astringent. It is used in the form of extract against freckles and aged skin stains. Evaluation and remarks: Category A

-*Acorus calamus* L. var. *americanus* Rafin. - Araceae (Azak eđiri): This plant was taken in 1550s from Turkey to Europe as a medicinal plant and has spread to Europe in this way. This plant is grown in Sapanca, Yeniçaęa and Beyşehir Lakes in Anatolia. Part used: Rhizomes are used after peeling the fungus. Active principles: Essential oils, acorin, a bitter principle acoretin, tannins, starch, amino acids, triglycerides, resin and gum. Intended cosmetic effects: Tonic, cleansing, astringent and soothing; hair tonic, anti-dandruff preparations, mouthwash and toothpastes, stimulant bath products and shampoos, as well as emulsions for massage. It has fragrance effect. Antiinflammatory, antiedema, granulation promoting agent and antimicrobial; traditionally lipolytic and insect repellent. Evaluation and remarks: Category C (if β -asarone and methylgenol are detectable amounts), Category B (if β -asarone and methylgenol are not in detectable amounts)

Acorus calamus L. var. *americanus* does not carry β -asaron unlike other varieties.

-*Aesculus hippocastanum* L. - Hippocastanacea (At kestanesi, Horse chestnut): Homeland of this plant is Asia (India) but with grown as an ornamental plant in Turkey and Europe. Europe (France) was taken it from Istanbul at the beginning of the 17th century. Part used: Seeds. Active principles: Triterpenic saponins, flavonoids, amino acids, phytosterols, vitamins, proteins. Intended cosmetic effects: Tonic, astringent, anticuperosis, anti-edema, vasoprotective, peripheral vasoconstrictor. Preparations for skin and scalp, lotions, creams and gels for cellulites, astringent shampoos; tonic bath products for feet and body. Horse chestnut seeds reduce the capillary fragility and prevent the accumulation of fluid in the surrounding tissues. In the content of the cosmetic preparations with anti-aging properties for the eye area, it is also included in the cosmetic products against the aging and wrinkles for the skin with the witch hazelnut extract. Evaluation and remarks: Category A

-*Allium sativum* L. - Liliaceae (Sarımsak, Garlic): It is grown in Middle Asia steppes and a herbaceous plant in Turkey. Active principles: Essential oils (allicin), carbohydrates, vitamins, flavonoids and sulfur compounds. Intended cosmetic effects: Extract obtained by crushing the onions is used as a hair growth preparations and applied to the hairless skin.

-*Anthemis nobilis* L. - Asteraceae (Romen papatyası, German chamomile): The plant is wild in Central Europe. However, this plant is cultivated in Germany, Belgium, England and France, and herbal drug is derived from a form of cultivates with capitata consisting of ligulate flowers. Part used: Inflorescentia. Active principles: Essential oils. Intended cosmetic effect: It is used to regenerate the skin against irritation, to prevent irritation and to change hair color. Antiinflammatory and antiseptic effect. Evaluation and remarks: Category A (α -methylene γ -lactone should be taken into account because of the sensitivity-enhancing effect due to carriage)

-*Betula pendula* L. - Betulaceae (Huş ağacı, Birch): This plant is widely grown in Western Europe, Kazakhstan, Siberia, the mountainous regions of Caucasus, Iran, Iraq and Turkey. Part used: Bark and wood. Active principles: Phenols, triterpenes, resins and tannins. Intended cosmetic effects: Tonic, stimulant, antidandruff, promoting hair growth, tonic agent in hair preparations, after sport and massage products, purifying and stimulant detergents. Evaluation and remarks: Category C (Allergic substances and high phenolic substances).

-*Borago officinalis* L. - Boraginaceae (Hodan, Borage): This plant with herbaceous and light blue flowers grows in the vicinity of Istanbul and North Anatolia. Part used: Flowers and aerial parts. Active principles: Essential oils, polysaccharide, tannin, pyrolizidine alkaloids. Intended cosmetic effects: Emollient, soothing, flavouring, helps

to open pores in the skin; only traditionally use by infusion and decoctions prepared and used at %5 concentration is known. Evaluation and remarks: Category B (Pyrolizidine alkaloid)

-*Calendula officinalis* L. - Asteraceae (Tıbbi nergis, aynısafa, Medical calendula, Calendula): This plant is cultivated in many countries, including Turkey. Part used: Flowers. Active principles: Essential oils, carotenoids, flavonoids, mucilage and saponins. Intended cosmetic effects: Emollient, lenitive, protective. Extracts and oil tincture in bath, hand care preparations, products for chapped and irritated skins, baby toiletries. Due to the effect of re-epithelization in cosmetic application, it is in the composition of preparations used against aging. Creams containing 5% *Calendula* flower extract and allantoin in its combination significantly increase the metabolism of glycoprotein and collagen fibers in epithelial tissue regeneration and are therefore important in cosmetic product formulation. Moisturizing properties are mostly due to the mucilages and are recommended for sun protection products, after shave products, balm and bath products formulations. Also, flower extract is widely used in cosmetics that aim to prevent photo aging. It is also antiinflammatory, antiiritan, antiseptic. Evaluation and remarks: Category A

-*Camellia sinensis* (L.) O. Kuntze - Theaceae (Çay, Tea): Although the homeland of this plant is China, the tea is grown in Turkey (Northeast coast of Anatolia) as a cultivated plants. Part used: Leaves and seeds. Active principles: Xanthines (caffeine), polyphenols (catechins, procyanidins, flavonoids (tannins), triterpenic saponins, mineral salts (F, Al, K, Mn), fatty acids, vitamins (C, B1, B2, B3), phytosterols. Intended cosmetic effects: For dry and aged skin, protective, emollient, moisturizing, smooth appearance, as well as tonic and astringent. Concentration limited for dry and damaged hair and scalp shampoos and conditioning products, nail strengtheners, after-sun products, eye contour products, hand creams, moisturising products for dry, ageing skin. It has also been shown that green tea can have a photoprotective effect against UV rays. Tea extract carrying polyphenols is known to be included in the composition of products used against photoaging for external application prior to exposure to the sun. Mechanism of action is based on the free radical scavenging feature of this plant. It provides protective and cell regeneration. Caffeine, by stimulating blood circulation and catechin derivatives increase the fat oxidation by accelerating the metabolism and cause fat burning into the content of anticellulite preparations. Hemostatic, stimulant and antibacterial (oil). Evaluation and remarks: Category: Group A (Dry extract and tea extract); Group B (oil) (Polyphenol-rich extracts may be responsible for the toxic effect, although there may be no toxicological data on external use. Also, oil may be responsible for the unknown side effect since it may contain saponin compounds)

-*Centaurea cyanus* L. - Asteraceae (Peygamber çiçeği, Cornflower): Dried flowers of the plant grow naturally in Western and Southwestern Anatolia. Part used: Rhizomes and roots. Active principles: Phenolic acids, flavonoids, coumarins, anthocyanidins, catechins, tannins, amino acids, mineral salts and sesquiterpene lactones. Intended cosmetic effects: Due to its tonic, soothing, astringent, emollient and moisturizing properties, it is used in pre-and post-shave products designed for cleaning lotions, gels, eye area products, masks and sensitive skin. Other possible effects: anti-inflammatory, antiseptic, free radical scavenger. Evaluation and remarks: Category B

-*Citrus lemon* (L.) Burm. - Rutaceae (Limon, Lemon): It is a native of India and grows in all Mediterranean countries today. Part used: Fruits. Active principles: Essential oils, flavonoids, coumarins, hydroxy acids, vitamins, phytosterols, pectin and sugar. Intended cosmetic effects: Due to its tonic, regenerating, astringent, cleanser,

moisturizing and anti-aging effects, it is used in solutions, emulsions and gels designed for oily and old skin, in pre- and post-sun products, mouthwashes and mouthwashes. Pectin is used as thickening agent. The activity of stimulating collagen synthesis is dependent on the vitamin C content of lemon. Vitamin C or ascorbic acid works as a co-factor in collagen synthesis. Vitamin C is important for the appearance of proline hydroxylation. As a result, it is essential to maintain the production and integrity of collagen. In addition, antimicrobial (pectin), antipruritic, free radical scavenger, anti-edema, capillary protective effect. Evaluation and remarks: Category A (The allergic effect of citral and limonene is almost non-existent. Pectin is a completely safe product).

-*Cucumis sativus* L. - Cucurbitaceae (Salatalık, Cucumber): Mainland of plant which is grown in Turkey is North India. Part used: Fresh juice and stabilized juice obtained by squeezing fresh fruits. Intended cosmetic effects: It is used as a moisturizer, softener and soothing. Evaluation and remarks: Category A

-*Cupressus sempervirens* L. - Cupressaceae (Servi, Cypress): These trees are evergreen in winter and grow naturally in the Taurus Mountains. Part used: Leaves and branches, cones. Active principles: Essential oil and polyphenols. Intended cosmetic effects: It is an astringent, skin protection, cleanser and fragrance. Cypress essential oil is included in the composition of soap and cleaners. There are also cream, lotion, gels and deodorants before and after sun products. Hemostatic, free radical scavenging and antibacterial effect supporting granulation formation. Evaluation and remarks: Category A

-*Foeniculum vulgare* Mill. - Apiaceae (Rezene, Fennel): It is wild in the Northern Anatolia. It is a cultivated plant grown in the Aegean and Mediterranean regions. Part used: Fruits and roots. Active principles: Essential oil, flavonoids, triterpenes, triglycerides, phytosterols, protein, vitamin E and pectin. Intended cosmetic effects: The plant as tonic, soothing, cleansing and fragrance is included in the composition of cleansing creams, emulsions, eye contours and oral mucosa products. In addition, stimulant, supporting the formation of granulation and antibacterial effect. Evaluation and remarks: Category C

-*Gentiana lutea* L. - Gentianaceae (Centiyan, Bitterwort): Common in Central European mountains, however, it is rarely found in Turkey (Bursa-Uludag, Ödemiş Bozdag). It is always found on a height of 1500 m. Part used: Roots and rhizomes collected in the fall and dried under sun. Active principles: Essential oil, bitter glycosides, polyphenols, polysaccharides, triterpenes and amino acids. Intended cosmetic effects: Tonic, relaxing and cleansing properties. It is included in the composition for sensitive and oily skin products. It has traditionally been used as an agent for insect bites, bruising and wounds as well as for the formation of granulation. Evaluation and remarks: Category B.

-*Hedera helix* L. - Araliaceae (Sarmaşık, Ivy): It is mainly grown in moist forests in Northern Anatolia in Turkey. Part used: Leaves and shoots. Active principles: Triterpenic saponins, flavonoids, mineral salts and phenolic acids. Intended cosmetic effects: Due to tonic, astringent, softening and anti-cellulite effect, it is included in the cream, lotion and gels composition and used as a body massage. Evaluation and remarks: Category A

-*Humulus lupulus* L. - Cannabinacea (Şerbetçiotu, Hops): It is a plant found to be rare in the North Anatolia in Turkey, Bilecik and Bursa. Part used: Female flowers. Active principles: Essential oil, humulon, lupulon, flavonoids (quercetin, kaempferol) and phytosterols. Intended cosmetic effects: It has moisturizing and emollient effect. Evaluation and remarks: Category B

-*Juglans regia* L. - Juglandaceae (Ceviz, Walnut): It grows wild in Northeast and Eastern Anatolia. Part used: Pericarp. Active principles: Naftoquinone (juglon), hydroquinone and catechic tannins. Intended cosmetic effects: It is used as astringent, soothing, cleansing, odorant and dyestuff. Glycolic extract and oil tincture are included in suntanning lotion, gel and creams; also the composition of shampoos and hair tonics due to its dyeing properties. Evaluation and remarks: Category A

-*Lilium candidum* L. - Liliaceae (Zambak, Lily): It is grown as an ornamental plant in gardens and grows wild in Western Anatolia. It likes stony and rocky places. Part used: Flowers and fresh onions. Active principles: Essential oil, flavonoids, amino acids, phytosterols, organic acids, phenolic acids, carotenoids, tannins, mineral salts and vitamins. Intended cosmetic effects: It is included in cleansing gels, solutions, emulsions, anti-aging masks, preparations for dry and cracked skin, and sunscreen products for relaxing, protective, softening and moisturizing the skin. It is also used against antiirritan, free radical scavenging, capillary protective, antimycotic, wound healing, insect bites and bruising, as well as skin redness in sunburn. Evaluation and remarks: Category B

-*Malva sylvestris* L. - Malvaceae (Ebegümeçi, Mallow): It is widely grown in Anatolia. Part used: Fresh and dried leaves and berries. Active principles: Anthocyanin, mucilage, phenolic acids and vitamins. Intended cosmetic effects: It is used as soothing, smoothing, demulcent and skin roughness remover. It is included in products such as shower, bath products and mouthwashes for delicate and sensitive skins. Evaluation and remarks: Category A

-*Matricaria chamomilla* L. - Asteraceae (Papatya, Chamomile) The plant blooms in May is growing in Turkey. Part used: Dried flowers. Active principles: Essential oil and polyphenols. Intended cosmetic effects: Essential oil is used as a cleansing of the skin and against itching, as well as essential oil and kamazulen as antiirritan are included in skin and makeup preparations and into the composition of solar products. It is also used in bath preparations, lotions, creams and hair colorants / hair coloring products. Other possible effects: Antiinflammatory and wound healing. Evaluation and remarks: Category A (alfa-methylene gamma-lactone is an allergic substance and is not to be found or should be within certain limits).

-*Melissa officinalis* L. - Lamiaceae (Oğulotu, Balm mint): It is abundant in Anatolia and especially, in the Mediterranean Region. Part used: Leaves and flower buds. Active principles: Essential oils. Intended cosmetic effects: As the purpose of tonic, soothing and fragrant, it is included in relaxing and calming bath preparations. It is used against insect stings. It has also antiviral activity. Evaluation and remarks: Category B

-*Mentha piperita* L. - Lamiaceae (Nane, Mint): It is a perennial culture plant in Turkey. Part used: Leaves. Active principles: Volatile oil obtained by distillation. Intended cosmetic effects: It has tonic, odor, cleansing, relaxing properties and is effective against itching. It is used as odor and taste regulator. It is especially used in aromatherapy, massage and bath preparations. Evaluation and remarks: Category A (Maximum menthol concentration in preparations can be 2%. It should not be placed on children's products).

-*Olea europaea* L. - Oleaceae (Zeytin, Olive): Turkey is the fifth rank in terms of wealth of olive trees, and is the fourth rank in terms of production among the olive trees producing countries in the world. It grows wild in Aegean and Mediterranean regions. Part used: Fruits. Active principles: Triglycerides, free fatty acids, flavonoids, secoiridoids, hydroxy acids, phenolic acids, non-saponified parts, vitamin E and proteins. Intended cosmetic effects: Olive oil is used as emollient, moisturizing and soothing for sensitive skin. Emulsions and lipogens of olive oil are used in solar products. Non-

saponified parts are included in the composition of softeners and sunscreens as well as hair conditioners. Traditionally, olive oil is used against injuries, scars and bruises and shows anti-inflammatory action. Non-saponified parts have also anti-inflammatory and wound healing activities and they activate melanin biosynthesis. It is also included in the composition of the products prepared for the gums. Evaluation and remarks: Category A (Non-soapless parts)

-*Plantago major* L. (*P. lanceolata* L. and other species) - Plantaginaceae (Sinirliot, Large plantain): They are grown widely in Turkey, found in damp places, and are perennial herbaceous plants. Part used: Leaves and aerial parts. Active principles: Polysaccharides, iridoids, phenolic acids, coumarins, flavonoids, tannins and mineral salts. Intended cosmetic effects: They are effective as skin softening, soothing, moisturizing, cleansing and astringent agents. Fresh water phase of the plants are traditionally used against insect bites. It also acts as a sedative for the eyes. It shows antiinflammatory, antibacterial and hemostatic effects supporting granulation formation. Evaluation and remarks: Category B

-*Potentilla tormentilla* Neck. (*P. erecta* L.) - Rosaceae (Tormentil): This is a plant with a perennial rhizome. Part used: Rhizome. Active principles: Volatile oil and catechic tannins. Intended cosmetic effects: Due to tonic, astringent and skin regenerating effect, it is included in skin preparations, toothpastes and mouth water. Evaluation and remarks: Category A

-*Rosa rubiginosa* L. - Rosaceae (Yaban gülü, Wild rose). Part used: Seeds. Active principles: Fatty acids (oleic, linoleic, linolenic acids), vitamin E, β -carotene and non-saponified parts. Intended cosmetic effects: It is used as moisturizing, emollient and anti-aging. It is included in the composition of emulsions against wrinkles. It has also antiinflammatoxy effect and it is included in the treatment of skin ulcers. Evaluation and remarks: Category A

-*Ruscus aculeatus* L. - Liliaceae (Tavşanmemesi, Butcherbroom): It is an evergreen plant that grows in Turkey. Part used: Rhizomes and roots. Active principles: Saponins, flavonoids, coumarin and sterols.. Intended cosmetic effects: It has tonic and soothing effects. It is included in the composition of gel, cream and massage products for foot and muscle pains as well as sunscreen preparations as soothing agent. Evaluation and remarks: Category A

-*Salix alba* L. (*S. purpurea* L.) - Salicaceae (Ak Söğüt, White willow): They are trees and shrubs that deciduous in winter and widely grow in Anatolia. It usually grows on the riverside edges. Part used: Cortex, flowers and sometimes leaves. Active principles: Phenolic glycosides, phenolic acids, flavonoids, catechic tannins, oligo- and polysaccharides. Intended cosmetic effects: It is included in the composition of emulsions, mask for face and body as moisturizing and keratolytic agent for hardened skin. It can be added as a preservative to the preparations. In addition, it has astringent, analgesic, anti-inflammatory and antimicrobial effects. Evaluation and remarks: Category A (without salicylate).

-*Salvia officinalis* L. - Lamiaceae (Adaçayı, Sage): It grows wild in Central Europe and the Western Balkans, and is cultivated in Turkey. Part used: Leaves. Active principles: Essential oil and phenolic compounds. Intended cosmetic effects: It has tonic, deodorant, cleansing, anti-dandruff and antiperspirant effects. It is included in the composition of unhealthy skin preparations, toothpastes, bath preparations and shampoos. Evaluation and remarks: Category A

-*Sambucus nigra* L. - Caprifoliaceae (Kara mürver, Black elderberry): The plant grows as a white flowered shrub and is also cultivated in gardens in Anatolia. Part used:

Flowers and fruits. Active principles: Essential oils, triterpenes, phytosterols, flavonoids, phenolic acids and tannins. Intended cosmetic effects: Fruits are used as tonic, astringent, refreshing, relaxing, protective and moisturizing. In addition, fruits have dyeing properties. Aromatic water of the plant is included in the composition of products for sensitive skin, lotions for eyes as well as skin cleansing lotions for freckles and sunburn. The plant extract is also included in the composition of preparations for cracked hands as well as mouthwashes and pre-sun products. In addition, this plant has diaphoretic, diuretic, anti-inflammatory, astringent, antihemorrhoidal activities. Evaluation and remarks: Category B

-*Saponaria officinalis* L. - Caryophyllaceae (Sabunotu, Soapwort): It grows in forests in the Black Sea region of Turkey. Part used: Roots and leaves. Active principles: Essential oil, flavonoids, triterpene saponins, proteins, organic acids, mucilage and calcium oxalate. Intended cosmetic effects: It is used as sedative, cleanser, antipruritic, surfactant, foaming and emulsifying agent. It is included in the composition of products for oily skin; emulsions and gels for cellulite; lotions for sensitive skin and scalp. In addition, it has anti-inflammatory, antiedema, antiseboric and antiviral effects. Evaluation and remarks: Category B

-*Silybum marianum* (L.) Gaertn. - Asteraceae (Devedikeni, Milk thistle): This is a common plant growing in Turkey's coastal areas and on roadsides of the Mediterranean and Black Sea regions. Part used: Fruits. Active principles: Essential oil, silymarin, triglycerides, saponins, proteins, polysaccharides, sesquiterpenes, phytosterols and vitamins. Intended cosmetic effects: It is used as anti-aging, skin protection, cleansing and anti-dandruff agent. For soiled and oily skin, it is also included in the composition of the pre-sun products. It has anti-inflammatory, antioxidant, antibacterial, cell membrane protective and antielastase effects. Evaluation and remarks: Category A

-*Urtica dioica* L. - Urticaceae (Isırgan, Nettle): It is a fairly common plant in Turkey. It grows in gardens, on the edges of roads and walls. Part used: Leaf and aerial parts. Herbal drugs are used for the treatment since Dioscorides period. Active principles: Mineral salts, amines, histamine, serotonin, lecithin, caffeic and chlorogenic acids, flavonoids, sterols and essential oil. Intended cosmetic effects: Due to its anti-dandruff effect, it is included in the composition of hair care preparations and hair tonics. It is also used as a dyeing agent. Evaluation and remarks: Category A

-*Vaccinium myrtillus* L. - Ericaceae (Maviyemiş, Blueberry): It grows in the forests of the North Anatolian mountains. Part used: Fresh ripe fruits. Active principles: Anthocyanins, tannins, flavonoids, fruit acids, vitamins and pectin. Intended cosmetic effects: It is used as tonic and anticoagulant agent. The plant is included in the composition of sensitive and cohesive skin preparations, toothpastes and mouth waters. It has also dyeing properties. Evaluation and remarks: Category A

-*Vitis vinifera* L. - Vitaceae (Asma, Üzüm, Vine grapes): Turkey is the sixth rank in terms of grape production. Part used: Leaves, berries and seeds (kernels). Active principles: Leaves; polyphenols, organic and phenolic acids, vitamin C, carotenoids, volatile components and mineral salts; fruits; polyphenols, alpha-hydroxy acids, vitamin C, polysaccharides; seeds; procyanidins, triglycerides, phospholipids and vitamin E. Intended cosmetic effects: The fruits of the plant have dyeing properties due to their anthocyanins. They have skin protection and moisturizing effects. Seeds are used as emollient, skin protection and anti-aging agents. The leaves are used as tonic, astringent, refreshing and anti-aging agent, and included in the composition of anti-aging skin lotions, creams and gels as well as hair products. Due to polyphenol content, it has antioxidant (free radical scavenger), antiirritant and the protection of microcirculation

activities. Non-saponified parts support the formation of granulation. Evaluation and remarks: Category A

9. Results and Discussion

There are many plants growing in Anatolia and it is important to evaluate these plants in cosmetic industry. A plant preparation for cosmetic products can have different effects depending on the part used and active constituents of the plant. In addition, the quality of raw materials (harvesting time, fresh or dried, cultivation etc.) and manufacturing techniques should be well-established. The assessment of the safety-in-use of cosmetic products based on plants and plant preparations is also important. Although the use of natural ingredients in cosmetic products has a very long history, it can't be forget that nature provides substances which are highly active. Therefore, it is necessary to take into consideration, on the basis of current risk evaluation criteria. In the field of cosmetic products, to examine quality standards of natural ingredients, the sustainability of raw materials, manufacturing processes, good manufacturing practices and suitability of pharmacopoeia limits are the task of the manufacturer. Therefore, this review will be a meaningful guide for the producers.

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