



The Magical Aloe Vera Plant with Numerous Health Benefits and Uses

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Aloe vera is a hot, arid climate plant that resembles a cactus. Aloe vera is used in folk medicine, where it is said to have anti-inflammatory, immune-modulatory, and wound- and burn-healing qualities. Because of these medicinal qualities, aloe vera is employed in many different commercial goods. Two widely used compounds that differ in their chemical makeup and therapeutic potential are derived from the plant. The gel and the golden sap are these two products. The clear, viscous substance known as "juice" or "gel" is extracted from the plant's parenchymal tissues in the leaves. The second product, yellow sap or latex, is an active cathartic medicinal product that is found in pericyclic tubule cells and is simply referred to as *aloe*.

Chemical composition of aloevera

More than 75 possible active ingredients have been found in aloe vera, which is mostly found in the plant's yellow sap and gel. The gel is mostly made up of polysaccharides and water (> 98%). The active ingredients in yellow sap are derivatives of hydroxyanthrone.

- It has been documented that aloe contains the hormones gibberellins and auxins. They have anti-inflammatory properties and aid in the healing of wounds.
- Aloe provides 20 of the 22 human required amino acids and 7 of the 8 essential amino acids. 8. Vitamins: Aloe contains vitamins A (Beta-carotene), C and E, which are antioxidants. It also contains vitamin B " folic acid and choline.
- Aloe also contains salicylic acid, lignin, saponins. Salicylic acid 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 are the soapy substances and have cleansing and antiseptic properties.
- Both mono- and polysaccharides are present in aloe gel. Acemannan and glucomannans are the most prevalent polysaccharides, while mannose-6-phosphate is the most notable monosaccharide.
- Aloin and emodin are two of the twelve anthraquinones found in yellow sap. These are phenolic substances that have historically been used as laxatives and have analgesic, antiviral, and antibacterial properties.
- Gel is composed of cholesterol, campesterol, α -sisosterol, and lupern, which have analgesic, antimicrobial, and anti-inflammatory qualities.
- Alkaline phosphatase, amylase, bradykinase, carboxypeptidase, catalase, cellulase, lipase, and peroxidase are the eight enzymes found in aloe gel. When applied topically, bradykinase helps to lessen severe inflammation in the skin. while others aid in the fats and sugars' breakdown.
- The main minerals found in aloe include calcium, chromium, copper, selenium, magnesium, manganese, potassium, sodium, and zinc.

Extraction of gel from aloe vera

Processing can be broken down into three basic steps viz., preliminary processing, intermediate processing and final processing. Preliminary processing begins with sanitizing the outer surface of the freshly harvested leaf and proceeds through removal of the outer rind and expression of the gel fillet either manually or by machine to produce the gel. Ideally, leaves should be harvested and washed within two to four hours.

Stabilization of aloe vera gel

Heat treatment processing sterilizes aloe vera gel by heating it to 65°C for approximately 15 minutes, then cooling it quickly to 5°C or below. Preservatives and other additives, like citric acid, potassium sorbate, and sodium benzoate, can also stabilize the gel. Another useful technique to prevent bad flavour and biological activity loss from aloe vera gel is HTST treatment, which involves heating the gel to 85-95°C for one to two minutes. After pasteurisation, the juice is quickly cooled to 5°C or below, which takes ten to fifteen seconds. This is an important step to preserve the biological activity of the aloe vera gel.

Beneficial effect of aloe vera

- Polysaccharides aid in securing hydration in the skin. The production of collagen and elastin fibres by aloe promotes fibroblast, which makes the skin less wrinkled and more elastic.
- Increases collagen synthesis, which speeds up wound contraction and raises the breaking strength of scar tissue
- Anthemaquinanes, which are found in latex, increase intestinal water content, stimulate mucus secretion, and increase intestinal peristalsis
- Zinc acts as an astringent to tighten pores, Amino acids also soften hardened skin cells.
- Alprogen prevents mast cells from receiving calcium, which prevents mast cells from releasing histamine and leukotriene through the action of antigen-antibody complexes.
- There have been reports of aloe gel's ability to shield skin against radiation harm. When aloe gel is applied topically, the skin produces metallothionein, an antioxidant protein that scavenges free radicals and keeps the skin's production of glutathione peroxidase and superoxide dismutase from being suppressed.
- Ingredients that suppress fungi, bacteria, and viruses include luteol, salicylic acid, urea nitrogen, cinnamonic acid, phenols, and sulphur.
- External application of fresh, undiluted leaf gel is calming and restorative.
- It was discovered that smoothing hair requires external application of an 86.6% concentration of water extract of dried leaves on adult humans. It has been discovered that applying fresh leaf gel externally to adult humans will lessen hair loss. *Alopecia areata* sufferers saw an improvement in their hair.

Value added products from aloe vera

- Aloe Candy contains aloe vera polysaccharides in concentration of 200 to 300%
- Juice from bruised aloe is less palatable since it contains various anthraquinones and other contaminants. Concentrated aloe juice has a high concentration of active compounds and is easy to make.
- Aloin is extracted using a straightforward procedure that is done at room temperature. It uses an organic solvent that is recoverable and reusable. The extracted chemical possesses further medicinal and laxative qualities.
- The aloe crack cream works wonders for dry, parched skin and damaged feet. In addition to softening and moisturizing the skin, it promotes the healing of skin blemishes and cracks.

- The moisturizer made out of aloe vera is very much suitable for normal/oily skin. It makes the skin smooth and glowing. It removes the black spots from the skin formed due to cold.
- Aloe gel moisturizer suitable for summer. Regular use on a scalp may help in growing new hair.
- Aloe shampoo, aloe hair nourishing cream, aloe pickle are some other products can also be prepared at small scale and at industrial level.

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