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Anti Aging Cream – Herbal Ingredients

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ABSTRACT

Skin is the largest organ of the integumentary system. The overall well-being & perception of health in humans very much depends on skin health aging beauty. Skin plays a vital role in immunity and protects the body against pathogens, maintains water and electrolyte balance, and also regulates body temperature. The 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 wrinkle formation and causes ageing. Ageing occurs due to intrinsic factors like genetics, cellular metabolism, hormone, and 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 the biological functioning of the skin and supply nutrients required for healthy skin. Herbs contain several phytochemicals like carotenoids, terpenoids, polyphenols which possess anti-aging activity. A few herbs which show anti-aging activity includes, Aloe, Cucumber, Ginseng, Honey, Wheat, Liquorice, Arjuna, Jatamansi, etc.

INTRODUCTION:

Skin aging is influenced by many factors including ultraviolet radiation (UV), excess alcohol consumption, tobacco abuse, and environmental pollution. Aging of the skin is characterized by irregular pigmentation, increased wrinkling, loss of elasticity, dryness, and roughness. The use of natural compounds in skin protection especially topical application of antioxidants indicates their popularity in decreasing the effect of aging on the skin.[1]

Cosmetics are commercially available products that are used to improve the appearance of the skin. Consumer demand for more effective products that more substantively beautify the appearance has resulted in increased basic science research and product development in the cosmetics industry. The result has been more ingredients that may actually improve not just the appearance of the skin, but the health of the skin as well. We now have products that renew, restore, and rejuvenate—not just cleanse, protect, and moisturize.[1,2] Skin aging is characterized by a progressive deterioration of the skin's functional properties, linked to alterations of dermal connective tissue due to the changes in the cell, gene, and protein levels. Skin aging can be divided into two basic processes: intrinsic aging and photoaging.[19]

Cutaneous aging can be defined as the result of two different and cumulated processes: intrinsic and extrinsic aging (also known as photoaging). While intrinsic aging is natural and mainly due to the passage of time (influence of genetic factors, oxidative stress, cellular senescence, etc.) and its consequences. Photoaging is mainly linked with the detrimental effects of solar exposure on the skin, although pollution, diet, and smoking are also contributing factors.[20]

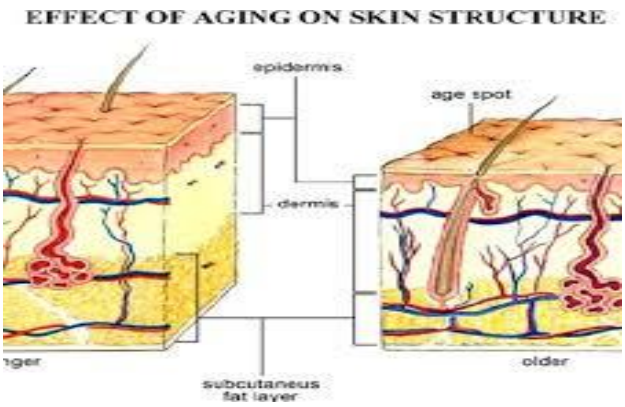

Figure No. 1: Changes occurring in aged skin layers

Skincare products that affect wrinkles are a reality and are well established in consumer, practitioner, and corporate perspectives. In the broadest definition, ‘‘products’’ range from classic and simple cosmetic preparations through vitamins, antioxidants, topical and oral cosmeceutical, and pharmaceutical preparations, and even to surgical and laser interventions. The application of cosmetic products containing oils with antioxidant activity is widely accepted to benefit healthy skin.[18]

MECHANISM OF ANTI-AGING:

Extrinsic skin aging:- This is caused by environmental factors, such as exposure to sun rays, repetitive facial expressions, gravity, sleeping positions, and smoking.[7] Extrinsic aging is caused by chronic exposure to UV light, so it is also known as photoaging.[8] Extrinsic skin aging is a collective process and depends mostly on the degree of sun exposure and skin pigment. With chronic skin exposure to UV rays, the stratum corneum layer of the skin thickens, the epidermis is damaged and there is progressive dysplasia with cellular atypia and anaplasia, reduction in collagen, and degradation of elastic fibers.[9]

a. Membrane/ nuclear signaling:- UV irradiation provokes reactive oxygen species (ROS) which repress the activity of enzyme protein *tyrosine phosphatase* κ. This enzyme maintains cell surface receptors of the skin, including receptors for an epidermal growth factor (EGF), interleukin (IL)-1, keratinocyte growth factor and tumour necrosis factor (TNF)-α in an inactive (hypophosphorylated) state.[10] Activated receptors impel to intracellular signaling through stimulation of the stress-associated mitogen-activated protein (MAP) kinases p38 and c-Jun amino terminal kinase (JNK). Kinase activation induces the transcription of MMPs (matrix metalloproteinase) and decreases expression of the procollagen I and III and TGF-β receptors, with an outcome of reduced dermal matrix formation and hence, it reduces the synthesis of collagen.[11]

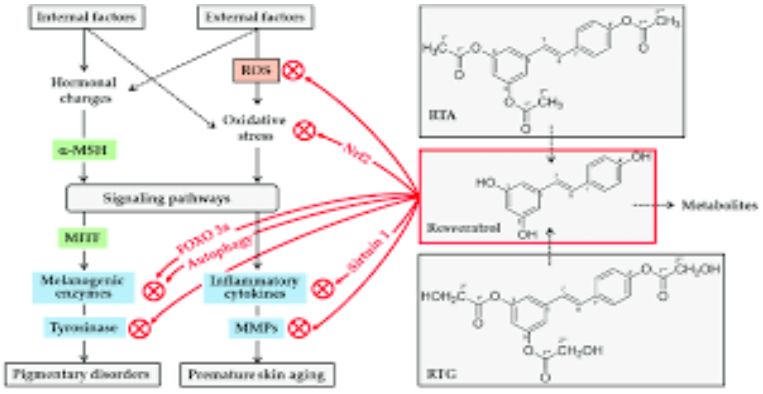

Figure No. 2: Nuclear signaling

b. Mitochondrial damage: Mitochondria are cellular organelles that generate energy (ATP) by compelling oxygen. UV effect on the mitochondria electron transport chain produces abundant ROS that can damage mitochondrial DNA (mtDNA). The mitochondrial genome encodes 13 components of the electron transport chain and oxidative damage may be foremost to deletions or rearrangements of the DNA, most likely due to double-strand breaks which may affect mitochondrial ability to generate energy for the cell. It is inferred that the consequent decrease in mitochondrial function photodamaged skin leads to additional accumulation of ROS and further compromises the cell's ability to initiate energy.[12]

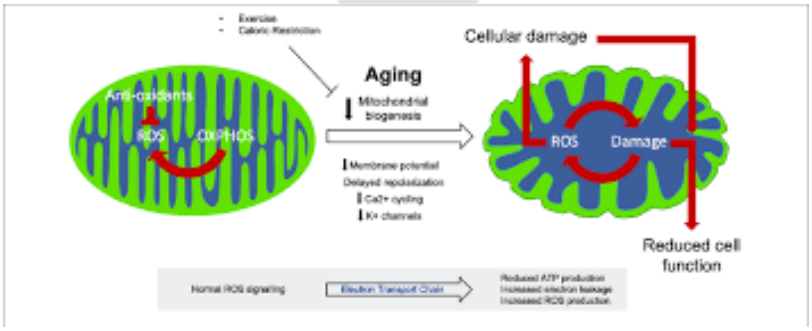

Figure No. 3: Mitochondrial damage.

c. Protein oxidation: Oxidative damage can also affect proteins and photodamaged skin. Oxidative protein impairment may result in loss or gain of activity (i.e. enzymes), loss of structural protein function and increased/decreased susceptibility to degradation.[13]

d. Telomere: Telomeres are tandem repeats of a short sequence TTAGGG. It exists in a loop configuration. Telomeres become critically short when this loop is disrupted by cell division or UV irradiation. During cell division telomeres cap (the terminal portion of chromosomes, preventing the fusion of telomeres with each other) cannot be replicated, so the bases of the

telomeres caps are lost with each cell division and finally enters a state of senescence or apoptosis. When telomeres are damaged by UV irradiation the configuration of the loop becomes disclosed and through interaction with the protein activates the tumour suppressor protein p53 and other proteins which responsible for DNA damage and also induces senescence or apoptosis.[14]

Intrinsic skin aging: Intrinsic skin aging, also known as natural aging mostly found in sun-protected areas. It is due to the passage of time or by the inherited gene, therefore also termed as chronological aging. The molecular mechanisms of both the type of skin aging (extrinsic and intrinsic) are similar, for example shortening of telomeres, mutations of mitochondrial DNA, oxidative stress, genetic mutations, and decrease of many hormone levels. According to the free radical theory of aging, ROS, chiefly commencing from oxidative cell metabolism, play a notable role in both chronological aging and photoaging. ROS influence the transcription factor c-Jun via MAPK (mitogen-activated protein kinase). Intrinsic skin aging is the same as extrinsic aging and collagen is degraded present in intrinsically aged skin similar to photoaged skin.[12] Hormonal changes can also alter intrinsic skin aging. The exhibition of sex hormones in the gonads, the pituitary, and adrenal glands already gradually decline in the mid-twenties. The hormones oestrogen and progesterone start decreasing during menopause. In particular, the imperfection in oestrogens and androgens cause dryness, wrinkling, epidermal atrophy, collagen breakdown, and loss of elasticity.[15]

NATURAL ANTI-AGING HERBS[14,15,16]

MORINGA OLEIFERA

Biological Source: It consists of dried, long, slender, triangular seed pods of *Moringa oleifera* belonging to the family Moringaceae.

Phyto-constituents: *Moringa* leaves have been reported to be a rich source of β-carotene, protein, vitamin C, calcium, and potassium and act as a good source of natural antioxidants; and thus enhance the shelf-life of fat-containing foods due to the presence of various types of antioxidant compounds such as ascorbic acid, flavonoids, phenolics, and carotenoids. The seeds contain Morigyne, 4-(α-L-rhamnosyloxy) benzyl isothiocyanate, and many amino acids.

Role in anti-aging: *Moringa* oil has exceptional anti-aging properties. The antioxidants and the nutrients present in the Moringa oil help to curb the activity of the free radicals on the

skin. The free radicals are the agents that cause damage to the skin tissues and pave way for skin wrinkles. Antioxidants rich in Moringa oil curbs the activities of free radicals and hence finds a place in the anti-aging creams.

Figure No. 4: Moringa oleifera

ALOE VERA

Biological Source: Aloes is 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, aloe-emodin, and resins.

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 fibers.

Figure No. 5: Aloe vera

AMLA

Biological Source: This consists of dried as well as fresh fruits of the plant *Emblica officinalis* belonging to the family Euphorbiaceae.

Phyto-constituents: Amla fruit is a natural source of vitamin C (Ascorbic acid) and also contains fat, phyllembelin, and tannins. Amla fruit is also rich in mineral matters like phosphorus, iron, and calcium.

Role in anti-aging: Amla, being a rich source of vitamin C, is considered important to slow the aging process. It improves skin health. Aging is a cumulative result of damage to various cells and tissues, mainly by oxygen free radicals. Vitamin C is a scavenger of free radicals that breaks them down.

Figure No. 6: Amla

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

Figure No. 7: Turmeric

HONEY

Biological Source: Honey is a sugar secretion deposited in the honeycomb 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-aging: 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 No. 8: 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 the triterpenoid group. These are Ginsenosides, Panaxosides, and Chikusetsusaponin which are responsible for the various activities of ginseng.

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

Figure No. 9: Ginseng

LIQUORICE

Biological Source: Liquorice consists of dried, unpeeled, roots, and stolons of *Glycyrrhiza glabra*, belonging to the family Leguminosae.

Phyto-constituents: The chief constituent is of liquorice is a triterpenoid saponin known as glycyrrhizin (glycyrrhizic acid), which is a potassium and calcium salt of glycyrrhizinic acid. It also contains flavonoids, liquiritin, and isoliquiritin.

Role in anti-aging: The anti-aging activity of liquorice is due to the presence of phenylflavonoids (dehydroglyasperin C, dehydroglyasperin D, and isoangustone A, which act as superoxide scavenger and prevent wrinkles.

Figure No. 10: Liquorice

JATAMANSI

Biological Source: Jatamansi consists of dried rhizomes of *Nardostachys jatamansi* belonging to the family Valerianaceae.

Phyto-constituents: It contains volatile oil, resin, sugar, starch, and also contains jatamansic acid and ketones, jatamansone, and nardostachnone.

Role in anti-aging: Jatamansi triggers fibroblasts to increase the synthesis of collagen and elastin fibers, due to which skin elasticity increases and wrinkles formation (aging) decreases.

Figure No. 11: Jatamansi

ARJUNA

Biological Source: Arjuna consists of dried stem bark of the plant known as *Terminalia arjuna*, belonging to the family Combretaceae.

Phyto-constituents: Arjuna contains tannins, triterpenoid saponins, arjunolic acid, arjunic acid, arjungenin. It also contains ellagic acid, arjunin, arjunolone.

Role in anti-aging: Aging occurs due to a decrease in collagen production. Collagen synthesis and epidermal barrier function are improved by pentacyclic triterpenoids found in *Terminalia arjuna*. It also increases skin moisturization and decreased scaliness. It

strengthens the skin barrier and induces sebum production to reduce the signs of dry skin and protect the skin from external challenges. It also contributes to improved blood circulation for better nutrient supply.

Figure No. 12: Arjuna

GREEN TEA:

Biological Source: It is the dried ripe seed of *Camellia sinensis*, belonging to the family Rubiaceae.

Phyto-constituents: The leaves of tea consist of thease which is an enzymatic mixture containing an *oxidase*, which partly converts the phlobatannin into phlobaphene, as a chemical constituent. Other chemical constituents present in tea leaves are tannins, caffeine. It contains 1-5% of tannin and 10-24% of caffeine.

Role in anti-aging: Epigallocatechin gallate and other catechins prevent adverse effects caused by UV radiation. The polyphenols present in green tea have good ROS scavenging activity, which makes it a potential candidate in antiphotoaging therapy.

Figure No. 13: Green tea

CINNAMON:

Biological Source: It consists of the dried inner bark of the shoots of coppiced trees of *Cinnamomum zeylanicum (Cinnamomum verum),* belonging to the family Lauraceae.

Phyto-constituents: Cinnamon consists of 0.5-1% volatile oils, 1.2% tannins (phlobatannin), mucilage, calcium oxalate, starch, and mannitol, and Cinnamon oil – Eugenol, benzaldehyde, cumin aldehyde, and other terpenes.

Role in anti-aging: Cinnamon has powerful antioxidant and anti-inflammatory properties that slow down skin aging, plus it can help you shed some extra pounds. Cinnamon improves blood circulation and brings oxygen to your skin, giving you a healthy glow. Better circulation means that more nutrients can reach the layers of your skin where collagen and elastin are produced, resulting in healthier and younger-looking skin.

Figure No. 14: Cinnamon

BASIL (TULSI):

Biological source: It consists of the fresh and dried leaves of *Ocimum* species like *Ocimum sanctum* L. and *Ocimum basilicum* L belonging to the family Labiatae.

Phyto-constituents: The main chemical constituents of Tulsi are: Oleanolic acid, Ursolic acid, Rosmarinic acid, Eugenol, Carvacrol, Linalool, and β-caryophyllene, have been used extensively for many years in food products, perfumery, and dental and oral products and plant extract continues the numerous searches for more effective drugs of plant origin which are less toxic and available for the low socio-economic population in the treatment of diseases caused by pathogenic bacteria.

Role in anti-aging: Neutralizes biochemicals that can contribute to degenerative diseases, cancer, and premature aging. Rich in vitamins and minerals, holy basil contains calcium,

zinc, iron, vitamins A and C as well as chlorophyll and other phytonutrients. Holy basil improves digestion and absorption of nutrients.

Figure No. 15: Basil (Tulsi)

COFFEE:

Biological Source: It is the dried ripe seeds of *Coffea arabica* Linn, belonging to the family Rubiaceae.

Phyto-constituents: The main constituents of coffee are caffeine, tannin, fixed oil, and proteins. It contains 2–3% caffeine, 3–5% tannins, 13% proteins, 10–15% fixed oils. In the seeds, caffeine is present as a salt of chlorogenic acid. Also, it contains oil and wax.

Role in anti-aging: Coffee contains caffeine and many kinds of polyphenols. Caffeine has several effects on aging, especially through inhibiting the mammalian target of rapamycin (mTOR) complex 1 (mTORC1) and prolonging the life span of fission yeast.

Figure No. 16: Coffee

DISCUSSION:

Table No. 1:

Sr. No.	Ingredients	Qty used in anti-aging
1.	Moringa Oleifera	2 gm
2.	Aloe vera	0.35 gm
3.	Amla	0.5 gm
4.	Turmeric	1 gm
5.	Honey	4 gm
6.	Ginseng	3 gm
7.	Liquorice	1.5 gm
8.	Jatamansi	0.3 gm
9.	Arjuna	0.001 gm
10.	Green tea	4 ml
11.	Cinnamon	2 gm
12.	Basil (Tulsi)	2 gm
13.	Coffee	1.5 gm

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-aging effect duration.

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