INNOVARE JOURNAL OF HEALTH SCIENCES

Vol 11, 2023

ISSN - 2347-5536

Review Article

# A REVIEW ON NATURAL SKIN LIGHTENING AGENTS

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*Received: 04 October 2023, Revised and Accepted: 21 October 2023*

**ABSTRACT**

Natural bleaching agents are the natural metabolites mostly obtained from plants as well as from other natural sources implied to reduce or alter melanin production in the human body. Many natural compounds exert their efficiency as skin lightening agent, i.e., vitamin C, E and niacinamide flavonoids, phenolic compounds, arbutin, kojic acid, azelaic acid, Mulberroside F, Aloin, aloesin, Glabridin, liqriritin, N-acetyl glucosamine has found as a substantial compound obtained from a natural source and could be used reduce skin condition that causes hyperpigmetation. Natural bleaching agents could be better alternatives to synthetic bleaching agents due to their biocompatatibily to the human skin.

**Keywords:** Tyrosinase, Melanin, Bleaching agent, Hyperpigmentation, Skin lightening.

 DOI: http://dx.doi.org/10.22159/ijhs.2023v11i1.IJHS_49554. Journal homepage: https://innovareacademics.in/journals/index.php/ijhs

## INTRODUCTION

Natural bleaching agents are compounds obtained from natural source implied to provide esthetic look and even tone. Skin-lightening agents would be used to improve skin tone, fading of dark skin spots, and alleviate other skin conditions. The most favored pathway of skin-lightening agents is by hampering the biosynthetic pathways of melanin production and inhibition of tyrosinase. However, melanin is a protective natural pigment accountable for the characteristic color of skin, hair, and eye. Melanin is produced in our body by specialized cells called melanocytes situated in the stratum germinativum or basal layer, uneven distribution and deposition of melanin may lead to defile natural appeal of the skin. Natural skin lightening agent are preferred over their synthetic counterparts due to their lower toxicity and side effects. The review aims to highlight the natural and safer alternative agents that would help to improve various skin conditions [1,2].

## NATURAL INGREDIENTS AS SKIN LIGHTENING AGENTS

### Arbutin

Arbutin is a naturally occurring glycosylated hydroquinone, chiefly found as beta-arbutin, in the leaves of plants bearberry, blueberry, and cranberry belonging to families Ericaceae. Arbutin accolades as globally accepted and widely recommended skin-lightening agent. Bearberry or *Arctostaphylos uva-ursi* has been used as a rich source of natural arbutin since ancient times**.** Another form of arbutin is alpha-arbutin could be synthesized enzymatically from hydroquinone or β-arbutin [3-5]. Alpha arbutin has been proven more stable, safe, effective, and better alternative to hydroquinone and beta arbutin. Arbutin has shown potential anti tyrosinase activity by competitive inhibition of tyrosinase biosynthesis, an enzyme responsible for melanin synthesis in melanocytes this action leads to suppression in melanin production and lightening of skin coloration. Arbutin would be used for hyperpigmentation, melasma, freckles, senile lentigines, post-inflammatory hyperpigmentation, sunspots, and uneven skin tone [6-8].

### Kojic acid

Kojic acid is an organic acid that is primarily produced by a fungus of genus *Aspergillus* as metabolite, concurrently it could be generated through fungi ferment. Kojic acid was first isolated in 1907 by Saito from mycelia of *Aspergillus oryzae* grown on steamed rice. In 1912 Yabuta gave it the name kojic acid. Certain other genus capable to produce kojic acid are *Penicillium* and *Acetobacter* [9-13]. Kojic acid is globally accepted and impressively used by cosmetic formulators for a variety of skin conditions, i.e., sun spots, uneven skin tone, melasma, hyperpigmentation, it also offers protection against ultraviolet rays. Kojic acid and its derivatives impede melanin production by inhibiting tyrosinase a fundamental enzyme in melanin biosynthesis. Hindrance in melanin production reflects as skin brightening, 1% concentration of kojic acid in cosmetics was recommended as safe by CIR [14-18].

### Azelaic acid

Azelaic acid is a natural dicarboxylic acid compound found in barley, wheat, and rye. It is also produced instinctually by *Malassezia furfur*, a yeast that resides on normal skin. Azelaic acid might be effective against multiple skin conditions, i.e., lightening of dark spots, hyperpigmetation, melasma, to retain even skin tone, acne scars, and other skin conditions [19,20]. Azelaic acid reduces melanin production by inhibiting of tyrosinase enzyme selectively responsible for the production of melanin in our body [21,22].

### Mulberroside F

Mulberroside F is a stilbenoid isolated from *the* leaves of *Morus alba* commonly known as white mulberry naturally found in various tropical countries. The compound had shown a skin-lightening effect by suppressing the melanin biosynthesis and tyrosinase inhibitory action by obstructing the enzyme that converts dopa to dopachrome in melanin biosynthesis therefore inhibiting melanin production [23,24].

### Flavonoid and Polyphenolic compounds

Flavonoids and polyphenolic are the predominant group of variable compounds found ubiquitously in plant species. Those were well recognized for their antioxidant potential, epigallocatechin from green tea leaf extract, Hesperidin from citrus fruits such as lemon and orange, proanthocyanidins and anthocyanidins from pigmented vegetables and fruits, quinic acid, caffeic acid, and chlorogenic acid from tea and coffee beans, hydroxychavicol from *Piper betel* leaves extract isoflavones from soya beans, alfalfa, and clover, Umbelliferone found in various plants of family umbelliferae now *Apiaceae* and *Rutaceae* has been recognized for their substantial effect in melanogenis [25-31].

### Aloin and aloesin

Aloin also known as barbaloin is a prominent anthracene glycoside found in a wide variety of genus aloe known for its purgative and cosmetic effect for long age. It is a yellow to brown color compound

with a bitter taste. Aloesin also known as aloe resin B is the resinous component present in aloe and has been shown great potential in wound healing, burns, and subdued melanogenesis by competitive inhibition of tyrosinase an enzyme fundamentally important in the biosynthesis of melanin. As skin lightening agent [9,32,33].

**Glabridin and liqriritin**

Glabridin is an isoflavonoid majorly isolated from the root of plant *Glycyrrhiza glabra* commonly known as licorice belonging to family *Fabaceae.* Glabridin could be found as yellowish–brown powder in hydrophobic portion of the extract of root. Glabridin is a tyrosinase inhibitor that was shown to reduce UVB-raised pigmentation. Liqriritin one another compound isolated from the same plant potentially shows its ability to reduce hyperpigmentation [34].

**Vitamin C and E**

Vitamin C also dictated as L-ascorbic acid, is a water-soluble vitamin found in a variety of fruits and vegetables known for its antioxidant and free radical scavenging potential. Vitamin E was found in vegetable oils, fruits, cereals, vitamin E is fat-soluble vitamin with predominately used as an antioxidant in various skin and hair cosmetics. Vitamin C acts by interacting and reducing various oxidative steps involved in melanin formation thus inhibit melanogenesis. Furthermore, vitamin E would be acts by obstructing and interfering with lipid peroxidation of the membrane of melanocyte, furthur it would act by raise in cellular glutathione content as well as tyrosinase inhibition [35-39].

**Niacinamide**

Niacinamide or nicotinamide is a type of vitamin B-3, it is inseminated in many foods including green vegetables, cereals, milk, meat, fish, and eggs. Niacinamide impedes the interaction of keratinocytes and melanocytes, therefore obstructing melanogenesis. Furthermore it would alter protease-activated receptor involved in the transferring melanosomes from melanocytes into surrounding keratinocytes [40,41].

**N-acetyl glucosamine**

N-acetyl glucosamine is a natural monosaccharide found majorly in outer shells of shellfish lobster, shrimp, and crab. N-acetyl glucosamine would reduce the amount of melanin in melanocytes, therefore minimizing hyperpigmentation and improving skin tone. It might inhibit the conversion of pro-tyrosinase to tyrosinase moreover it affects the genetic expression in hyperpigmentation [41,42].

## CONCLUSION

Natural skin lightener would play a major role in a variety of skin conditions by maintaining the ratio of melanin in skin layers. Synthetic ingredients might cause deleterious reactions to the skin may not be safe to use. On the other side, natural alternatives are more biocompatible, safer, and friendly to use in the skin as well as to the environment. Limited data are available to ensure safety and efficacy. Furthermore, insight is needed to ensure safety and efficacy of these compounds. Further research is needed to find out more related compound from natural origin that would provide better and efficient alternative to the available product in the market.

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