



A REVIEW OF THE ANTIOXIDANT PROPERTY OF HERBS FOR THEIR ANTIWRINKLE USE

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Abstract: Skin wrinkle formation is one of the major causes of aging. Skin aging is a complex process. Wrinkle formation is induced by constant exposure to ultraviolet (UV) irradiation, and changes taking place in this modern world in eating habits, living habits, day to day life that damage human skin. This can be prevented by using one of the remedies which is the use of antioxidant compounds. Antioxidant compounds can be obtained from natural sources as well as synthetic sources. Any compound obtained from a synthetic source has its drawbacks such as; side effects, toxicity, poor biocompatibility, and high cost of the product. Antioxidants obtained from a natural source are available in abundance; it is cost-effective with no side effects. Many herbal drugs available in the surrounding possess the antioxidant property this antioxidant property can be used to treat wrinkle formation on the skin and as a result, aging signs are also reduced. Antioxidant compounds scavenge the free radicals generated from the herbs and thereby protect the skin against oxidative damage. The present study aimed to review the antioxidant property present in herbs used for the treatment of wrinkle formation.

Keywords- skin wrinkle, antioxidant compounds, aging signs, biocompatibility

I. INTRODUCTION

Wrinkle formation on the skin is influenced by many factors including ultraviolet radiation (UV), excess alcohol consumption, tobacco abuse, and environmental pollution. Because of all these factors, cumulative deterioration in skin appearance and function occurs. Wrinkle formation on the skin is characterized by irregular pigmentation, increased lines, loss of elasticity, dryness, and roughness, changes in skin tone and texture, skin surface dullness, visible pores, blotchiness, and age spots. All these signs are prominent reasons to cause the aging of the skin. Aging is the stage of gradual wearing of body efficiency and metabolic activities after reaching a stage of maturity. Free radicals cause oxidative changes in collagen, elastin material, and membrane characteristics that induce polymerization reactions. So skin creams used to prevent aging signs are called Anti-wrinkle creams.

Plants and plant products are used as medicines since ancient times. From the literature survey, it has been observed that several works of literature contain written descriptions of the use of various herbs, shrubs, and plants. From different parts of the plants such as leaves, fruits, stems, roots, and seeds natural compounds are extracted and isolated which shows admirable medicinal value. The use of natural compounds in skin protection especially the topical application of antioxidants indicates their popularity in decreasing the effect of aging on the skin and wrinkle formation is reduced. The best reason for using an herbal cosmetic is that it is purely made of herbs and shrubs. No side effects are observed on the human body due to the natural content in the herbs, but these herbal remedies enrich the body with nutrients and other useful minerals. Plants consist of many phytoconstituents which can calm or smooth the skin but also restore activity, and heal and protect the skin.

Creams are products that are prepared for application on the body for cleansing, beautifying, or altering the appearance and enhancing beauty. Creams are developed to reduce wrinkles, fight acne, and control oil secretion. For various types of skin ailments, formulations like skin protection, sunscreen, antiacne, antiwrinkle, and antiaging are designed by using a variety of materials, either natural or synthetic. The use of antioxidants for a particular topical formulation appears to be an interesting approach to protecting skin against oxidative stress caused by different extrinsic agents. To ensure the effectiveness of antioxidants against free radicals, it is essential to stabilize the final formulations as antioxidants are very unstable and can easily oxidize, becoming inactive before reaching their site of action.

The present article aims to review antioxidant properties obtained from the herbal source.

II. SKIN AGING

Skin aging is of two types, that is, extrinsic or premature or photoaging (evitable phenomenon) and intrinsic aging or chronological aging (inevitable phenomenon) which is caused by physiological and environmental factors, respectively. People who are exposed to direct sunlight show the signs of skin aging such as dry, rough, mottled pigmented, leathery texture, and abraded skin, especially of the face and hands such type is called photoaging. Conversely, fine, smooth wrinkles on dry, pale skin show signs of intrinsic aging. In the case of intrinsic aging the vascular damage of skin is not seen but vice versa it is observed in the case of photo-damaged skin and as a result, increased skin vascularization and angiogenesis are observed in the photoaged skin. When microscopically the epidermis of the photoaged skin is observed it appears to be thicker. Apart from intrinsic and photoaging, there is one more type of skin aging such as stochastic aging which shows cell damage by metabolic processes, free radicals, and cosmic irradiation.

There are three layers present in the skin epidermis, dermis, and subcutaneous layer. The epidermis of the photoaged skin is thicker. The dermis which is present in the skin consists of elastin fibres. The dermis maintains the skin structure by stretching and folding back when the muscle undergoes various stress conditions like facial expressions etc. Elastin is a fibrous protein that is reduced in thickness from the deeper to the superficial dermis. Elastin present in the body provides natural elasticity and strength to the human body. It also plays a role in tissue repair. The extracellular matrix of intrinsically aged skin possesses diminished levels of elastin, while the elastin present in the photoaged skin is observed just below the dermal-epidermal junction. The basic and major molecular unit involved in the construction of human skin is collagen which is produced from procollagen. Collagen, also present in the dermis is responsible for preventing wrinkle formation. Collagen is a protein that is present in the connective tissues of the human body. Upon aging, the skin will lose elastin and also Collagen undergoes breakdown. This makes the skin thinner and moisture cannot enter the skin layers making the skin dry. The strength and resiliency of the skin depend on the proper and uniform arrangement of collagen types I and type III fibrils and elastin in the dermis; thus, collagen deficiency may result in skin aging due to the production of collagenase and thymine dimer in the skin on exposure to UVR. The procollagen is generated by the dermal fibroblasts under the effect of transforming growth factor- β (TGF- β) and activator protein-1 (AP-1), where TGF- β and AP-1 govern the production and breakdown of collagen, respectively. Under the effect of UVR received from the sun, the upregulation of matrix metalloproteinases (MMPs) enzymes

secreted by keratinocytes, fibroblasts, and other cells promotes the breakdown of collagen by AP-1 as well as a decrease in collagen synthesis. It results in a breakdown of the connective tissues during photoaging. The subcutaneous fat which gives the skin a plumpy appearance also begins to disappear. All these conditions will be the reason for the progression of wrinkle formation which is due to the structural changes in the lower dermal layers of the skin.

III. ANTIOXIDANTS

Antioxidant means "against oxidation." Antioxidants block the process of oxidation by neutralizing free radicals. In doing so, the antioxidants themselves become oxidized. Antioxidants are the chemical constituents that are present in the plant in less or abundance quantity. This antioxidant present in plants helps to reduce wrinkle formation on the skin caused by various extrinsic and intrinsic factors. The concentration and absorption mechanism of natural antioxidants are important in obtaining the maximum beneficial effect. Reactive oxygen species are generated during cellular metabolism and excessive production of the reactive oxygen species leads to oxidative stress. Oxidative stress act as a precursor of many health issues and one of them is skin aging. The diseases developed by oxidative stress are managed by the prolonged use of safe antioxidants. With the help of antioxidants, it is possible to overcome sunlight-induced skin problems and make skin look fresh, healthy, and young through collagen synthesis. The antioxidants behave as antiwrinkle compounds through their action because they are capable of scavenging ROS leaving a healthy effect on the skin. Since living systems are capable to maintain homeostasis of ROS in a cell, the human skin is protected from UVR through a complex antioxidant defense system comprising two types of antioxidants, that is, 1] endogenous and 2] exogenous (consumed) antioxidants

IV. ENDOGENOUS ANTIOXIDANTS

The endogenous antioxidant consists of a network of protective antioxidants in the skin; it includes melanin and some enzymes. Manganese-superoxide dismutase is a mitochondrial enzyme that destroys the superoxide ions produced by respiratory chain activity. As compared to the dermis and stratum corneum layer of skin the antioxidant enzymes are found very high in the epidermal layer. If there is an imbalance between oxidants and endogenous antioxidants, exogenous antioxidants are helpful to restore the balance. Vitamins, ascorbate, carotenoids, and polyphenols are the antioxidants that are involved in the maintenance of oxidative homeostasis. The endogenous antioxidants in dermal and epidermal layers of skin exposed to sunlight are reduced under the effect of elevated levels of UVR-generated ROS. Such reduction results in the decreased activity of these antioxidants leading to skin damage. With age, endogenous antioxidants are steadily consumed increasing the risk of oxidative stress; then the use of exogenous antioxidants as a prevention strategy is essential.

V. EXOGENOUS (CONSUMED) ANTIOXIDANTS

The exogenous antioxidants contain synthetic and natural compounds. The exogenous antioxidants comprise compounds that cannot be synthesized by the human body. The synthetic exogenous antioxidants include monoethanolamine, diethanolamine, sodium Laurel sulfate, and triethanolamine, but these compounds have undesired effects including allergic and irritant contact dermatitis and contact dermatitis. On the other hand, natural exogenous antioxidants are nontoxic in nature and produce no unwanted effect on the skin.

VI. PHYTOANTIOXIDANTS

The photo-kingdom includes vegetables, fruits, whole grains, and beverages, for example, tea, chocolate, and wine. These products are rich in natural antioxidants. An important class of natural exogenous antioxidants is phytoantioxidants, that is, antioxidants found in plants. Phytoantioxidants include terpenes or polyphenols. After synthesis in plants, these compounds are found to have an important role in the metabolism and defense system of plants. Terpenes are known to have the potential for managing oxidative stress through their free radical scavenging potential. Moreover, polyphenols occur in all parts (roots to leaves) of the plants and protect them from environmental stress through their free radical scavenging property. There are various types of polyphenols based on molecular weight and polarity. The structural formula of polyphenols contains phenol groups, that is, the benzene ring possesses a hydroxyl group. The antioxidant activity of various polyphenols depends on the number and position of phenol groups.

VII. HERBS

Plants have a growing demand in the world market and the plants have been reported in the literature as having good anti-oxidant properties. Plants (fruits, vegetables, medicinal herbs) may contain a wide variety of free radical scavenging molecules such as phenolic compounds (phenolic acids, flavonoids, quinones, coumarins, lignans, stilbenes, tannins, etc.), nitrogen compounds (alkaloids, amines, betalains, etc.), vitamins, terpenoids (including carotenoids) and some other endogenous metabolites which are rich in antioxidant activity. The antioxidant compounds which are present in the plants can be used to reduce the wrinkle formation on the skin and as result, the aging signs can also be reduced. The antioxidant compounds need to be extracted from the compound by using various extraction techniques. When the compound is extracted it can be checked for its antioxidant property by using various tests such as DPPH and other tests. Determine the Ic_{50} value for the extract which gives an idea about the antioxidant property of the extract.

VIII. References

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