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A REVIEW ARTICLE ON HERBAL ANTI-AGING SERUMS BASED ON ESSENTIAL OILS

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ABSTRACT

Among the integumentary organs, skin plays a pivotal role. Human happiness and how healthy we feel greatly depend on the state of our skin. The skin is incredibly important since it aids in immunity, prevents infection, regulates body temperature, and controls the body's water and electrolyte balance. The epidermis is the outermost layer of the skin and acts as a barrier against bacteria and other pathogens. Wrinkles form and skin loses elasticity as a result of the epidermal layer thins with age. Extrinsic variables such as sun exposure, smoking, nutrition, and pollution contribute to aging just as much as hereditary factors like cellular metabolism, hormones, and the metabolic process. People today prefer natural herbs over invasive procedures like plastic surgery or laser therapy because of the lower risk of side effects. Herbs aid the skin's natural processes and provide essential nutrients for glowing, healthy skin. Phytochemicals found in herbs, such as carotenoids, terpenoids, and polyphenols, have been shown to have anti-aging effects. Herbs including aloe, cucumber, ginseng, honey, wheat, liquorice, arjuna, jatamansi, etc., have been shown to slow the aging process.

KEYWORDS: Anti Aging, Anti-inflammatory, Skin, Serum, Essential oils (EOS).

INTRODUCTION

The skin starts to age and change around one's third decade. Environmental damage, on top of the natural aging process, is a major factor in how our skin will eventually look. Bone, cartilage, and the subcutaneous compartments that support the skin are all vulnerable to breakdown as a result of the aging process. Two separate aging processes exist. Chronological or intrinsic aging is the type of aging that is determined by our genes and the passage of time itself. Extrinsic aging, on the other hand, is the result of things like sun exposure and pollution in the environment. The state of mature skin has nothing to do with how old its owner is. Skin aging is largely influenced by environmental variables. Contrary to areas exposed to light, skin that is not exposed to light retains its tone, flexibility, and epidermal regeneration potential well into old age.[1]

Even though the skin protection factor (SPF) system in topical products has been successful in educating the public about the risks of sun exposure, dermatologists have been discussing and debating sunlight's contribution to or facilitation of premature skin aging since the late 1800s. Despite this, a disproportionate amount of people seeks out dermatologists because they have the most obvious signs of sun damage, such as wrinkles and undesirable pigmentation (photo-aging). The sun is the principal external cause of skin aging, along with several endogenous and environmental factors. In this section, we'll talk about how the sun can affect both the intrinsic (natural) aging process and photo-aging (the extrinsic (outside the body) aging of skin). Also covered will be tactics for warding off photo-aging as well as the effects of both types of aging on the skin.[2]

One of the most common cosmetic worries amongst women is the signs of aging skin on the face. Wrinkles, sagging, uneven skin tone, and dull, dry skin are just a few of the outward signs of aging that can have a devastating effect on confidence and relationships with others. Photoaging is a significant progressive factor in the aging process, which is influenced by both inherent and external factors. There are already a wide variety of treatment options available to reverse the effects of cellular and molecular damage associated with aging skin. Oxidative free radicals cause damage on a cellular and molecular level, and topical antioxidants are a non-invasive way to repair this damage. In addition to more invasive procedures including chemical peels, ablative and no ablative laser photo-rejuvenation, radiofrequency (RF) therapy, dermal fillers, and botulinum toxin, topical cell growth regulators and retinoids are also employed.

The human epidermis contains bioactive antioxidants in both its water- and lipid-soluble compartments. Vitamins C and E are just two examples of those that cannot be made by the body and are thus required to be obtained either through diet or supplementation. As the most bioavailable form of vitamin C, L-ascorbic acid is the skin's primary antioxidant. Percutaneous absorption of L-ascorbic acid from a topical solution is limited to no more than a 20% concentration. In addition to acting as an antioxidant and mediator of photo-damage and melanogenesis, vitamin C's activities in supporting collagen production and stability, which provide regeneration and anti-inflammatory benefits, also contribute to its anti-aging effects on the skin.[3]

MECHANISM OF SKIN AGING

Intrinsic Aging

The process of intrinsic aging, or natural aging, begins in most people around their mid-twenties and continues indefinitely. Collagen production slows down and elastin's elasticity decreases as we age. There may be a marginal slowing in the production of new skin cells and the shedding of dead skin. These alterations normally start to take place in one's twenties, although the telltale indicators of intrinsic aging are sometimes not noticeable for decades afterward. Fine lines and wrinkles, thinning and transparency of the skin, loss of underlying fat, bones shrinking away from the skin as a result of bone loss leading to sagging skin, dry skin, inability to sweat enough to adequately cool the skin, greying hair, hair loss, and unwanted hair are all indicators of intrinsic ageing. Young people's faces are round and large, with prominent cheekbones, wide nose bridges, and full mouths. The mandible becomes more scalloped and shadows deepen as we age, and our lips get flatter and our cheeks and temples sink.

The dermis, epidermis, and stratum corneum rely on the structural support of the underlying bone, cartilage, and subcutaneous compartments that make up the skin support system. Reversing the age-related decline in each of these areas is a key component of any comprehensive anti-aging strategy. The underlying skeletal framework is an essential factor to think about. The skin droops unsupported over the face without a solid foundation. At the age of 25, demineralization of the bones occurs, resulting in a general flattening of the face. Treatment with bisphosphonates and other bone regenerative drugs is typically delayed until obvious osteoporosis is established. Facial structure is determined by the relationship between the bones and cartilage. The nose, of all the cartilage-dependent face features, is

arguably the most significant. While cartilage remains intact throughout life, its shape may alter slightly as we become older. High quantities of produced relaxins cause the alteration in the third trimester of pregnancy.

Much of the alteration that brings about the aging look of the face occurs in the subcutaneous compartment. Fat cells shrink in size, lose their ability to store energy, stop differentiating into new cell types, and get redistributed as a result of the aging process. In order to reduce levels of growth hormone, subcutaneous fat is shed from the entire body, including the face, and redeposited within the abdominal cavity. As a result of lipoatrophy, the face becomes excessively concave, with muscles and bony landmarks standing out. Menopause causes a reorganization of the body's fat stores. After menopause, a woman's fat deposits often shift, with less accumulating in the face and more in the breasts, arms, waist, thighs, and buttocks. Under the eyes, the tear troughs, and the cheeks all start to lose volume. The decrease of volume in the cheek and perioral area is most noticeable near the nasolabial folds. Midface ageing is characterized by the prominence of the nasolabial fold. This crease is more mobile when a person is young, but it flattens out as they get older.

Skin health depends on a dermis and epidermis that can function normally. Wrinkles and a more pronounced look of muscle attachments are the results of skin collagen fibre bundles being damaged and lost. Lentigines, poikiloderma, and melasma result from irregular melanization, while erythema results from significant telangiectasias.

Skin loses its mechanical capabilities as we age due to a breakdown in the extracellular matrix and the breakdown of its key component, hyaluronate, which stabilizes intracellular structures by generating a viscoelastic network in which collagen and elastin fibres are embedded. Hyaluronate cushions the epidermis and underlying components of the skin. Loss of hyaluronate, and hence of the viscoelastic buffering mechanism, would make the skin more prone to tearing and, as a result, lacerations, as the extracellular matrix is responsible for providing the skin with its solidity. Fine lines and wrinkles are caused by dehydration, a curable issue with the stratum corneum. It is possible to bring back the usual brick-and-mortar lamellar structure of the corneocytes and intercellular lipids.

Extrinsic Aging

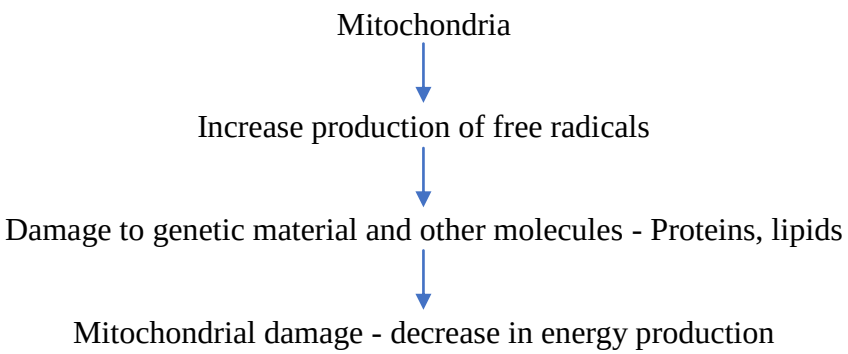
Extrinsic, or external, factors often work in conjunction with the natural aging process to accelerate skin aging. Premature aging of the skin is caused by environmental factors such as

sun exposure, gravity, certain sleeping positions, and cigarette use. Lines and wrinkles on the face are a direct result of repeated facial expressions. Lines appear on our faces because of the crease that emerges when we contract the muscles that make up our faces. Wrinkles and fine lines appear on the face because aging skin is less elastic and unable to return to its smooth, wrinkle-free state. As we get older, we experience increasingly pronounced changes associated with gravity. The effects of gravity become more apparent when skin elasticity decreases around middle age. A drooping nose tip, stretched ears, drooping eyes, sagging jowls, and a diminished upper lip and a more pronounced lower lip are all effects of gravity. Resting your face in the same position night after night for years also causes wrinkles. Over time, wrinkles caused by sleeping in the same position don't fade away.

Biochemical alterations brought on by smoking cigarettes hasten the aging process. Long-term smokers' skin takes on an undesirable yellowish tint and develops deep wrinkles and a leathery texture not found in non-smokers. Quitting smoking has been shown to significantly reduce these symptoms.

The sun is the primary culprit in accelerated aging. Photoaging is mostly determined by one's level of sun exposure and skin pigmentation, as opposed to how much time has passed, as in the case of chronological aging. The effects of photoaging are more pronounced in fair-skinned people who lead active lifestyles in sunny environments.

The long-term consequences of frequent exposure to UV radiation are the most significant among damaging environmental elements that contribute to extrinsic aging, and are known as photoaging. The cumulative exposure to ultraviolet radiation throughout a lifetime is exactly proportional to the rate of photoaging. Photoaging occurs long before the symptoms of natural aging become noticeable. Excessive sun exposure in young people causes them to look older than they are.[1,4]



Aging

Essential Oils

Because of its low cost and therapeutic properties, essential oil produced from plants has various uses in the medical, cosmetic, and pharmaceutical industries.

Essential oils have a lower density than water and a pleasant, calming aroma; they are secondary metabolites found in plants. Essential oils have gained popularity in both the medical and pharmaceutical fields due to their wide range of health benefits and minimal toxicity. Essential oils have been the subject of numerous reports of health benefits and lower toxicity. Essential oils have been increasingly used in the fields of food and medicine due to the wide range of benefits they provide, including antioxidant and antibacterial properties.

Because it is such a rich source of components that exhibit antioxidants and many other properties, essential oil is essentially a natural extract that consists of phytochemicals and demonstrates biological and antioxidant activities. There are about 3000 different types of essential oils, but only about 300 are widely used. Essential oil can be extracted using a wide variety of both modern and traditional processes, including hydro distillation, steam distillation, ultrasonic, ohmic, and microwave assisted hydro distillation, and supercritical fluid extraction. Long extraction times, low efficiency, and solvent toxicity are only a few of the problems with traditional methods. As a result of improvements in speed, efficiency, energy savings, extraction yield, productivity, and thermal-stability of essential oils, modern procedures are now favoured over traditional ones. Phytochemicals are substances extracted from plants that have biological effects. These chemical components can be isolated from a variety of botanical sources; all that matters is the extraction technique used. Recovering essential oils from the plant matrix requires the use of solvents and procedures that reveal the purity and chemical family of the extracted oil. This review, outlining the biological activity of two different plants, was created with the class of molecules that essential oils contain in mind.[5]

Essentials oils Chemistry

Essential oils (EOs) are a class of volatile plant chemicals that are both naturally occurring and chemically complicated. Flowers, leaves, seeds, rhizomes, and barks are rich sources of EOs, which are often extracted using hydro-distillation or cold-pressing techniques. The

Arabs invented steam distillation in the Middle Ages, and it has become a standard laboratory technique since then. Essential oils have been used medicinally for a long time; even the bible mentions them as having spiritual, mental, and bodily healing properties. Aromatic plants containing EOs were utilized as food preservatives, flavouring agents, and therapeutic purposes; they were even given the title "father of medicines" by Hippocrates, the legendary ancient Greek physician. Quinta essential, a phrase used to describe a medicinal ingredient, is where the term "essential oil" comes from. Essential oils are employed in numerous industries now, including medical (both traditional and alternative), cosmetics, perfumes, cuisine, and massage. Essential oils (EOs) derived from aromatic herbs were used in Egypt as a means of both disease prevention and treatment. Greeks and Romans quickly picked up on Egyptian methods of employing EOs for aromatherapy and general well-being enhancement. For CNS stimulation and mental relaxation, for instance, they used steam baths filled with oils of jasmine, ylang-ylang, and lavender. Essential oils (EOs) serve an important role in plant protection and growth because they kill microorganisms, deter herbivores, and entice pollinating insects. Essential oils (EOs) have been widely employed as antibacterial, antifungal, and insecticidal agents because of their naturally occurring characteristics. As our knowledge of the chemistry of EOs and their ability to penetrate biological membranes has grown, they have emerged as promising tools for the therapy of a wide range of neurological illnesses. About 3000 EOs have been identified so far, with another 300 being extremely important to commercial sectors like the food, pharmaceutical, cosmetic, agronomy, sanitation, and perfume industries. D-carvone, D-limonene, and geranyl acetate, for example, are utilized in the manufacture of a wide variety of items, including cosmetics, toiletries, detergents, and industrial solvents. Essential oils are also utilized in massages, often in combination with vegetable oils. Para-medical practitioners claim that certain EOs have healing powers and that they can treat a variety of illnesses.[6]

Natural Herbs Used for Anti-aging

When it comes to slowing down and even reversing skin aging, herbal cosmetics are in a league of their own. Herbal cosmetics contain ingredients that not only promote healthy skin but also have an effect on the skin's biological processes. More than half of all pharmaceuticals are derived from nature, and treatments based on plants show great promise in improving human health. Herbal anti-aging product use has increased dramatically in recent years. Several cosmetics that shield the skin from premature aging and wrinkles have emerged as a result of current developments in the anti-aging skin care industry, which center

on the discovery and development of new plant extracts and botanical ingredients based on their traditional medical uses.[4]

Aloe Vera

Aloe vera, also Aloe barbadensis miller, is the scientific name of the plant. It is a member of the Asphodelaceae (Liliaceae) family and is either an evergreen shrub or an evergreen tree. The arid regions of Africa, Asia, Europe, and North America are ideal for its growth. Rajasthan, Andhra Pradesh, Gujarat, Maharashtra, and Tamil Nadu are some of the states in India where you can find it.[7]

Fig. 1: Aloe Vera.

Anthraquinone glycosides can be found mostly in the gel of all aloe plants. Aloin, a combination of glycosides in which barbaloin has a preeminent role, is aloe's primary active component. Isobarbaloin, -barbaloin, aloe-emodin, resins, and barbaloin are all present in the medicine.

Aloe vera leaves are frequently found in moisturizers and lotions marketed as anti-aging. The ingredients of aloe Vera, such as aloin A and B, have been proven to suppress the activity of collagenase, the enzyme responsible for the destruction of collagen fibers, making them effective in the treatment of aging and wrinkles.[8,9,10]

Amla

The amla (Phyllanthus emblica) fruit has significant concentrations of phytochemical components, making it a natural source of antioxidants and nutraceuticals with medical benefits. Fruits of the Euphorbiaceae plant Emblica officinalis, both dried and fresh, make up

this. The fruit of this small to medium-sized deciduous tree or shrub is the most valuable for its usage in ancient ayurveda treatment.

Amla fruit includes lipids, phyllemblin, and tannins in addition to vitamin C (Ascorbic acid). Calcium, phosphorus, and iron are just a few of the minerals found in abundance in amla fruit.

Amla's high vitamin C content means it can help people feel younger for longer. It's good for the skin. Damage to cells and tissues, especially from oxygen free radicals, adds up over time and leads to the aging process. Vitamin C acts as a scavenger, neutralizing free radicals.[8,9,10]

Fig.2: Amla.

Turmeric

"Turmeric" is the English name for Curcuma longa, which is also known as "kurkum" in Arabic and "haldi" in Hindi and Urdu.

Curcuma longa, a member of the ginger family, produces the rhizomes that are used to make turmeric both in its dried and fresh forms.

Fig. 3: Turmeric.

Curcuminoids, the ingredient that gives turmeric its yellow color, are found in it. Curcumin is the primary component of curcuminoids (50-60%). A volatile oil, resin, camphor, camphene, etc., is also present.

Curcumin, the active ingredient in turmeric, is an antioxidant that can neutralize both superoxide radicals and singlet oxygen. Therefore, curcumin is primarily responsible.

Ginseng

Genus Panax belonging to Family Araliaceae contains eleven species (three varieties) namely P. trifolius, P. notoginseng, P. quinquefolius, P. ginseng, P. pseudoginseng, P. zingiberensis, P. stipuleanatus, P. japonicus, P. japonicus var. angustifolius, P. japonicus var. major, and P. japonicus var. bipinnatifidus, which are mainly distributed in Eastern Asia and Northern America.

Previous research has shown that P. ginseng contains a number of bioactive ingredients. These include ginsenosides, polysaccharides, alkaloids, glucosides, and phenolic acids. The most common ginsenosides found in the roots of the Panax genus. They have ocotillo and oleanolic acid as well as protopanaxadiol and protopanaxatriol.

Ginsenoside is a bioactive compound thought to have anti-aging effects on the skin. A study that used a randomized, double-blind, placebo-controlled design found that red ginseng extract reduced the depth of facial wrinkles by increasing the expression of type-I procollagen genes and proteins and decreasing the activation of MMP-9 genes. To some extent, the effects of UVB irradiation on the epidermal thickness and skin TGF-1 concentration were blunted by red ginseng extract. These findings lend credence to claims that red ginseng can slow the effects of photoaging and make it a more effective "beauty food."[11]

Honey

Honey is a sweet secretion produced by the bees (Apis mellifera and other species of Apis) of the family Apidae and stored in honeycomb.Honey is a 35% glucose, 45% fructose, and 2% sucrose (by weight) aqueous solution. Maltose, gum, polyphenols, flavonoids, vitamins, proteins, etc. are all part of its make-up.[9,10]

In vitro antimicrobial activity of honeys from all over the world has been described in several scientific articles, some of which are addressed here.

Traditional Ethiopian medicine makes use of honey from South Gondar, Ethiopia, produced by the stingless bee Apis mellipodae, for the treatment of a wide range of illnesses, including skin infections.[12]

Arjuna

Arjuna is the dried stem bark of a plant in the Combretaceae family. The plant's scientific name is Terminalia arjuna.

Tannins, triterpenoid saponins, arjunolic acid, arjunic acid, and arjungenin are all compounds found in Arjuna. Ellagic acid, arjunine, and arjunolone are also present.

Arjuna's antioxidant capabilities protect the skin from the free radicals that might cause damage over time. It aids in cell renewal, keeps skin moist, and makes skin more elastic. As an added bonus, it keeps the skin from drying out and drooping.[8,9,10]

Ashwagandha

Herbal remedies have been utilized in traditional medicine to treat hair and skin disorders since ancient times, and many scientific investigations have found that chemicals isolated from plants have anti-inflammatory and wound-healing effects. Ashwagandha, or Withania somnifera (WS) is a member of the nightshade family that is utilized in Ayurvedic medicine for a variety of purposes.[13]

The skin's natural oils are stimulated by ashwagandha. It calms, clarifies, and replenishes the skin while aiding in the reduction of acne. It has anti-aging qualities that help skin retain its suppleness.

Ashwagandha is a Rasayana, or rejuvenator, that protects the skin from the sun's rays. Ashwagandha is a "super food" for the skin since it purifies, moisturizes, soothes, and restores the skin's natural radiance.[14]

American witch-hazel

Witch-hazel, as well as Hamamelis virginiana, has been used for centuries as a beauty aid. The steam-distilled oil extracted from the plant's fresh leaves and twigs is used as a mild astringent and is reportedly helpful for treating boils, ulcers, itchy eczema, bruises, and other skin ailments. The twigs can be used to make a decoction that can be used to treat tumours, inflammation, and edema. The volatile oil, hamamelitannin, catechins, gallic acid, etc., are all

present in the leaves as well as the bark. The high tannin content of this plant is likely responsible for its astringent action and its haemostatic property, both of which are of great benefit in the treatment of varicose veins. It helps calm the mucosa, the skin, and mild capillary issues because of its relaxing and anti-couperose properties. Hamamelis ointment has also been used to treat atopic dermatitis, provide sun protection, tone oily skin on the face, prevent the creation of small pimples, and lessen the discomfort of sprains and other sports-related injuries. have used ESR spin-trapping and malondialdehyde production techniques to assess Witch Hazel's anti-aging efficacy in a mouse dermal fibroblast culture system. The bark has been analysed and found to contain polymeric proanthocyanidins and polysaccharides. When tested on cultured human keratinocytes, it was found to boost cell proliferation while decreasing trans epidermal water loss and erythema development. Thirty healthy participants were tested with a modified UVB erythema test model to determine the efficacy of hamamelis lotion in reducing inflammation. Within 48 hours, it was discovered that erythema could be greatly reduced by between 20 and 27 percent compared to other formulation. Forty human volunteers participated in a modified UV erythema test with three UV dosages to evaluate the topical treatments containing 10% hamamelis distillate for their anti-inflammatory activity. Although the effect was diminished, UV erythema was greatly mitigated.[15]

Centella asiatica

India, Sri Lanka, Madagascar, South Africa, Australia, China, and Japan are just some of the places you can find the perennial herb Centella asiatica. (Family - Umbelliferae) Madecassoside, asiaticoside, centelloside, and asiatic acid are some of the active triterpenoids and saponins found in the plant, and they have been shown to stimulate cellular hyperplasia, collagen production, granulation tissue levels of DNA, protein, total collagen, hexosamine, rapid collagen maturation and cross-linking, and other beneficial effects. Madecassoside is a component of C. asiatica that has been shown to influence inflammatory mediators and stimulate collagen expression. To back up this claim, a randomized, double-blind clinical trial was conducted, the results of which showed a statistically significant increase in the clinical score for smoothness, firmness, roughness, and hydration. In human dermal fibroblast cells, the active saponin known as asiaticoside stimulates the production of type I collagen.[16]

Berberis aristata

In Ayurveda, B. aristata plays a significant role in the treatment of liver and gallbladder disorders. Russian doctors prescribed it for inflammatory diseases, hypertension, and menstrual irregularities. (Genus - Berberis), (family - Berberidaceae), A decoction made from B. aristata roots is said to help with skin issues and purify the blood. Aphthous sores, scrapes, and ulcerations can be healed using a mixture of aristata and honey. Patients with skin diseases have had success using a topical preparation including B. aristata to ward off acne vulgaris. The plant's native range extends from India through the rest of South and Southeast Asia. TPA-induced IL-6 expression, ERK activation, and AP-1 DNA binding activity in UV-induced skin inflammation, aging, and extracellular matrix protein degradation have all been shown to be inhibited by berberine isolated from B. aristata.[17,18,19]

Indian gooseberry

Using immunocytochemistry and Western blotting, researchers found that E. officinalis's 0.1 mg/ml concentration significantly promoted type I collagen and inhibited collagenase activity in primary mouse fibroblast cells. Fruit extract from the Phyllanthaceae family has been shown to induce procollagen synthesis and stimulate fibroblast proliferation at a concentration and time dependent rate. In contrast, fibroblast MMP-1 production was greatly reduced, whereas TIMP-1 production was greatly enhanced.

Among the five primary compounds identified from F. chinensis extract, aesculetin was discovered to exhibit significant free radical scavenging action, resulting in a dose-dependent reduction in MMP-1 mRNA and protein expression in UVB-irradiated human dermal fibroblasts.[20,21]

Tulsi

Tulsi, which means "the incomparable one" in Sanskrit, is a wonderful addition to any first aid box due to its wide variety of uses. In fact, all 13,000 species of Tulsi are celebrated for their potential to aid in the healing of a variety of diseases, placing them at the top of the list of plants known for their medicinal significance. Phytochemicals such as oleanolic acid, rosmarinic acid, ursolic acid, eugenol, linalool, carvacrol, element, caryophyllene, and germacrene may play a role in this. Antioxidant activity is highest in Tulsi’s ursolic acid, rosmarinic acid, and eugenol components. As we've shown, they're effective at counteracting the free radical damage that has been associated with aging and collagen depletion. They may also have anti-inflammatory effects.

Fig.4: Tulsi.

Environmental stressors, such as UV radiation, can set off inflammation, which in turn has been linked to the acceleration of the aging process. Thus, Tulsi can prevent the formation of wrinkles, fine lines, and sagging skin.

In example, hyaluronic acid degradation-inhibiting biological activities have been traced to ethanolic and rosmarinic qualities. This factor is responsible for the youthful suppleness of the skin and the maintenance of its moisture and health. Both of these characteristics were linked to a decrease in collagen fibre degradation in research, which suggests that brighter, scar-free skin may be maintained with their support.

This may explain why Tulsi is being researched by so many cosmetics companies as a possible anti-aging component.[22]

CONCLUSION

More research using various models is needed to establish whether or not herbs can indeed reduce the appearance of wrinkles. To discover viable leads from natural resources used in the treatment of skin aging, traditional and other resources' plants must be examined using a combination of exploitation and investigation.

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