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A Review on *Aloe vera*

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Abstract

Aloe vera is a natural product that's now a day constantly used in the field of cosmetology. Though there are colourful suggestions for its use, controlled trials are demanded to determine its real efficacity. The Aloe vera factory has been known and used for centuries for its health, beauty, medicinal and skin care parcels. The name Aloe vera derives from the Arabic word “Alloeh” meaning “shining bitter substance,” while “vera” in Latin means “true.” 2000 years ago, the Greek scientists regarded Aloe vera as the universal nostrum. The Egyptians called Aloe “the factory of eternity.” moment, the Aloe vera factory has been used for colourful purposes in dermatology.

Aloe vera is gel from the leaves of aloe shops. People have used it for thousands of times for mending and softening the skin. Aloe has also long been a folk treatment for numerous distemperatures, including constipation and skin diseases. ultramodern- day exploration into aloe vera's benefits is mixed, with some substantiation showing it can beget cancer in lab creatures.

Keywords: Aloe vera, Natural Products, Disease

Introduction

Aloe vera, a natural product widely utilized in the field of cosmetology, is currently gaining significant attention. While there are various suggestions regarding its applications, it is essential to conduct controlled trials to ascertain its actual effectiveness. For centuries, the Aloe vera plant has been recognized and employed for its health, beauty, medicinal, and skincare properties. The term "Aloe vera" originated from the Arabic word "Alloeh," which translates to "shining bitter substance," while "vera" in Latin means "true." Greek scientists regarded Aloe vera as a universal remedy around 2000 years ago, and the Egyptians referred to it as "the plant of eternity." Presently, Aloe vera finds diverse applications in dermatology. It is derived from the gel found in the leaves of aloe plants and has been used for centuries to heal and moisturize the skin. Aloe vera has also been traditionally used as a remedy for various ailments, including constipation and skin disorders. However, recent scientific studies on the benefits of Aloe vera have yielded mixed results, with some evidence suggesting its potential to induce cancer in laboratory animals.

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History

For centuries, Aloe vera has held a significant place in the realm of medicine across various cultures, including Greece, Egypt, India, Mexico, Japan, and China. Renowned figures such as Nefertiti, Cleopatra, Alexander the Great, and Christopher Columbus recognized its therapeutic value, incorporating it into beauty regimens and utilizing it for treating wounds. The first mention of Aloe vera in English can be traced back to John Good yew's translation in 1655 of Dioscorea's Medical treatise, De Materia Medica. While initially employed as a laxative in the early 1800s in the United States, its potential in medical applications gained prominence in the mid-1930s with successful treatment of severe radiation dermatitis. Aloe vera, a stemless succulent, exhibits thick fleshy leaves ranging in color from green to grey-green, adorned with small white teeth along the serrated margins. During summer, the plant produces pendulous yellow tubular flowers on tall spikes. Additionally, Aloe vera forms arbuscular mycorrhiza, a beneficial symbiotic relationship enhancing its access to mineral nutrients in the soil.

Anatomy

The impressive Aloe vera plant possesses distinct characteristics, such as triangular-shaped fleshy leaves with serrated edges, vibrant yellow tubular flowers, and fruit containing numerous seeds. The leaves themselves consist of three distinct layers, each serving a specific purpose. The inner layer holds a transparent gel, primarily composed of water (approximately 99%), along with essential components like glucomannans, amino acids, lipids, sterols, and vitamins. In contrast, the middle layer contains the bitter yellow sap known as latex, which contains anthraquinones and glycosides. Acting as a protective barrier, the outer layer, known as the rind, consists of 15-20 cells responsible for carbohydrate and protein synthesis. Within the rind, vascular bundles are found, responsible for transporting substances like water (xylem) and starch (phloem). Aloe vera contains an impressive assortment of active components, including 75 potentially active constituents such as vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids, and amino acids.

Biological Compounds

Aloe vera latex and gel contain bioactive substances that exhibit diverse physiological effects, either independently or in synergy. The composition of Aloe vera can vary based on factors like climate, region, growing conditions, plant age, and processing techniques. The primary constituents of Aloe vera include anthraquinones, which are phenolic compounds found in the latex. These compounds possess potent laxative, antibacterial, analgesic, and antiviral properties. However, it is important to note that anthraquinones may also have adverse effects such as genotoxicity, mutagenicity, and tumor promotion. On the other hand, Aloe vera gel is rich in polysaccharides, with acemannan being the most active among them. Acemannan has been associated with antiviral, antibacterial, wound healing, immunostimulatory, radiation-protective, and hematopoietic activities. The gel also contains water, polysaccharides, vitamins, enzymes, and steroids. It is worth mentioning that the biological activities of the gel can degrade upon exposure to air, underscoring the importance of using fresh gel whenever possible. While Aloe vera gel has demonstrated therapeutic benefits, rare cases of adverse effects such as eczema, allergic dermatitis, and an increase in circulating leukocyte count have been reported, potentially attributed to immune system stimulation.

Mechanism of Actions - Uses and Applications

Aloe vera finds extensive applications in the cosmetics, food, and medical industries due to its versatile properties. In cosmetics, Aloe vera gel, latex, and whole leaf extract are widely utilized for their moisturizing and soothing effects. These ingredients can be found in various products such as moisturizers, cleansers, sun lotions, toothpastes, and shampoos. The concentration of Aloe vera in cosmetic formulations typically ranges from 1 to 98%. To ensure safety, the levels of anthraquinones, a component of Aloe vera, should not exceed 50 ppm in cosmetics to avoid phototoxicity. The Food and Drug Administration (FDA) in the United States has approved the external use of Aloe vera gel as a cosmetic ingredient.

In the food industry, Aloe vera is employed in functional foods and beverages, including yogurt and health drinks like tea. Aloe vera gel can also

serve as an edible coating for fresh produce, helping to extend their shelf life by preserving functional compounds such as phenolics and ascorbic acid. Aloe vera possesses antimicrobial properties, inhibiting the growth of microorganisms responsible for foodborne illnesses and spoilage. It can serve as a natural and environmentally-friendly alternative to synthetic preservatives.

Medicinally, Aloe vera has a history of use in wound healing due to its polysaccharides and the growth hormone gibberellins, which promote the formation of collagen and elastin. The presence of mucopolysaccharides (MPS) in Aloe vera contributes to its remarkable healing capacity. Aloe vera has also demonstrated efficacy in the treatment of scar tissue and prevention of scar formation following skin injuries, possibly attributed to the presence of amino acids necessary for new cell formation.

Aloe vera exhibits a range of beneficial effects on the skin and the body. Its enzymes facilitate the regeneration of deep skin layers, aiding in the healing process. The presence of salicylic acid in Aloe vera imparts anti-inflammatory and analgesic properties, inhibiting the production of prostaglandins, thereby making it useful in addressing conditions such as arthritis and joint-related issues. Aloe polysaccharides enhance immune activity, while lectins may contribute to its therapeutic effects on burns and ulcers.

Aloe vera has shown potential in the treatment of ulcers, including mouth ulcers, herpes simplex, and psoriasis. It also exhibits protective effects against gastric ulcers. The plant's polysaccharides, along with certain inorganic elements, contribute to its antidiabetic activities by reducing blood glucose and lipid levels. Aloe vera demonstrates antioxidant properties comparable to α-tocopherol (vitamin E), with its antioxidant activities varying depending on the growth stage of the plant.

The anthraquinones present in Aloe vera latex act as potent laxatives, stimulating intestinal peristalsis. Aloe vera also exhibits antibacterial properties against various microorganisms, particularly Gram-positive bacteria responsible for food poisoning. While research on its antifungal activity is limited, Aloe vera has been reported to inhibit the growth of Candida. Moreover, Aloe vera shows potential antiviral and antitumor effects, possibly through the stimulation of the immune system and the presence of anthraquinones.

In studies conducted on pathogen-free rats, Aloe vera has demonstrated promising results in addressing age-related diseases. Ongoing clinical trials aim to further explore its potential use in the treatment of HIV-AIDS and cancer.

Medicinal Uses

Aloe vera possesses remarkable properties for wound healing, attributed to its polysaccharides and gibberellins that promote collagen and elastin formation, reducing wrinkles and facilitating wound recovery. The abundant presence of mucopolysaccharides (MPS) in Aloe vera, ranging from 10,000 to 20,000 MPS per liter, plays a vital role in its high healing capacity.

In addition to wound healing, Aloe vera has shown efficacy in treating scar tissue and preventing scar formation after skin injuries. This can be attributed to the activity of amino acids necessary for new cell formation. By promoting skin cell regeneration and supporting collagen and elastin synthesis, Aloe vera aids in the healing process, resulting in reduced scar visibility and improved skin health.

Aloe vera exhibits a wide range of beneficial effects on the human body, including anti-inflammatory properties, immune system enhancement, protection against UV and X-radiation exposure, treatment of ulcers, antidiabetic activities, antioxidant activities, laxative effects, antibacterial properties, antifungal activity, and potential antiviral and antitumor activity.

The presence of salicylic acid in Aloe vera contributes to its analgesic and anti-inflammatory properties. By inhibiting prostaglandin production from arachidonic acid, it can alleviate symptoms associated with arthritis and joint-related issues. Aloe polysaccharides further enhance immune activity.

Aloe vera has been found to support the healing of first to second-degree burns, although the exact mechanisms are not fully understood. Lectin, a component of Aloe vera, is believed to play a role in its therapeutic effects.

When it comes to treating ulcers, such as mouth ulcers, herpes simplex, and psoriasis, Aloe vera has demonstrated successful outcomes. It has also

been shown to protect against gastric ulcer formation.

The polysaccharides present in Aloe vera, along with specific inorganic elements like vanadium, manganese, and copper, may contribute to its antidiabetic activities. Aloe vera has been associated with reduced blood glucose levels in diabetic individuals and lower blood lipid levels or cholesterol in individuals with hyperlipidemia.

Aloe vera exhibits antioxidant activities comparable to α-tocopherol (vitamin E), with its antioxidant potential varying based on the growth stage of the plant.

The anthraquinones present in Aloe vera latex have laxative effects, stimulating intestinal peristalsis.

Aloe vera possesses antibacterial properties, inhibiting the growth of microorganisms such as Streptococcus pyogenes, Shigella flexneri, and various Klebsiella species, particularly Gram-positive bacteria.

Although less extensively studied, Aloe vera has demonstrated inhibitory activity against Candida, suggesting potential antifungal properties. It is even used as a fish tank water conditioner for its antifungal effects.

Aloe vera's antiviral and antitumor activities are believed to result from both indirect and direct effects. Indirectly, Aloe vera stimulates the immune system, while direct effects may be attributed to anthraquinones. Ongoing clinical trials aim to provide conclusive evidence for the use of Aloe vera in the treatment of HIV-AIDS or cancer.

Promising results have been observed in studies conducted on pathogen-free rats, suggesting potential benefits of Aloe vera in addressing age-related diseases.

It is important to note that while Aloe vera has demonstrated various potential health benefits, further research and clinical trials are necessary to fully understand its mechanisms of action and establish its efficacy and safety for specific conditions.

The Use of Aloe vera in Animal Nutrition

Aloe vera has shown potential benefits in promoting growth and improving the health of chickens in various studies. The supplementation of Aloe powder, Aloe water extract, Aloe ethanol extract, or a combination of these extracts in the diet of broiler chickens has demonstrated positive effects on production performance and immune function. Aloe water extracts, in particular, have been effective in enhancing body weight in broilers. Similar positive outcomes have been observed when Aloe vera extract was added to the drinking water of broiler chickens.

However, it is worth mentioning that some studies have reported no significant effects on body weight or feed conversion ratio in broilers fed with Aloe vera. The addition of Aloe vera to the diet has also not shown significant impacts on carcass characteristics, sensory attributes of broiler meat, abdominal fat levels, cholesterol levels in breast and thigh muscles, or serum biochemistry.

Aloe vera has shown promise in improving the immune response of broilers, as evidenced by higher haemagglutination inhibition titre values against Newcastle disease. Additionally, it has been suggested that Aloe vera can be used in the treatment and control of coccidiosis, a common poultry disease.

In laying hens, the incorporation of Aloe vera in their diet has been found to significantly improve egg production without affecting feed consumption or feed conversion ratio. Furthermore, dietary supplementation with Aloe vera extracts may help prevent or treat the effects of lead intoxication in birds.

Moreover, Aloe vera has been utilized as a natural phytogenic growth promoter in shrimp farming, showing promising results in promoting shrimp growth.

It is important to note that while these findings indicate potential benefits of Aloe vera in chicken farming, further research is needed to determine the optimal dosage, long-term effects, and potential interactions with other factors in the production system.

Conclusion

Aloe vera is indeed a remarkable plant with a wide array of medicinal and cosmetic properties. Its gel is known to contain beneficial compounds that offer numerous advantages for human health and well-being. Traditionally, aloe vera has been used to treat various skin conditions, such as cuts, insect stings, bruises, poison ivy, and eczema. It is also recognized for its moisturizing and anti-aging

effects, helping to keep the skin hydrated and maintain a youthful appearance.

Moreover, research has explored the potential health benefits of ingesting aloe vera. It is believed to possess anti-inflammatory and antiseptic properties, which may contribute to alleviating symptoms associated with conditions like cancer and diabetes. The cosmetic industry frequently utilizes aloe vera due to its diverse properties and potential benefits.

However, while aloe vera is widely acknowledged for its potential advantages, further research is necessary to comprehensively understand its mechanisms of action and fully harness its potential benefits for human well-being. It is essential to approach the use of aloe vera with gratitude and understanding as it is a natural gift from nature. Conducting a patch test and consulting healthcare professionals, particularly if you have pre-existing medical conditions or are taking medications, is recommended to ensure its safe and appropriate use.

In conclusion, aloe vera is a versatile and invaluable plant that continues to be revered for its medicinal and cosmetic applications. Its potential benefits for skincare, wound healing, digestive health, and overall well-being make it a cherished natural remedy.

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