

A Review: On Antioxidant Activity and Antiaging Preoperty of Herbal Drug

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Abstract

Antioxidants are abundant in fresh, healthy foods. There's plenty of research that confirms eating a diet rich in antioxidants can help stave off aging and keep you healthier for longer.

Many skincare products incorporate antioxidants into their formulations to deliver the benefits of antioxidants directly to the skin. How effective topically applied antioxidants are is still a bit unclear. More in-depth research is currently being done, but so far, it seems that topical antioxidants may deliver a host of benefits.

Skin is the largest organ of the integumentary system. The overall well-being & perception of health in humans, very much depends on skin health & beauty. Skin plays a vital role in immunity & protects the body against pathogens, maintains water and electrolyte balance & also regulates body temperature. Epidermis is the protective covering over the body surface which serves as a barrier to infection. Thinning of this epidermal layer, loosening of collagen & elastic fiber, leads to the wrinkle formation and causes ageing. Ageing occurs due to the intrinsic factors like genetics, cellular metabolism, hormone & metabolic process or extrinsic factors like sun exposure, smoking, diet and pollution. In this era of modern science, people choose natural herbs rather than plastic surgery or laser therapy for not only looking younger but also to reduce complications. Herbs help in biological functioning of the skin & supplies nutrients required for healthy skin.

Keywords: Antioxidant, Antiaging, Herbs

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Introduction

The screening studies for antioxidant properties of medicinal and food plants have been performed increasingly for the last few decades in hope of finding an efficient remedy for several present-day diseases and means to delay aging symptoms. The disorders related to excessive oxidation of

cellular substrates (oxidative stress) include type II diabetes, neuro-degenerative diseases, or even some types of cancer.[1] Ageing is an unavoidable process for all living organisms. Ageing phenomena starts from the moment of our birth and is markedly visible on the skin in progressive years. Based on increased life expectancy, it is estimated that there will be

over 1.2 billion older adults (over 60 years old) worldwide in 2025.[2] Ageing is at least partially attributed to an age related increase in weakness and immune senescence and perhaps mitochondrial dysfunction. Maintenance of the physical function in older adults is therefore a major public and clinical priority. In humans the skin is the tissue most markedly affected. Antioxidants aren't just one ingredient, so you won't see the word *antioxidant* in your skincare product's ingredients list. Antioxidants instead refer to a broad group of ingredients that work in the same way: fighting free radical damage.[3]

The ingredients below are some of the more well-studied antioxidants used in skincare:

Vitamin C: This is one of the most widely used and well-studied skin care antioxidants. You may also find it listed as L-ascorbic acid or ester-C. Vitamin C helps stimulate collagen production and is the best antioxidant for fading dark marks. It's notoriously unstable, though, which can be mitigated somewhat by using dark, preferably air-lock, packaging[4].

Vitamin E: Besides being an antioxidant, vitamin E also helps speed healing and is moisturizing[5].

Ferulic acid: Topical Ferulic acid may protect against sun damage. It's most effective when used along with topical vitamins C and E.

Retinol: Retinol is a form of vitamin A and is arguably the most effective over-the-counter (OTC) ingredient for reducing fine lines and wrinkles. Retinol also speeds and smooths the skin[6].

Coenzyme Q10: is one of the antioxidants that your body manufactures. It is naturally found in the skin but diminishes as we age. Coenzyme Q10 may improve skin elasticity and texture.

Botanical extracts (phytoextracts): There are a plethora of botanical extracts used in

skincare products for their antioxidant properties. The most common include green tea or white tea, coffee, calendula, and rosemary, but there are many more. Botanical extracts are incredibly common skincare ingredients and are often incorporated into blends.

Niacinamide: Also known as vitamin B3, niacinamide improves skin tone and texture, and helps fade dark marks[7].

Resveratrol: A compound found in grapes, berries, red wine, and tea, resveratrol is good for UV protection and is anti-inflammatory. It may also boost collagen and elastin.

Curcumin: A relative newcomer in OTC skincare products, curcumin is a polyphenol found in the spice turmeric. It's believed to deliver anti-inflammatory and skin brightening properties without staining the skin (turmeric is known for its bold yellow color).

Antioxidants are abundant in fresh, healthy foods. There's plenty of research that confirms eating a diet rich in antioxidants can help stave off aging and keep you healthier for longer[8].

Many skincare products incorporate antioxidants into their formulations to deliver the benefits of antioxidants directly to the skin. How effective topically applied antioxidants are is still a bit unclear. More in-depth research is currently being done, but so far, it seems that topical antioxidants may deliver a host of benefits[9].

Protection against UV damage: sun damage is a huge aging factor of the skin. Antioxidants may help give a protective effect against UV damage when used along with sunscreen.

Calm inflammation: Free radicals by their very nature create inflammation. Antioxidants can help reduce inflammation and may have a soothing effect on the skin.

Slow premature aging: Topical antioxidants can make the skin look more youthful and protect against extrinsic aging (for instance, premature aging caused by external factors like chronic sun exposure, smoking, pollution, and more). Antioxidants don't seem to slow intrinsic (chronological) aging, however[10].

Skin is a protective barrier against the external environment. Its function is to regulate temperature, fluid balance & to protect from harmful microbes and UV radiation in sunlight. Two types of skin ageing exist: age-dependent/chronological ageing and premature ageing/photoageing. Photoageing is caused by extrinsic factors and includes signs such as a leathery appearance, dark/light pigmentation and deep furrows. Natural ageing is visible as wrinkling of the skin. The skin is divided into three layers; the epidermis, dermis and subcutaneous tissue. The extracellular matrix (ECM) is the outermost part of the skin and is composed of fibroblasts and proteins including collagen

and elastin. After the age of 20, its symptoms appears as the collagen content per unit area starts decreasing, there is 1% decrease in collagen content per unit area of the skin every year. The ECM provides a structural supporting structure which is essential for growth and elasticity of the skin and plays an important role in the maintenance of physiological functions of the body.

Natural antiaging and antioxidant Herbs:

Aloe vera

Biological Source: Aloes are the dried juice of leaves of *Aloe barbadensis*, belonging to the family Liliaceae.

Phyto-constituents: All the varieties of aloe are the major sources of anthraquinone glycosides. The principal active constituent of aloe is aloin, which is a mixture of glycosides, among which barbaloin is the chief constituent. Along with barbaloin, the drug also contains isobarbaloin, β - barbaloin, aloemodin and resins.[11]



Figure 1: Aloe vera

Role in Anti-ageing: The leaves of aloes are commonly used in anti-aging and anti-wrinkle creams and moisturizers. In the treatment of aging and wrinkles the constituents of aloe Vera such as aloin A and B have shown the property to inhibit the activity of collagenase, the enzyme which causes degradation of collagen fibres.

Turmeric

Biological Source: Turmeric consists of dried as well as, fresh rhizomes of the plant *Curcuma longa* belonging to the family Zingiberaceae.

Phyto-constituents: Turmeric contains a yellow coloured substance known as

curcuminoids. The chief component of curcuminoids is known as curcumin (50-60%). It also contains volatile oil, resin, camphor, camphene etc.

Role in anti-ageing: The chief constituent of Turmeric is curcumin which acts as a superoxide scavenger & as a singlet oxygen quencher. Therefore, the anti-ageing property of Turmeric is mainly due to the curcumin.



Figure 2: Turmeric

Cocculus hirsutus:

In a step in this direction we have evaluated antioxidant potency of the ethanol extract on the aerial parts of *Cocculus hirsutus* Diels. The extract was investigated for its free radical scavenging action to wards 1, 1-Diphenyl-2-picryl hydrazyl, nitric oxide, superoxide and hydroxyl radicals and found

that the ethanol extract shows promising free radical scavenging activity in dose dependent manner. This antioxidant potency may be related to the presence of antioxidant vitamins and ABSTRACT Antioxidants or inhibitors of oxidation are compounds which retard or prevent the oxidation and in general prolong the life of the oxidizable matter[12].



Figure 3:

***Annona squamosa*:**

It is popular as 'Custard apple or Sitaphal'. Streptozotocin induced diabetic rats were used. It reduces the lipid peroxidation and

increases the activity of antioxidant enzymes and strong super oxide radicals and singlet oxygen quenchers. Chemical constituents are flavonoids



Figure 4: Annona squamosa

Honey

Biological Source: Honey is a sugar secretion deposited in honey comb by the bees, *Apis mellifera* and other species of *Apis*, belonging to the family *Apidae*. .

Phyto-constituents: Honey is an aqueous solution of glucose (35%), fructose (45%) and sucrose (2%). It also contains maltose, gum,

polyphenols, flavonoids, vitamins, proteins etc.

Role in anti-ageing: The antioxidant property of Honey is due to the phenolic compounds (benzoic acid and cinnamic acid) and flavonoids present in it, which helps to prevent wrinkles in our skin



Figure 5: Honey

Ginseng

Biological Source: Ginseng is the dried root of various species of *Panax*, like *P. ginseng* (Korean ginseng), *P. japonica* (Japanese ginseng), *P. notoginseng* (Chinese ginseng), belonging to the family *Araliaceae*.

Phyto-constituents: Ginseng contains a mixture of several saponin glycosides,

belonging to triterpenoid group. These are Ginsenosides, Panaxosides and Chikusetsusaponin which are responsible for various activity of ginseng.

Role in anti-ageing: The chief constituent of Ginseng is Ginsenoside which is responsible for the anti ageing activity of the ginseng. It improves the blood circulation and skin tone and also moisturizes the skin



Figure 6: Ginseng

Momordica charantia:

The investigate in vitro antioxidant activity of aqueous and methanol extracts of *Momordica charantia* leaves. The antioxidant activity of

the plant extract was also determined by DPPH and ABTS methods using ascorbic acid and gallic acid as standards respectively.



Figure 7:

Glycyrrhiza glabra:

It is popular as licorice ‘yastimadhu’. Its extract was tested by studying the inhibition of radiation induced lipid peroxidation in rat liver microsomes. Chemical constituents are glycyrrhizin, flavones, coumarins. It shows its activity through free radical scavenging property. Its other actions are diuretic, demulcent, tonic.

Glycyrrhiza glabra L. (Licorice) is a small perennial herb that has been traditionally used to treat many diseases, such as respiratory disorders, hyperdipsia, epilepsy, fever, sexual debility, paralysis, stomach ulcers, rheumatism, skin diseases, hemorrhagic diseases, and jaundice



Figure 8: Glycyrrhiza glabra

Mechanism of action of antiaging Herb:

The mechanism of action was that hyaluronic acid maintains the hydration of stratum corneum as dryness of stratum corneum plays

an important role in wrinkles development. Exposure to UV radiations causes damage to the skin which leads to degradation of extracellular matrix of dermis[13].

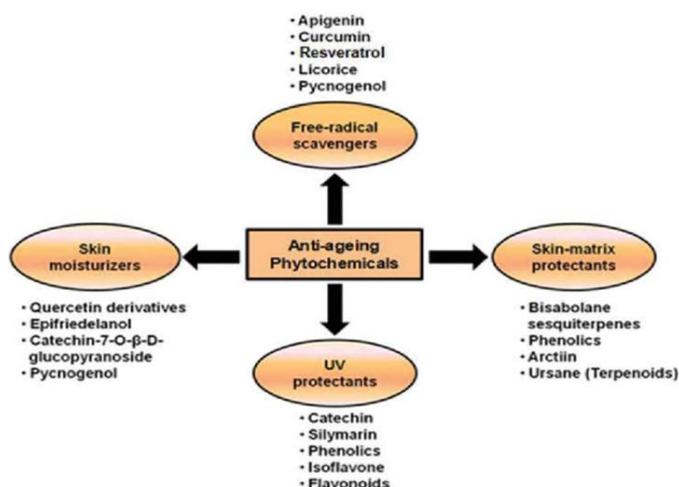


Figure 4: Mechanism of action of herbs in anti-aging

Discussion:

In conclusion, the medicinal herbs belonging to the Antiaging property are rich sources of antioxidants, in addition to the more popular and widely described Nepetoideae. The crude extracts can be fractionated in order to obtain highly efficient concentrated antioxidant mixtures that can be used for further purification or provide antioxidant protection from oxidative stress and prevent deterioration of food ingredients. Phytochemicals derived from plants have a lot of skin beneficial properties related to UV protection, antioxidant action, matrix protection and skin hydration. Over the past decade, a lot of phytochemicals from the plant extracts have been explored and their biological activities well-studied in vitro. Therefore, there is a continuous requirement for more clinical studies with emphasis on the concentration of the ingredient in herbal products, their formulation, safety, and the anti-ageing effect duration

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