

## *Aloe barbadensis mill.*

**Common Name** - Aloe Vera (Ghrithkumari)

*Aloe vera* has long been used as a traditional medicine for inducing wound healing. It is a natural product that now a days is used in cosmetic industry. Benefits associated with *Aloe vera* have been attributed to the polysaccharides contained in the gel of the leaves though there are various indications for its use. Biological activities include promotion of wound healing, antifungal activity, anti-inflammatory, anticancer and immunomodulatory. Gingival fibroblasts play an important role in oral wound healing. Double blind-controlled trials are needed to determine its real efficacy in oral health.

**Keywords:** *Aloe vera*, oral health, polysaccharides, wound healing

*Aloe vera* (Sanskrit-Ghrithakumari, Kumara; Botanical-*Aloe barbadensis* Miller; Hindi-Guarpatha, Ghikanvar) is perennial succulent xerophyte, which develops water-storage tissue in the leaves to survive in dry areas of low or erratic rainfall. The plant has stiff grey-green lance-shaped leaves containing clear gel in a central mucilaginous pulp. Benefits associated with *Aloe vera* have been attributed to the polysaccharides contained in the gel of the leaves.

Historically, it has been used for a variety of medicinal purposes. *Aloe vera* has long been used as a traditional medicine for inducing wound healing. Over the years, this plant has been known by a number of names such as ‘the wand of heaven’, ‘heaven’s blessing’ and ‘the silent healer’. It is a natural product that now a days is used very much in cosmetic industry.

### Active ingredient of *Aloe vera*

More than 75 active ingredients from inner gel have been identified including vitamins, minerals, enzymes, sugars, anthraquinones or phenolic compounds, lignin, saponins, sterols, amino acids and salicylic acid.

### Wound-healing effects

Different mechanisms have been proposed for the wound-healing effects of aloe gel, which include keeping the wound moist, increase epithelial cell migration, more rapid maturation of collagen and reduction in inflammation.

Glucomannan, a mannose-rich polysaccharide and gibberellin, a growth hormone, interacts with growth factor receptor on the fibroblast, thereby stimulating its activity and proliferation, which in turn increases collagen synthesis after topical and oral application.

An increase in synthesis of hyaluronic acid and dermatan sulfate in the granulation tissue of a healing wound is seen following oral and topical treatment.

*Aloe vera* gel contains a glycoprotein with cell proliferating- promoting activity, while in one research it is found that *Aloe vera* gel improved wound healing by increasing blood supply, which increased oxygenation as a result. Topical application of the *Aloe vera* derived allantoin gel stimulated fibroblast activity and collagen proliferation.

### Skin hydration actions

Mucopolysaccharides help in binding moisture into the skin. It was proposed that the *Aloe vera* gel containing products improved skin hydration possibly by means of a humectant mechanism.

### Anti-aging effect

Aloe stimulates fibroblast which produces the collagen and elastin fibres making the skin more elastic and less wrinkled.

### Anti-inflammatory effects

It inhibits the cyclooxygenase pathway and reduces prostaglandin E2. Recently, the novel anti-inflammatory compound called C-glycosyl chromone was isolated from gel extracts.

Recently, the peptidase bradykinase was isolated from aloe and shown to break down the bradykinin, an inflammatory substance that induces pain.

### Antibacterial

The activity of *Aloe vera* inner gel against both Gram-positive and Gram-negative bacteria has been demonstrated by several different methods. *Streptococcus pyogenes* and *Streptococcus faecalis* are two microorganisms that have been inhibited by *Aloe vera* gel. Aloe vera gel reportedly was bactericidal against *Pseudomonas aeruginosa* while acemannan prevented it from adhering to human lung epithelial cells in a monolayer culture.

### Antifungal

A processed *Aloe vera* gel preparation reportedly inhibited the growth of *Candida albicans*.

### Antiviral effects

This action may be direct and indirect. Indirect due to stimulation of immune system and direct is due to anthraquinones. The anthraquinones aloin activates various enveloped virus; herpes simplex, varicella zoster and influenza.

### Effect on immune system

Immunomodulating effects occur via activation of macrophage cells to generate nitric oxide, secrete cytokines (e.g., tumor necrosis factor- $\alpha$ , interleukin-1, interleukin-6 and interferon- $\gamma$ ) and present cell surface markers.

### Antioxidant property

Glutathione peroxidase activity, superoxide dismutase enzymes and a phenolic antioxidant were found to be present in *Aloe vera* gel, which may be responsible for these antioxidant effects.

### Antitumor effect

The two fractions from aloes that are claimed to have anticancer effects include glycoproteins (lectins) and polysaccharides. Different studies indicated antitumor activity for *Aloe vera* gel in terms of reduced tumor burden, tumor shrinkage, tumor necrosis and prolonged survival rates.

An induction of glutathione S-transferase and an inhibition of the tumor-promoting effect of phorbol myristic acetate has also been reported which suggest aloe gel in cancer chemoprevention. Indirect action on antitumor activity is stimulation of the immune response.[

### Laxative effect (Purgative effect)

Anthraquinones increase intestine water content, stimulate water secretion and increase intestinal peristalsis.

### Antiseptic Properties

*Aloe vera* contain six antiseptic agent; lupeol, salicylic acid, urea nitrogen, cinnamonic acid, phenol and sulfur.

### Use of *aloe vera* in dentistry

#### Aphthous ulcer

It has been reported that acemannan hydrogel accelerates the healing of aphthous ulcers and reduces the pain associated with them.

Researchers evaluated a gel that combined allantoin, *Aloe vera*, and silicon dioxide and its effects on aphthous ulcers of the oral cavity. Each patient used a daily diary to document the number and duration of aphthous ulcers, the interval between ulcers, ulcer size, and ulcer pain over a period of 3-4 months. The reduced duration of the lesions in one arm of the study and the increased interval between lesions in the other arm of the study both were significant statistically. The gel did not demonstrate any consistent effectiveness on ulcers in the oral cavity.