

A Review on Safety and Efficacy of Herbal Medicines for Aloe Vera

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ABSTRACT:-

Aloe vera appears to have a range of potential therapeutic uses, including wound healing, anti-inflammatory effects, and possible anti-cancer effects. However, the safety and efficacy of aloe vera as a herbal medicine requires further investigation.

While aloe vera is generally considered safe, some individuals may experience adverse effects such as allergic reactions or gastrointestinal discomfort. In addition, there are concerns about the potential for aloe vera to interact with certain medications.

Further research is needed to fully understand the potential benefits and risks of aloe vera as a herbal medicine. Until then, it is recommended that individuals consult with a healthcare professional before using aloe vera or any other herbal remedies. Aloe vera is a natural product that is now a day frequently used in the field of cosmetology. Though there are various indications for its use, controlled trials are needed to determine its real efficacy. The aloe vera plant, its properties, mechanism of action and clinical uses are briefly reviewed in this article.

Keywords: Aloe vera, health and beauty, skin.

I. INTRODUCTION:-

Aloe vera is a succulent plant that has been used for medicinal and cosmetic purposes for centuries. It is native to North Africa but is now cultivated in many parts of the world, including the United States, Mexico, and India. The gel obtained from the aloe vera plant's leaves is commonly used topically to treat various skin conditions, such as burns, wounds, and psoriasis, while its juice is consumed orally for its potential health benefits, including its laxative properties.

Aloe vera is rich in several vitamins, minerals, and antioxidants, such as vitamin C,

vitamin E, and beta-carotene. Its gel also contains several bioactive compounds, including polysaccharides, anthraquinones, and phytosterols, that are believed to contribute to its medicinal properties. Aloe vera has been the subject of extensive research, and numerous studies have examined its potential health benefits, including wound healing, anti-inflammatory effects, and potential anti-cancer properties.

Although aloe vera is generally considered safe when used topically or ingested in small doses, it can cause adverse effects, such as skin irritation and gastrointestinal symptoms, when used in excess or in certain individuals. It is important to use aloe vera products according to their recommended dosages and to consult with a healthcare professional before using them, particularly if you are pregnant, breastfeeding, or taking medication.

History:-

Aloe vera has been used for medicinal purposes in several cultures for millennia: Greece, Egypt, India, Mexico, Japan and China. Egyptian queens Nefertiti and Cleopatra used it as part of their regular beauty regimes. Alexander the Great, and Christopher Columbus used it to treat soldiers' wounds. The first reference to Aloe vera in English was a translation by John Goodyew in A.D. 1655 of Dioscorides' Medical treatise De Materia Medica. By the early 1800s, Aloe vera was in use as a laxative in the United States, but in the mid-1930s, a turning point occurred when it was successfully used to treat chronic and severe radiation dermatitis.

Plant:-

The botanical name of Aloe vera is Aloe barbadensis miller. It belongs to Asphodelaceae

(Liliaceae) family, and is a shrubby or arborescent, perennial, xerophytic, succulent, pea- green color plant. It grows mainly in the dry regions of Africa, Asia, Europe and America. In India, it is found in Rajasthan, Andhra Pradesh, Gujarat, Maharashtra and Tamil Nadu.

Anatomy:-

The plant has triangular, fleshy leaves with serrated edges, yellow tubular flowers and fruits that contain numerous seeds. Each leaf is composed of three layers: 1) An inner clear gel that contains 99% water and rest is made of glucomannans, amino acids, lipids, sterols and vitamins.

2) The middle layer of latex which is the bitter yellow sap and contains anthraquinones and glycosides. 3) The outer thick layer of 15–20 cells called as rind which has protective function and synthesizes carbohydrates and proteins. Inside the rind are vascular bundles responsible for transportation of substances such as water (xylem) and starch (phloem).

Active components with its properties:-

Aloe vera contains 75 potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids.

Vitamins:-

It contains vitamins A (beta-carotene), C and E, which are antioxidants. It also contains vitamin B12, folic acid, and choline. Antioxidant neutralizes free radicals.

Enzymes:-

It contains 8 enzymes: amylase, alkaline phosphatase, amylase, bradykinase, carboxypeptidase, catalase, cellulase, lipase, and peroxidase. Bradykinase helps to reduce excessive inflammation when applied to the skin topically, while others help in the breakdown of sugars and fats.

Minerals:-

It provides calcium, chromium, copper, selenium, magnesium, manganese, potassium, sodium and zinc. They are essential for the proper functioning of various enzyme systems in different metabolic pathways and few are antioxidants.

Sugars:-

It provides monosaccharides (glucose and fructose) and polysaccharides:

(glucomannans/polymannose). These are derived from the mucilage layer of the plant and are known as mucopolysaccharides. The most prominent monosaccharide is mannose-6-phosphate, and the most common polysaccharides are called glucomannans [beta-(1,4)-acetylated mannan]. Acemannan, a prominent glucomannan has also been found. Recently, a glycoprotein with antiallergic properties, called alprogen and novel anti-inflammatory compound, C-glucosyl chromone, has been isolated from Aloe vera gel.

Anthraquinones:-

It provides 12 anthraquinones, which are phenolic compounds traditionally known as laxatives. Aloin and emodin act as analgesics, antibacterials and antivirals.

Fatty acids:-

It provides 4 plant steroids; cholesterol, campesterol, β -sisosterol and lupeol. All these have anti-inflammatory action and lupeol also possesses antiseptic and analgesic properties.

Hormones:-

Auxins and gibberellins that help in wound healing and have anti-inflammatory action.

Others: It provides 20 of the 22 human required amino acids and 7 of the 8 essential amino acids. It also contains salicylic acid that possesses anti-inflammatory and antibacterial properties. Lignin, an inert substance, when included in topical preparations, enhances penetrative effect of the other ingredients into the skin. Saponins that are the soapy substances form about 3% of the gel and have cleansing and antiseptic properties.

Mechanism of actions:-Healing properties:

Glucomannan, a mannose-rich polysaccharide, and gibberellin, a growth hormone, interacts with growth factor receptors on the fibroblast, thereby stimulating its activity and proliferation, which in turn significantly increases collagen synthesis after topical and oral Aloe vera.⁹ Aloe gel not only increased collagen content of the wound but also changed collagen composition (more type III) and increased the degree of collagen cross linking. Due to this, it accelerated wound contraction and increased the breaking strength of resulting scar tissue.¹⁰ An increased synthesis of hyaluronic acid and dermatan sulfate in the granulation tissue of a healing wound following oral or topical treatment has been reported.¹¹

Effects on skin exposure to UV and gamma radiation:-

Aloe vera gel has been reported to have a protective effect against radiation damage to the skin.^{12,13} Exact role is not known, but following the administration of aloe vera gel, an antioxidant protein, metallothionein, is generated in the skin, which scavenges hydroxyl radicals and prevents suppression of superoxide dismutase and glutathione peroxidase in the skin. It reduces the production and release of skin keratinocyte-derived immunosuppressive cytokines such as interleukin-10 (IL-10) and hence prevents UV-induced suppression of delayed type hypersensitivity.

Anti-inflammatory action:-

Aloe vera inhibits the cyclooxygenase pathway and reduces prostaglandin E2 production from arachidonic acid. Recently, the novel anti-inflammatory compound called C-glucosyl chromone was isolated from gel extracts.

Effects on the immune system:-

Alprogen inhibit calcium influx into mast cells, thereby inhibiting the antigen-antibody-mediated release of histamine and leukotriene from mast cells.⁷ In a study on mice that had previously been implanted with murine sarcoma cells, acemannan stimulates the synthesis and release of interleukin-1 (IL-1) and tumor necrosis factor from macrophages in mice, which in turn initiated an immune attack that resulted in necrosis and regression of the cancerous cells.¹⁵ Several low-molecular-weight compounds are also capable of inhibiting the release of reactive oxygen free radicals from activated human neutrophils.

Laxative effects:-

Anthraquinones present in latex are a potent laxative. It increases intestinal water content, stimulates mucus secretion and increases intestinal peristalsis.

Antiviral and antitumor activity:-

These actions may be due to indirect or direct effects. Indirect effect is due to stimulation of the immune system and direct effect is due to anthraquinones. The anthraquinone aloin inactivates various enveloped viruses such as herpes simplex, varicella zoster and influenza.¹⁸ In recent studies, a polysaccharide fraction has shown to inhibit the binding of benzopyrene to primary rat hepatocytes, thereby preventing the formation of potentially cancer-initiating benzopyrene-DNA

adducts. An induction of glutathione S-transferase and an inhibition of the tumor-promoting effects of phorbol myristic acetate has also been reported which suggest a possible benefit of using aloe gel in cancer chemoprevention.

Moisturizing and anti-aging effect:-

Mucopolysaccharides help in binding moisture into the skin. Aloe stimulates fibroblast which produces the collagen and elastin fibers making the skin more elastic and less wrinkled. It also has cohesive effects on the superficial flaking epidermal cells by sticking them together, which softens the skin. The amino acids also soften hardened skin cells and zinc acts as an astringent to tighten pores. Its moisturizing effects has also been studied in treatment of dry skin associated with occupational exposure where aloe vera gel gloves improved the skin integrity, decreases appearance of fine wrinkle and decreases erythema.²¹ It also has anti-acne effect.

Antiseptic effect:-

Aloe vera contains 6 antiseptic agents: Lupeol, salicylic acid, urea nitrogen, cinnamonic acid, phenols and sulfur. They all have inhibitory action on fungi, bacteria and viruses.

Anti acne:-

Aloe vera has been used for centuries as a natural remedy for various skin conditions, including acne. Aloe vera contains several active compounds, including polysaccharides, anthraquinones, and lectins, which may have anti-inflammatory and antimicrobial effects, making it a potentially useful treatment for acne.

One study published in the Journal of Dermatological Treatment found that aloe vera gel was effective in reducing the severity of acne lesions in a group of 60 acne patients. Another study published in the Journal of Chemical and Pharmaceutical Research showed that a combination of aloe vera and tea tree oil was effective in reducing acne lesions and improving overall skin condition.

Aloe vera has been shown to have anti-inflammatory properties, which can help reduce the redness and swelling associated with acne. It may also help to reduce the production of sebum, the oil that can clog pores and contribute to acne.

General safety of aloe vera:-

Herbal medicines, including aloe vera, are generally considered safe when used as directed.

However, it is important to note that the safety of herbal medicines can vary depending on the specific herb, the form and preparation of the product, and individual factors such as age, medical history, and other medications being taken.

In general, herbs that are used in traditional medicine have been used for centuries and are considered safe when used appropriately. However, herbal medicines may interact with prescription medications or other supplements, and some herbs may have side effects or interactions with certain medical conditions.

It is important to purchase herbal products from reputable sources and to follow the recommended dosage and usage instructions. It is also important to inform your healthcare provider about any herbal medicines or supplements you are taking, especially if you have a medical condition or are taking prescription medications.

Additionally, some herbal products may be adulterated with other substances, such as heavy metals or pesticides, which can pose a risk to human health. Therefore, it is important to choose products that are tested for purity and quality.

Overall, while herbal medicines can be a safe and effective treatment option for some individuals, it is important to use them with caution and under the guidance of a healthcare professional.

General efficacy of aloe vera:-

Aloe vera has been used for centuries for a variety of health benefits, and numerous studies have investigated its potential efficacy for various conditions. While more research is needed to fully understand its therapeutic benefits, aloe vera has shown promise in several areas.

One of the most well-known benefits of aloe vera is its ability to soothe and heal skin. Its anti-inflammatory and antimicrobial properties may help to reduce redness and inflammation, and its moisturizing properties may improve the overall appearance and texture of the skin. Aloe vera has been used topically to treat a variety of skin conditions, including burns, cuts, eczema, and psoriasis.

Aloe vera has also been studied for its potential benefits for digestive health. Some studies have suggested that aloe vera may have laxative properties and may be useful for treating constipation. Additionally, aloe vera may have anti-inflammatory effects in the digestive tract, which could be beneficial for those with inflammatory bowel disease (IBD).

Other potential health benefits of aloe vera

include its ability to support immune function, promote wound healing, and improve oral health. However, more research is needed in these areas to fully understand the extent of aloe vera's therapeutic benefits.

Overall, aloe vera is a promising natural remedy with a range of potential health benefits. While it is generally considered safe when used as directed, it is important to consult with a healthcare professional before using aloe vera or any other herbal medicine or supplement, especially if you have a medical condition or are taking medications.

ALOE VERA: AVAILABLE HERBAL PLANT

The medicinal use of Aloe plants is known from the beginning of history of human civilization. Aloe Vera (*Aloe barbadensis* Miller) one of the four hundred species of Aloe, belonging to the family liliaceae is 3 feet tall having thick, fleshy, spiky, grey-green leafy structure that grows with a very short stem from a central point. Aloe vera is a succulent plant which may retain water in its leaves, stem as well as in roots and can grow in hot and humid environment even in the absence of sufficient water.

In the ancient times, Aloe vera was used for cosmetics, and for curing certain infections, besides treating and preventing skin related problems. It also helps evacuation of bowels, treating eczema with licorice and for regenerating the cell powers and for certain other ills. Aloe gel is rubbed on forehead to relieve headache. Success story of Aloe in 1930s in the United States lies in the hand of the people who used Aloe for treating burns related with the x-ray.

All parts of the plant Aloe are used, such as the exudates, the pure or the inner gel. The gel obtained from the plant is used in the form of gel or power for the preparation of the herbal products or cosmetics. It is also used as an important ingredient in certain pharmaceutical products including the manufacturing of tablets, capsules, ointments, creams and paste. In food industry, Aloe has found its worth and now it is used as a function of food because of its nutritional value, especially in healthy drinks and because of its moisturising activity Aloe vera gel is used as a base in cosmetic products.

CHEMICAL AND NUTRITIONAL VALUES OF ALOE

Seventy five of the 200 compounds, identified in Aloe vera, has shown biological activity. Aloe, a miracle plant, having a wide

variety of nutritional substances, contain 27 vitamins: 13- carotene (vitamin A), ascorbic acid (vitamin C), and tocoferol (vitamin E) which are used as anti-oxidants. Other vitamins include thiamine (vitamin B1) riboflavin (vitamin B2) vitamin F and choline. Cyanocobalamin (vitamin B12) plays a vital role in red blood cells production and folic acid in the development of red cells. Aloe vera has eleven minerals namely: calcium, chlorine, chromium, copper, iron, magnesium, manganese, potassium, phosphorus, sodium and zinc, which work in combination with vitamins and with each other and play an important role in regulating many functions of the body, especially relating to enzyme activity.

Out of eight essential amino acids, seven of them namely:- iso-leucine, leucine, lysine, methionine, phenylalanine, threonine and valine are found in Aloe vera, which are utilized in the body, especially in the synthesis of proteins, in order to regulate certain processes undergoing in human cells. In addition, some sterols (cholesterol, campesterol, lupeol and sitosterol), sugars (glucose and fructose) and hormones (auxin and gibberellins) are also reported from Aloe vera which are known for their anti-inflammatory activities.

II. CONCLUSION:-

The use of herbs as medicine is known from the early history of human civilization. Some modern medicines have been extracted from some of the plant. In recent years, there has been a growing interest in herbal medicines among health care as recommended by WHO are supported by many professionals, scientists, and the general public. One common ingredient of herbal plant, used as cosmetics is Aloe vera, which possesses many medicinal properties such as anti-inflammatory, astringent, emollient, anti-fungal, anti-bacterial, anti-viral properties. Externally it is used for the treatment of skin irritation, burns, scars, eczema, dermatitis, acne, as whitening, softening and moisturizing agent in skin care creams.

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