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# Review on Skin Aging and Anti-Aging Natural Herbs

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**Abstract**

*The biggest part in the integumentary system is the skin. The state and texture of an individual's skin has significant effects on their entire fitness and their overall a healthy life. The skin regulates body temperature, maintains water and electrolyte balance, and helps in immunity by protecting the body from infections. The outermost layer of skin that covers the body's surface and acts as a protective barrier is known as the epidermal layer. The reduction of this epidermal layer, decreased collagen and elastic fibers, and the formation of lines are the signs of aging. Extrinsic like sun exposure, smoking, diets, and pollution can cause aging, as can intrinsically factors like heredity, cellular metabolism, hormones, and biological processes. Nowadays, with advances in technology, many people want to look younger and prevent issues by using natural herbs instead of plastic surgery or laser therapy. Herbs provide the nutrients required for healthy skin as well as enhance the skin's biological processes. Herbs are rich in phytochemicals with anti-aging properties, such as polyphenols, terpenoids, and carotenoids. Herbs having anti-aging properties are aloe plant, neem, turmeric, amla, peppermint, green tea, honey from bees, liquorice, arjuna, also and jatamansi.*

**Keywords** - Herbs, Anti-aging, Skin, phytochemicals

## INTRODUCTION

In society, appearances are very important because they reflect one's identity to others and have a big impact on how people see you. In the era of social media, celebrities and Photoshop, every person is now highly aware of their appearance. Setting excessive standards for self is a usual mistake, especially when comparing the typical person with the beautifully altered photos that famous people provide. Their picture-perfect society shows an apparent fear to aging, as seen by the filters used to smooth out wrinkles on Instagram postings, fillers injected to boost up tissue to decrease laugh lines and makeup to cover up any sunspots that have appeared. [1]

### What is skin aging

A complex biological process, skin aging is affected by both internal and external causes. The process of a chronological aging, also referred to as intrinsic cellular aging, is mainly brought by a genetic factor. It happens through time. Normally, it shows up as thinner skin, fine wrinkles and decreased flexibility. On the other hand, environmental factors such as pollution, smoking, sun exposure (photoaging) and lifestyle choices are causing extrinsic aging. Photoaging is the main cause of most of noticeable changes in the texture of the skin, pigmentation and the formation of deeper wrinkles. [2]

Process of aging starts at birth and becomes noticeably apparent on the skin as we age. It is predicted that there will be more than 1.2 billion older persons (those over 60) in the world in 2025 due to a longer lifetime. [3]

A reduction in the quantity of specialized cells, which synthesize the protein collagen, and the vessels which provide nourishment to the skin is a sign of aging skin flexibility, which leads to the development of wrinkles. [4] Between the human body and the external environment, the skin works as difficulties. Its function includes maintaining fluid balance, regulating temperature and protecting against dangerous bacteria and UV rays from the sun. Age-dependent/chronological ageing and premature ageing/photoaging are the two types of skin aging. Deep lines dark/light pigmentation and a rough appearance are some of the external signs of photoageing. Skin wrinkles are a common sign of natural ageing. The different layers of the skin are known as the dermis, epidermis and subcutaneous tissue. [5]

The outermost membrane of skin, called an extracellular matrix (ECM), is composed of proteins such as elastin and collagen and also fibroblasts. An extracellular matrix (ECM) gives a structural framework that is essential to skin flexibility and growth. It contains the enzymes collagenase, elastase and hyaluronidase. One of the key parts of skin is collagen, which gives the skin its strength, flexibility and elasticity. The structure, flexibility and hydration of the skin are all enhanced by hyaluronic acid. It also helps in the rapid proliferation, regeneration, and restore of tissue along with the product exchange.

Hyaluronic acid, elastin, and collagen level decrease with ageing, causing the skin to lose strength and flexibility. This causes wrinkles to appear, which are linked to thick epidermis, as well as spotted discolouration, laxity, dullness, and roughness. [6]

Modern science and technology provide plastic surgery, laser rejuvenation, and other invasive procedures. On-surgical procedures are risk-free and typically have little adverse effects as compared to invasive technique. Herbal extracts are more popular in cosmetics over the past ten years as a way to slow down the aging process. Because of their positive effects on skin, extract of aloe Vera, Alma, Turmeric, Green tea, Honey, neem, Liquorice, Arjuna, peppermint, and Jatamansi are commonly used in the herbal cosmetic industry. [7]

**Aging process**

The aging process is a complex natural process caused by external as well as internal factors. The main features of skin aging are given as follows:

**Types of aging**

**Chronological aging or intrinsic aging**

The term “intrinsic aging,” also called “chronological aging,” describes the biological aging process that is caused by both genetic and physiological factors.

**Decrease in collagen and elastin**

The skin’s flexibility and strength is maintained by elastin, while collagen begin to break down. This causes wrinkles and sagging

**Reduced natural oil production**

As people age, their sebaceous glands produce less oil, which leads to dry skin. Reduced cell turnover: Skin gets thinner and more sensitive as skin cells regenerate more slowly.

**Reduced blood flow**

A duller less red skin indicates less blood flowing to the skin. Derma thinning: This condition makes the skin drier and more open to injury by causing the layers of the skin, particularly the dermis, to thin out. [8]

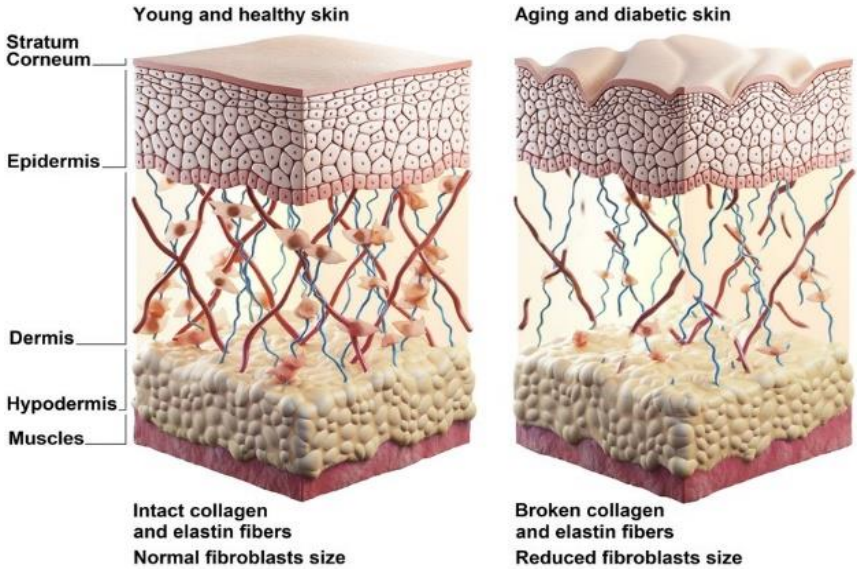


***Figure 1*:** *Aging process: comparison of young skin and aged skin*

**Extrinsic aging (or environmental) Sun Exposure (photoaging)**

By dissolving collagen, UV rays rapidly accelerate up aging and cause wrinkles and pigmentation problems.

**Smoking**

Nicotine constricts blood vessels, which reduces skin moisture and increases along the breakdown of collagen.

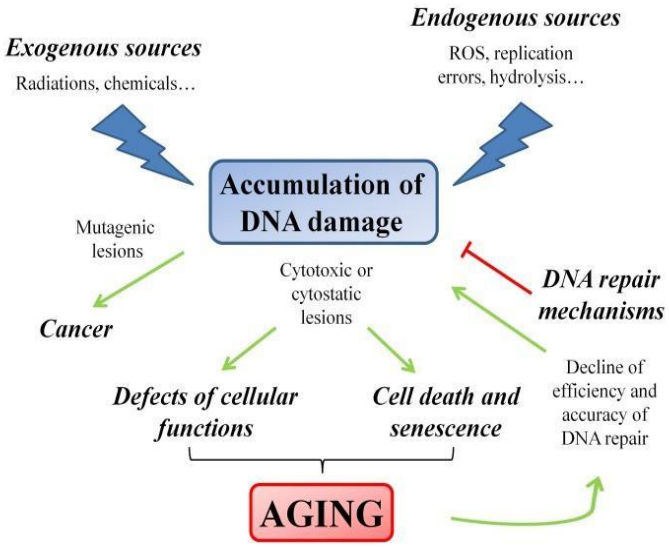


***Figure 2*:** *Telomerase inducing Skin Aging*

**Pollution**

Chemicals found in the environment cause oxidative stress, which speed up the aging process. Lifestyle: Excessive stress, an unhealthy diet, lack of sleep, and lack of water can all increase the rate of skin aging.

**Cell and Molecular System Mechanisms Oxidative Stress**

Reactive forms of oxygen (ROS) caused by pollutants, UV rays, and metabolic activity results in cellular damage and rapid aging. In order to reduce the effects of aging on the skin, preventive measures like sunscreen use, a healthy lifestyle, skincare routines are crucial.

This is because environmental and genetic factors connect in a complex way. [8]

**Mechanism of skin aging**

**Oxidative stress**

Oxidative damage may affect proteins and skin that is photodamaged. Loss or gain of activity (i.e., enzymes), loss of basic protein function, and increased or decreased sensitivity to disintegration are the potential effects of oxidative protein damage. [9]

**Telomere**

The short sequence TTAGGG is tandemly repeated to form telomeres. It is present in the structure of a loop. When these loops are broken by UV radiation or cell division, telomeres become critically short. The base regions of the telomere's caps are lost with each cell division and ultimately enter a state of aging or cell death because the telomeres cap the terminal region of chromosomes that prevents telomeres from fusing with each other cannot be reproduced during cell division. UV rays damages telomeres, exposing the loop structure that, through protein-protein interaction, release the p53 gene suppressor of cancer gene and more genes that harm DNA, resulting in aging or cell death.[10]

**Mitochondrial damage**

Organisms of cells called mitochondria use oxygen pressure to produce energy (ATP). ROS produced by the UV effect on Mitochondrial DNA (mtDNA) can be destroyed by the electron transport process in the mitochondria.

Thirteen elements of electron transport chain are stored in the mitochondrial genome, and oxidative damage may be the primary cause of DNA mutations or rearrangements carried on by double-strand breaks, which may impair the mitochondria's capacity to produce life for a cell.

The prediction is assumed the resulting loss of metabolic activity in skin aging. More ROS build up and affects the cell's capacity to start an energy cycle. [11]

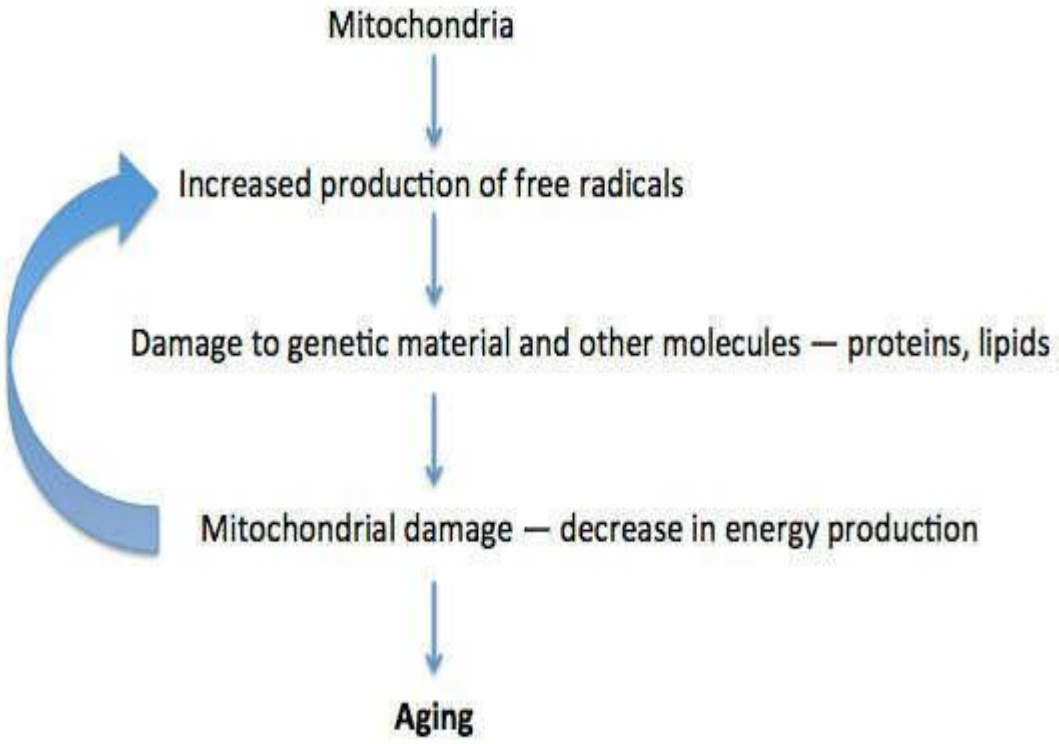


***Figure 3*: *Mitochondrial damage***

**Membrane nuclear signalling**

Tyrosine phosphatase κ enzyme activity is reduced by (ROS) reactive oxygen species generated by Ultraviolet rays. This enzyme maintains the inactive (hypo phosphorylated) state of skin receivers on the cell membrane, like as in epidermal hormone, interleukin (it)-1, TNF-α, and keratinocyte development hormone.[12]

The p38 protein and the c-J glutamate ends enzyme, stress-associated nitrogen regulated protein enzymes are stimulated by activated receptors, which lead to intracellular signalling. The activation of kinase leads structure protease activator decrease in synthesis of transforming growth factor receiver.

This leads to in a reduced growth of the dermal matrix, which in turn regulates the synthesis of collagen. [13]

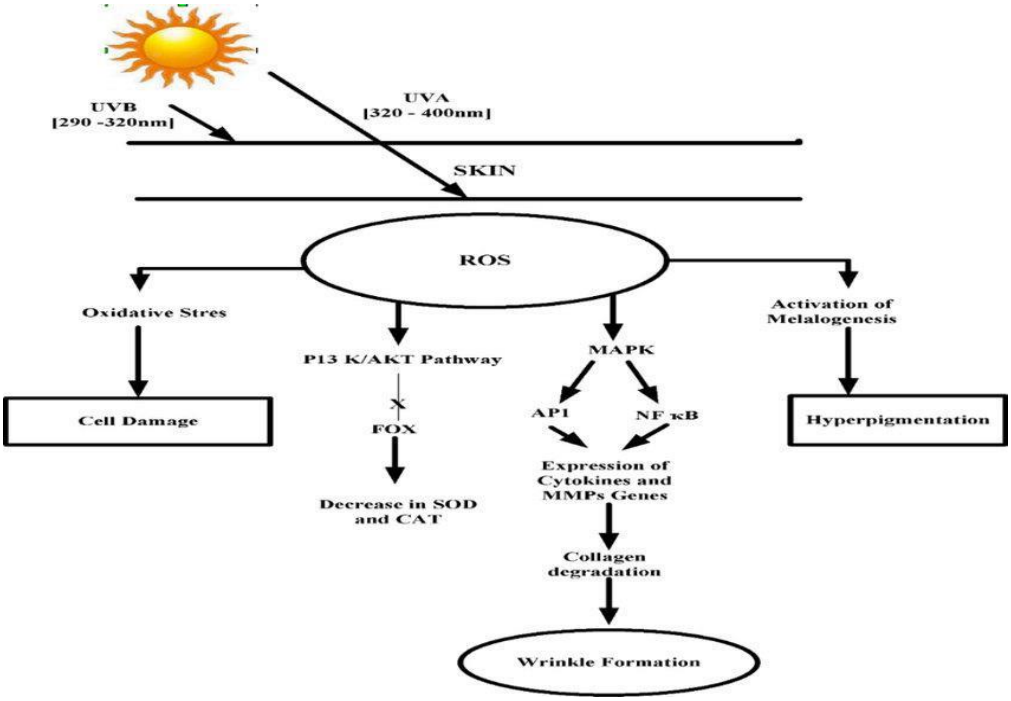


***Figure 4*:** *Nuclear signalizing pathway*

**Common symptoms of aging skin**

**Fine lines and wrinkles**

As we age, our skin starts to loose collagen and elastin, especially in regions where we move our faces a lot, including the mouth and eyes. [14]

**Skin sagging**

Lower level of elastin and collagen causes the skin's elasticity to decrease, which causes sagging, particularly in the face and jaw regions. [15]

**Dryness**

As skin ages, it produces fewer natural oils, which makes it dry and rougher. [16]

**Hyperpigmentation or age spots:**

Sunlight over time causes dark patches, also referred to as liver spots or age spots, which commonly appear on sun-exposed areas including the hands and cheeks. [17]

**Skin thinness**

Skin thins and becomes more porous when fat is lost, leaving it more opens to injury. [18]

**Dullness**

The skin looks tired and dull due to a decrease in cell division, which causes a loss of brightness. [19]

**Pores**

As the skin loses elasticity, pores become larger and clearer. [20]


***Figure 5*: *Common signs of skin aging***

**Role Of collagen in skin aging**

The most common protein in human beings, collagen acts as one of the basic components in many tissue types, such as bones, muscles, skin, and hair. Collagen is made up of protein. Collagen fibers are present in the skin's dermis layer, where they help produce fibroblasts, which are areas where new cells can develop and replace damaged skin cells. [21]

**Type I Collagen**

**Role**

Tensile strength for the skin, making it hard and flexible.

**Aging Effect**

Form I collagen, the most common form in the skin, produces significantly less collagen as we age. This reduction causes reduction in dermis, formation of fine Wrinkles, and decrease in flexibility. [22]

**Type III collagen**

**Role**

The roles in along with Type I collagen to provide flexibility and structure to the dermal layer.

**Aging Effect:**

Type III collagen reduces with age, but at more slowly than Type I collagen. Reduced Type III collagen can lead to decreased skin flexibility, loosening, and deep wrinkles. [23[

**Type IV collagen**

**Role**

It's mainly found in the subcutaneous layer and helps to support and separate the epidermis and dermis.

**Aging Effect**

Type IV collagen breakdown damages, Skin layers' rigidity. Reducing cell binding and nutrition exchange between the dermis and epidermis. Causes lack in skin texture.[24]

**Type VII Collagen**

**Role**

Supports fibrils that connect the dermis and epidermis.

**Aging Effect**

As Type VII collagen levels reduce with age, the skin's structure breaks down, resulting in dermal-epidermal separation and wrinkles.[25]

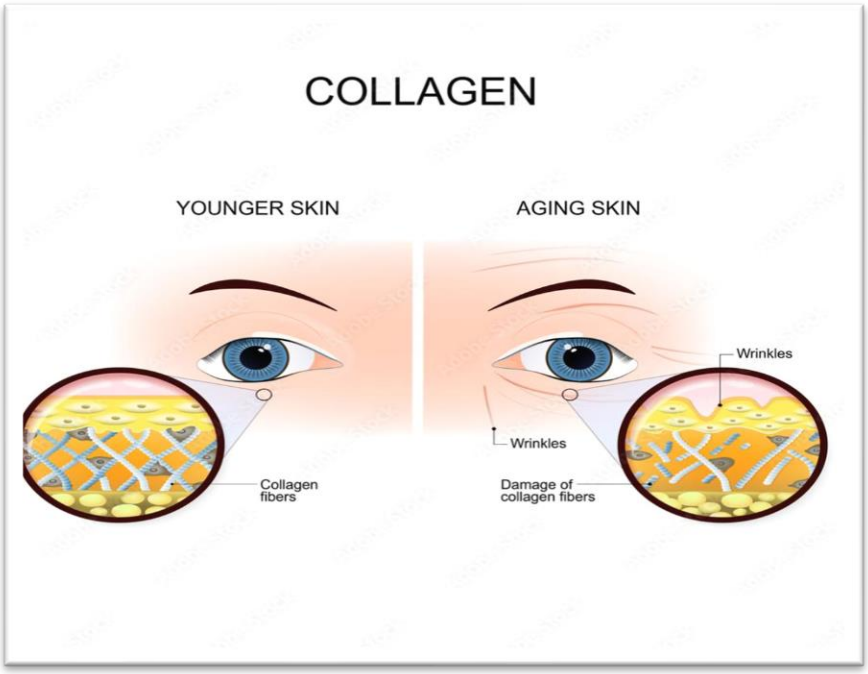


***Figure 6*: *Skin aging collagen damage***

**Anti-Ageing use of Natural Herbs**

Natural beauty products are an important component in preventing and reversing skin aging. Herbal cosmetics affect your skin's physiological processes or supply necessary substances that promote beautiful skin. . Natural products and their derivatives appear to make up over 50% of all medicines in the world and natural remedies to health are to be show promise. In personal care techniques, the application of herbal remedies for aging has risen greatly. A number of products that shield the skin from damage and stop sagging skin from harmful effects exist as a result of current developments in anti-aging skin care products that are focusing on creating fresh plant essences, herbal components as per to their ancient medical applications.[26]

**Aloe vera**

**Biological source**

Aloe Vera is derived from the extract of Aloe barbadensis leaf, which belongs to the **Liliaceous family.** [27]

**Phytoconstituents**

Aloe plants contain a high concentration of anthraquinone glycosides. Aloe's main active ingredient is aloin, a glycoside mixture which includes barb loin. The medication also contains aloe-emodin, β-barbaloin, isobarbaloin, and resins in addition to barb loin. [28]

***Figure 7*: *Aloe Vera***

**Role in anti-aging**

Aloe Vera enhances fibroblasts activity, which results in the production of elastin and collagen proteins that give face softer or minimize lines. Further, it produces a cohesiveness effect which keeps skin initially removed cell layers together, smoothing the structure of the skin. It can hydrate and smooth out scars on the skin while also having a healing impact on it. Aloe vera's cooling and antimicrobial properties help As an antibacterial products.[29] Aloe leaves frequently found in cleansers and creams that fight scars and aging. . Aloe Vera's components, including aloin A and B, has been show to block collagenase, an enzyme responsible for collagen fiber disintegration, so it's useful for treating aging and wrinkles.[30]

**Amla**

***Figure 8*: *Amla***

**Biological source**

The fruit-producing tree that produce amla, scientifically known as Phyllanthus emblica (sometimes called Emblica officinalis), is used medicinally. The fruits are famous for their high antioxidant and vitamin C content.

**Family**

Phyllanthaceae.[31]

**Phytoconstituents**

Ascorbic acid, tannins, flavonoids, phenolic compounds and alkaloids (phyllantine), These components are present in amla (Phyllanthus emblica) and are well-known for their antimicrobial, anti-allergic and antioxidant effects.[32]

**Role in Anti-aging**

Due to its high antioxidant content, particularly Vitamin C, which prevents oxidative stress and free radical major causes of (Phyllanthus emblica), plays a significant role in anti-aging. Amla's anti-inflammatory effects help in preventing UV-induced skin aging and it also increases the production of collagen, which enhances the elasticity of the skin.[33]

**Turmeric**

***Figure 9*: *Turmeric***

**Biological source**

Biological turmeric is dried rhizomes of the Curcuma longa plant are used to make turmeric. **Zingiberaceae** is the family to which turmeric belongs. [34]

**Phyto-constituents**

Curcuminoids are a yellow-coloured chemical substances found in turmeric. Curcumin, which makes up 50–60% of curcuminoids, is the main ingredient. Also, it contains volatile oil, resin, camphene and camphor.Turmeric includes phytoconstituents with anti-inflammatory, antioxidant and anticancer properties, such as curcumin, turmerone and ar-turmerone. [35]

**Role in anti-aging**

Turmeric is an excellent source of antioxidants, which are essential for protecting the skin from free radical-induced oxidative damage. Wrinkles, fine lines, and other signs of aging are caused by oxidative stress. [36]

Turmeric has long been used for wound healing due to its antibacterial and skin-repair qualities. This is useful in anti-aging because it helps faster skin regeneration, keeping the skin smooth and youthful. [37]

In the skin care and cosmetics fields, curcumin, the naturally found colouring agents, is used. Native American groups, cultures, religions and communities use it topically and orally as a skin beautifier in combination with milk. [38]

**Honey**

***Figure 10*: *Honey***

**Biological Source**

The natural production of sugar that bees, mainly A. mellifera as well as similar Apes genera include the Apididae group, deposit in honey comb is known as honey. [39]

**Phytoconstituents**

An aqueous solution containing 35% glucose, 45% fructosend 2% sucrose is called honey. Also; it has gum, proteins, polyphenols, flavonoids, maltose and vitamins.

**Role in Anti-aging**

Honey is a naturally occurring moisturizer; it absorbs moisture from the surrounding air into the skin. By preventing dryness, which is a significant source of aging signs like wrinkles and fine lines, this helps maintain hydration. Softening the skin Honey can help maintain skin soft and flexible by preventing the signs of aging. [40] Honey reduces the swelling and redness of acne. It removes the pores and regulates the formation of dust in the skin's pores. Prevents dryness by maintaining the skin's moisture. By hydrating the outermost layers of the skin, honey helps reduce wrinkles and fine lines. It's a chemical that heals wounds. [41] Honey's antioxidant properties come from its phenolic components. Collagen synthesis enhances by honey, and collagen is necessary to keep the skin elastic and smooth. [42]

**Neem**

***Figure 11*: *Neem***

**Biological source**

Neem is obtained from the leaves; bark, seeds and oil of the azadirchata indica belong to the

**Family** Meliaceae

**Phytoconstituents**

The main phytoconstituents found in neem (Azadirachta indica) are quercetin (an antioxidant), nimbin (an antibacterial and anti-inflammatory agent), beta-sitosterol (an anti-inflammatory agent) and tannins (an antimicrobial). [43]

**Role in Anti-aging**

Due to its antimicrobial and moisturizing properties, it is used as an ingredient in topical cosmetic. Neem soap can be used to treat minor skin issues or to prevent fungal infections. Neem, its main ingredient, has anti-aging, anti-microbial, moisturizing and acne-reducing properties also with the anti-wrinkles and anti-acne effects. Azadirachta indica or neem is used by native Indians in India. Neem's capacity to nourish healthy skin is highly valued by Ayurvedic physicians. Neem treats skin disease scabies, dry skin, rashes, itchiness and topical skin disorders. Neem has the ability to nourish and moisturize skin. Neem is used to treat acne and pigmentation problems of all kinds.

**Arjuna**

***Figure 12*: *Arjuna***

**Biological Source**

Arjuna is produced from the Terminalia Arjuna bark. The plant contains Combretaceae group. The tree is large and leafy native in India which grows along riverbanks and in humid environments.

**Phytoconstituents**

Saponins, tannins, arjunolic acid, arjunic acid and arjungenin are all present in Arjuna. Arjunine, arjunoloneandellagic acids are also present.

**Role in Anti-aging**

Tannins found in Arjuna, have strong antioxidant properties that help in absorbing free radicals. As a result, oxidative stress is decreased, it leads greatly to signs of aging. Collagen synthesis increased by the plant and this is important for maintaining the texture and flexibility of the skin. Decreased wrinkles and sagging can result with more collagen production. According to some research, arjuna extracts can improve skin hydration and give it a more young, flexible texture. It has been seen that arjuna helps wounds heal, which can improve skin health and regeneration mainly as well reduce the apparent signs of aging. Due to its connection with aging and a number of skin problems, arjuna's anti-inflammatory properties may be useful to help reduce inflammation. Reduced aging signs and better-looking skin can results from this. [44]

**Green Tea**

***Figure 13*: *Green tea***

**Biological source**

Biological source of green tea is the dried leaves of Camellia sinensis and belong to the family theaceae. [45]

**Phytoconstituents**

Green tea is rich in phytoconstituents, including flavonoids, polyphenols, caffeine, theanine, and catechins.

**Role in anti-aging**

Because it contains a lot of antioxidants, which prevents UV-induced skin aging, reduces wrinkles and fights free radical damage, it helps prevent aging of the skin. It also helps in enhancing skin softness and reducing inflammation. Thepolyphenols in green tea help in protecting cell DNA from oxidative damage. Green tea may help reduce these processes because DNA damage builds up with age and lead diseases related to age and skin damage.

A number of disease conditions such as coronary artery disease and gout, are caused by chronic inflammation. It has a significant part in the aging process.

Green tea is shown in studies that it can maintain the skin's collagen levels. The protein collagen is responsible for the flexibility and smoothness of skin and its breakdown speeds up the aging process. Green tea's polyphenols help in the prevention of collagen-breaking enzymes, maintaining the softness of the skin. [46]

**Jatamansi**

***Figure 14*: *Jatamansi***

**Biological source**

It comes from dry rhizhomes and roots of Nardostachys jatamansi DC are the biological source of jatamansi. Caprifoliaceae is the family (formerly classified under Valerianaceae). [47]

**Phyto-constituents**

Include volatile oil, resin, sugar, starch, jatamansic acid, ketones, jatamansi one and nardostachnone.

**Role in anti-aging**

It plays anti-aging role by stimulating fibroblasts to produce and elastin and collagen fibres, resulting in increased flexibility of skin, reduced wrinkle production.

For centuries, Ayurvedic medicine used jatamansi to relax the body and mind. It is also helpful for aging skin that may become more effective with time because when used topically, it helps relax the skin, reduce irritation, and produce a calming effect. [48]

**Anti-Inflammatory Properties**

Aging and many skin problems are caused by a long-term Research has shown that jatamansi has anti-inflammatory properties that can help in reducing skin irritation and redness, giving a look of younger skin.[49]

**Liquorice**

***Figure 15*: *Liquorice***

**Biological source**

The Liquorice is derived from Dry, unpeeled Glycyrrhiza glabra branches and stems,a plant in the Leguminosae genera.[50]

**Phytoconstituents**

Phytoconstituents found in liquorice are isoflavones, chalcones, glycyrrhizin, flavonoids and saponins. [51]

**Role in Anti-aging**

The chemical glabridin found in liquorice has been found to block the enzyme tyrosinase, which helps in the synthesis of melanin. Liquorice, which blocks tyrosinase, helps reduce hyperpigmentation (dark patches), a common symptom of aging. This brightening effect also helps to achieve a uniform skin tone and a young appearance. [52]

Liquorice root extracts help the skin stay hydrated and provides a calming effect. Sufficient moisture is essential for maintain softness of the skin and to prevent wrinkles. Liquorice enhances soft, smooth skin by absorbing moisture and avoiding the dryness that comes with age. [53]

**Peppermint**

***Figure 16*: *Peppermint***

**Biological source**

The mixture of peppermint (Mentha spicata) and watermint (Mentha aquatica) produce peppermint (Mentha piperita), which is a member of the mint family (Lamiaceae).

**Phytoconstituent**

Menthol, methyl acetate, flavonoids and phenolic compounds are some of the important phytoconstituents found in peppermint.

**Role in anti-aging**

Most commonly known treatment in worldwide use for many kinds of skin problems is peppermint. It helps remove extra oil from oily skin and nourish dull skin because it has high omega-3 healthy& vitamins A and C. When menthol is present, it keeps the skin being cool. Your skins look more youthful, healthy and bright when you use peppermint oil. Peppermint essential oil contains menthol, which has a rapid relaxing effect and is good for treating inflammation, oily skin, wrinkles and acne. [54]

## CONCLUSION

In conclusion, a review of natural herbs that prevent skin aging and skin aging process highlights the significant role of various plant-based compounds play in decreasing the appearance of skin signs of aging. Skin alterations connected to aging involved wrinkle development, increased dryness and elasticity loss. Natural herbs with potent antioxidant, anti-inflammatory and moisturizing qualities, such green tea, aloe vera, ginseng and turmeric, can help reduce these changes. It was found that the constituents in medicinal plants and herbs like polyphenols, flavonoids and essential oils promote the synthesis of collagen; improve the skin's protecting layer and increase skin moisture. These herbs' anti-aging properties are further improved by the fact that a lot of them consist of antioxidant and UV protection effects. As a growing range of scientific research indicates that to the efficacy of these natural medicines, additional trials are needed to fully grasp their mechanisms and enhance their use in dermatological applications. A viable approach to enhancing skin health and minimizing the aging process is by including these natural herbs into diets or skincare routines. The rising need from customers for secure and effective skincare products is in with a focus on the availability of natural options, which makes study of anti-aging herbs an essential and useful subject of research in the search for more powerful more youthful skin.

## REFERENCES

1. S. S. Bustos, K. Vyas, T. Huang, M. Suchyta, N. Brassier, S. Cotofana, S. P. Wyles, S. Mardini, Pharmacological and Other Noninvasive Treatments of the Aging Face, Journal of the American Society of Plastic Surgeon,2024:154(3):30-41.
2. J. Krutmann, The Skin Aging Exposome, Journal of Dermatological Science,2017:85(3):152-157.
3. Elisa Ceveninidia, F. Lescai, S. Salvioli, P. Teri, G. Castellani, Human Models of Aging and Longevity, Expert Opinion on Biological Therapy,2008:8(9):393-398.
4. C. C. Brancoran, J. G. Merlo, Related to Age and Hormone Replacement Therapy, Maturitas,1992:15(2):113-119.
5. L. Rittié, G. J. Fisher, UV Light Induced Signal Cascades and Skin Aging, Aging Research Reviews,2002:1(4):705-720.

6. J. N. Losso, C. N. Munene, R. R. Bansode, H. A. Bawadi, Inhibition of Matrix Metalloproteinase Activity by the Soybean Bowman Birk Inhibitor, Biological Letters,2004:26(11):901-905.
7. Abdul K. Mohiuddin, Skin Aging and Modern Age Anti-Aging Strategies, International Journal of Clinical Dermatological Research,2019:7(2):209-215.
8. J. Salsberg, A Review on Protection against Exposome Factors Impacting Facial Skin Barrier Function with 89% Mineralizing Thermal Water, Journal of Cosmetic Dermatology,2019:18(3):815-820.
9. E. Shacter, A Review on Protein Oxidative Damage, Methods in Enzymology,2000:19(3):428-436.
10. E. Kohl, J. Steinbauer, M. Landthaler, R. M. Szeimies, A Review on Skin Aging, Journal of European Academy Dermatology and Venereoogyl,2011:25(8):873-879.
11. F. Prado, F. Cortes-Ledesma, P. Huertas, A. Aguilera, A Review on Mitotic Recombination in Saccharomyces, Current Genetics,2003:6(4):185-190.
12. Yiru Xu, Yuan Shao, J. J. Voorhees, G. J. Fisher, Oxidative Inhibition of Receptor Type Protein Tyrosine Phosphatase Kappa by Ultraviolet Irradiation Activates Epidermal Growth Factor Receptor in Human Keratinocytes, Journal of Biological Chemistry,2006:2(3):389-394.
13. G. J. Fisher, Pathophysiology of Premature Skin Aging Induced by Ultraviolet Light, New England Journal of Medicine,1997:7(2):141-148.
14. B. A. Gilchrest, A Review of Skin Aging Basic Science and Clinical Implications, Journal of the American Academy of Dermatology,1996:13(6):867-874.
15. A. M. Kligman, Early Destructive Effects of Sun Exposure on the Aging of Human Skin, Journal of Investigative Dermatology,1989:9(4):77-81.
16. D. Cerimel, L. Celleno, F. Serri, Physiological Changes in an Aging Skin, British Journal of Dermatology,1990:22(5):13-19.
17. G. J. Fisher, Mechanisms of Photoaging and Chronological Skin Aging, Archives of Dermatological Research,2002:13(1):462-469.
18. M. A. Farage, Intrinsic and Extrinsic Factors in Skin Aging, International Journal of Cosmetic Science,2013:5(3):223-226.
19. C. C. Zouboulis, The Skin as a Mirror of the Aging Process in the Human Body, International Journal of Clinical Dermatology,2019:7(4):365-370.
20. J. W. Shin, Characteristics of Skin Aging Depending on Sex and Body Part, Journal of Clinical Cosmetic and Investigational Dermatology,2019:12(2):167-173.
21. R. Z. Kramer, J. Bella, P. Mayville, B. Brodsky, H. M. Berman, Sequence Dependent Conformational Variations of Collagen Triple-Helical Structure, Structural and Molecular Biology,1999:6(2):454-457.
22. J. Varani, M. K. Dame, L. Rittie, E. G. Fligiel, S. Kang, G. J. Fisher, J. J. Voorhees Decreased Collagen Production in Chronologically Aged Skin, American Journal of Pathology,2006:168(6):861-866.
23. L. Baumann, Skin Aging and its Treatment, Journal of Pathology,2007:11(2):241-247.
24. T. Quan, Y. Shao, J. J. Voorhees, G. Fisher, Reduced Expression of Connective Tissue Growth Factor Mediates Collagen Loss in Chronologically Aged Human Skin, Journal of Investigative Dermatology,2009:12(6):510-513.
25. M. Toselli, M. Ferretti, M. Rimoldi, L. Terenghi, A. Bonaldi, Expression of Collagen Anchoring Fibrils in Aged Human Skin, Journal of Cutaneous Pathology,2001:8(6):306-309.

26. P. Mukherjee, M. Maity, N. Nema, B. Sarkar, Bioactive Compounds from Natural Resources against Skin Aging, Phytomedicine,2012:19(1):64-70.
27. K. Eshun, H. Qian, AloeVera a Valuable Ingredient for the Food Pharmaceutical, Cosmetic Industries, Critical Reviews in Food Science and Nutrition,2004:4(2):91-96.
28. D. Grindlay, T. Reynolds, A Review on the Properties and Modern uses of the Leaf Parenchyma Gel, Journal of Ethnopharmacology,1986:16(3):117-120.
29. Yogesh B. Raut, Sanjay K. Bais, Nandini V. Regoti, Formulation and Evaluation of Rice Water Toner as Anti-Aging Property, International Journal of Pharmacy and Herbal Technology,2024:2(3):765-769.
30. Yogesh B. Raut, Sanjay K. Bais, Sahara Chavan, Moisturizing Activity of Herbal Cold Cream for Skin Dryness, International Journal of pharmacy and Herbal Technology,2024:2(1):411-414.
31. Vidhi J. Bhatia, Sreeja S. Nair, Nutraceuticals as Potential Chemopreventive Agents, The Natural Products Journal,2018:8(1):3-13.
32. Donald R. Yance, Stephen M. Sagar, Targeting Angiogenesis with Integrative Cancer Therapies, Integrative Cancer Therapies,2006:5(1):9-29.
33. M. Krishnaveni, S. Mirunalini, Therapeutic Potential of Phyllanthus Emblica the Ayurvedic Wonder, Journal of Basic Clinical Physiology and Pharmacology,2010:21(1):93-95.
34. F. Basri, H. P. Sharma, S. Firdaus, P. Jain, A. Ranjan, A Review of Ethnomedicinal Plant Vitex Negundo Linn, International Journal of Advanced Research,2014:2(3):882-890.
35. C. K. Kokate, A. P. Purohit, S. B. Gokhale, Pharmacognosy, 21st ed., Nirali Prakashan, Pune,2002, pp. 377-378.
36. V. P. Kapoor, Herbal Cosmetics and Hair Care, Indian Journal of Natural Products and Resources,2005:4(2):306-310.
37. B. B. Aggarwal, K. B. Harikumar, Potential Therapeutic Effects of Curcumin and Anti-Inflammatory Agent, International Journal of Biological Chemistry and Cell Biology,2009:41(1):40-43.
38. V. B. Lijju, K. Jeena, R. Kuttan, An Evaluation of Antioxidant, Anti Inflammatory and Anti-Aging Effect of Turmeric Extracts, Indian Journal of Pharmacology,2011:43(5):526-531.
39. E. Kohl, J. Stein Bauerhaler, R. M. Szeimies, A Review on Skin Aging, Journal of European Academy Dermatology Venereology,2011:25(8):873-875.
40. K. M. Murthy, Honey as a Natural Skin Moisturizer, International Journal of Research in Dermatology,2021:2(1):240-246.
41. Yogesh B. Raut, Sanjay K. Bais, Samruddhi M. Swami, Preparation and Evaluation of Herbal Lotion Review, International Journal of Pharmacy and Herbal Technology,2024:2(1):206-209.
42. Sami K. Saikaly, Honey and Wound Healing, American Journal of Clinical Dermatology,2017:18(2):237-241.
43. K. Biswas, I. Chattopadhyaye, R. K. Banerjee, U. Bandyopadhyay, Biological Activities and Medical Properties of Neem, CurrentScience,2002:82(11):336-340.
44. S. Dwivedi, Terminalia Arjuna Wight a useful Drug for Cardiovascular Disorders, Journal of Ethnopharmacology,2007:114(2):114-116.
45. H. N. Graham, Green Tea Composition, Consumption and Polyphenol Chemistry, Preventive Medicine,1992:21(3):334-337.

46. R. Artacho, R. Giménez, C. Carmen, Beneficial Effects of Green Tea, Journal of the American College of Nutrition,2006:25(2):79-81.
47. V. Zalavadiya, V. Shah, D. Santani, K. Kumari, S. Binawara, B. Raval, A Review on Nardostachys Jatamansi, Research Journal of Pharmacognosy and Phytochemistry,2013:5(5):251-257.
48. V. P. Kapoor, Herbal Cosmetics for Skin and Hair Care, Indian Journal of Natural Products and Resources,2005:4(4):306-308.
49. Renu Sahu, H. J. Dhongade, Medicinal Properties of Nardostachys Jatamansi, Oriental Journal of Chemistry,2011:30(4):122-124.
50. Cristina Fiore, Michael Eisenhut, Eugenio Ragazzi, Giorgio Zanchin, Decio Armanini, A History of the Therapeutic use of Liquorice in Europe, Journal of Ethnopharmacology 2005:99(3):317-320.
51. M. N. Asl, H. Hosseinzadeh, Pharmacological Effect of Glycyrrhiza Glabra and its Bioactive Constituents, Phytotherapy Research,2008:22(6):709-724.
52. T. Yokota, H. Nishio, Y. Kubota, M. Mizoguchie, Inhibitory Effect of Glabridin Liquorice Extract on Melanogenesis and Inflammation, Pigment Cell Research,1998:11(6):355-358.
53. M. Damle, Glycyrrhiza Glabra Liquorice a Potent Medicinal Herb, International Journal of Herbal Medicine,2014:2(2):132-134.
54. A. Scarano, V. Amodeo, V. Leonardi, C. Mortellaro, A. Sbarbati, D. Amuso, R. Amore, D. Pagnini, Evaluation of the Effectiveness and Safety of Peppermint Peel Soft Peeling for Skin Aging, Journal of Biological Regulators and Homeostatic Agents,2019:33(6):93-101.