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Aloe vera gel: Update for dentistry

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The fresh gel or mucilage from *Aloe barbadensis* Mill. (family Liliaceae)—otherwise known as *aloe vera*—is a handy home-grown remedy that can be used both as a moisturizing agent and for the treatment of minor burns, skin abrasions, and irritations.¹⁴ It has been suggested that external application of aloe vera gel promotes wound healing.³ The table provides a list of reported actions, properties, and uses of aloe vera gel; aloe vera gel reportedly has been used to treat gingivitis and been effective against herpes simplex viruses.¹⁴

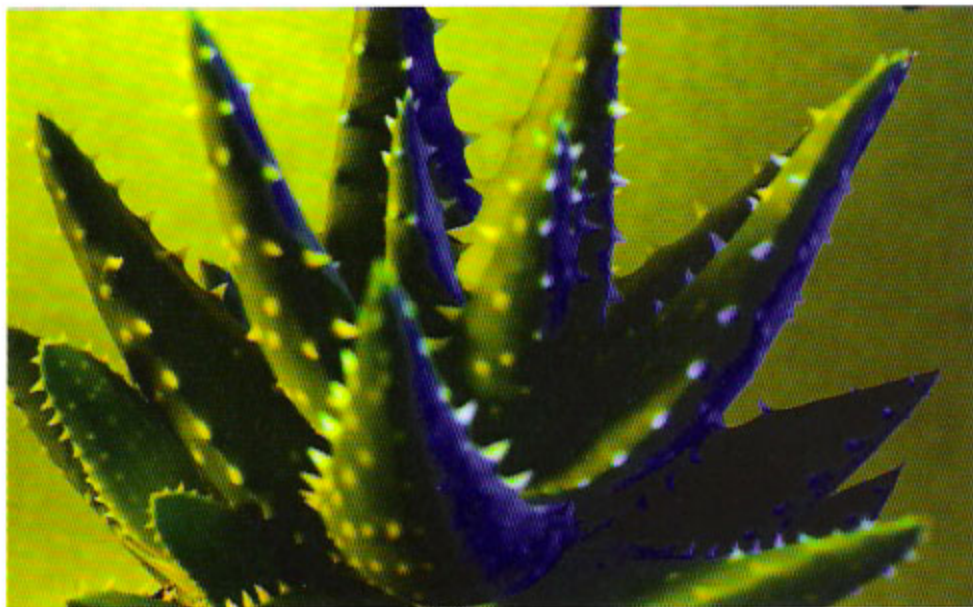
The *Aloe barbadensis* plant consists of two different parts, each of which produce substances with completely different compositions and therapeutic properties. The parenchymal tissue makes up the inner portion of the aloe leaves and produces the aloe vera gel (or mucilage), a clear, thin, tasteless, jelly-like material.³ This tissue is recovered from the leaf by separating the gel from the inner cellular debris.

The other part of the plant is a group of specialized cells known as the *pericyclic tubules*, which occur just beneath the outer green rind of the leaf.

These cells produce an exudate that consists of a bitter yellow latex with powerful laxative-like actions. This exudate—which is not to be confused with the gel/mucilage from the parenchymal leaf tissue—is available commercially for systemic ingestion to produce catharsis.

Gel constituents

The chemical composition of the aloe vera gel is complex and can read like a who's who list of chemical ingredients. A 1999 review by Vogler and Ernst lists 75 potentially active constituents, including vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids, and amino acids; this list was modified from a larger list of ingredients reported by other investigators.¹⁴ A report from the same year described using aloe vera for treatment of lichen planus and listed 39 chemical constituents, including the essential amino acids; numerous monosaccharides and polysaccharides; vitamins B₁, B₂, B₆, and C; niacinamide and choline; several inorganic ingredients; enzymes such as acid phosphatase, alkaline phosphatase, amylase, lactic dehydrogenase, and lipase; and numerous organic compounds such as aloin, barbaloin, and emodin.⁹ Reynolds and Dweck listed 16 different polysaccharides that have been extracted from the aloe vera leaf gel, in addition to 12 major polypeptides whose molecular weights ranged from 15,000–77,000 Daltons, and various glycoproteins with a molecular weight of 29,000 Daltons.¹⁰ Yamaguchi et al reported the presence of aluminum, boron, barium, calcium, iron, magnesium, sodium, phosphorous, silicon, and strontium in aloe vera gel.¹¹



Polysaccharide components

The major types of polysaccharides described by Reynolds and Dweck consisted of glucomannans of various composition (long chains of glucose and mannose units hooked together), some of which were acetylated; polymers of galactose and galacturonic acid also have been found in the gel.¹⁰ Different investigators have revealed different polysaccharide structures within the gel. Yaron's 1991 study regarding the gel's viscosity and rheology indicated that the glucomannans in aloe rarely were found in other plants and provided the plastic properties of the gel that are similar to the properties of human body fluids.¹² One of the glucomannans in the gel is an acetylated mannan that is available commercially as a patented product, acemannan hydrogel (Carrasyn, Carrington Laboratories, Irving, TX; 800.444.2563).¹³

Table. Properties, actions, and uses of aloe vera gel cited in recognized references.¹⁴

Moisturizing properties
Anti-inflammatory
Antibacterial
Antifungal
Antiviral
Wound healing
Pain relief
Treatment of minor burns, skin abrasions, and irritations
Treatment of psoriasis and frostbite