**Synonyms / Common Names / Related Terms**

Acemannan, Aloe africana, Aloe arborescens Miller, Aloe barbadensis, Aloe barbadensis, Aloe capensis, aloe-coated gloves, Aloe ferox, aloe latex, aloe mucilage, Aloe perfoliata, Aloe perryi Baker, Aloe spicata, Aloe vulgar, Barbados aloe, bitter aloe, burn plant, Cape aloe, Carrisyn, hirukattali, Curaçao aloe, elephant's gall, first-aid plant, Ghai kunwar (Indian), Ghikumar (Indian), Hsiang-Dan (Chinese), jelly leek, kumari, laloi, laloj, lily of the desert, Lu-Hui, medicine plant, Mediterranean aloe, miracle plant, mocha aloes, musabbar, natal aloes, nohwa, plant of immortality, plant of life, rokai, sabilla (Spanish), Savila, Socotrine aloe, subr, true aloe, Venezuela aloe, Za'bila (Swahili), Zanzibar aloe.

**Combination product (example):** Mepentol Leche (an emulsion based on hyper-oxygenated fatty acids, Aloe barbadensis and Mimosa tenuiflora).

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**Mechanism of Action**

**Pharmacology:**

- Aloe gel: The gel or mucilage obtained from the flesh of the leaf is 99% water at pH 4.5. The constituent polysaccharide glucomannan is an effective human skin moisturizer, which accounts for its use in many cosmetics. Acemannan, the major carbohydrate fraction in the gel, is a watersoluble long chain mannose polymer, which has been found in vitro and in animal studies to modulate immune function (particularly macrophage activation and cytokine production) and to accelerate wound healing. The macrophage stimulating principle of acemannan appears to reside in the high molecular weight polysaccharide Aloeride. Acemannan has also been reported to exhibit antineoplastic and antiviral effects in vitro.

- Other constituents include bradykininase, which possesses anti-inflammatory properties and magnesium lactate, which has antipruritic effects. A mannose-rich polysaccharide fraction of aloe gel has been shown in mice to enhance antibody production. Salicylic acid and other antiprostaglandin compounds may be responsible for aloe's local anti-inflammatory activity, possibly due to an inhibitory effect on the arachidonic acid pathway via cyclooxygenase.

- Maloyl glucan compounds isolated from Aloe barbadensis Miller include 6-O-(1-L-maloyl)-alpha-,beta-D-Glcp (veracylglocan A), alpha-D-Glcp-(1-->4)-6-O-(1-L-maloyl)-alpha-,beta-,D-Glcp (veracylglocan B) and alpha-D-Glcp-(1-->4)-tetra-[6-O-(1-L-maloyl)-alpha-,beta-D-Glcp-(1-->4)]-6-O-(1-L-maloyl)-alpha-,beta-D-Glcp (veracylglocan C). Based on in vitro study, veracylglocan B demonstrated potent anti-inflammatory and anti-proliferative effects, while veracylglocan C exhibited significant cell proliferative and anti-inflammatory activities. Veracylglocan B and C appeared antagonistic and competitive in their effects on cell proliferation.

- Antifungal effects: A hydroalcoholic extract of fresh Aloe vera leaves had a minimum fungicidal concentration (MFC) between 80 and 100mcL/mL against the mycelial growth
of Botrytis gladiolorum, Fusarium oxysporum f.sp. gladioli, Heterosporium pruneti, and Penicillium gladioli.1

- **Anti inflammatory effects:** Topical aloe’s anti-inflammatory properties do not appear to interfere with wound healing, but rather increase wound tensile strength, possibly due to the fibroblast stimulating activity of mannose-6-phosphate.17 In vivo, Aloe vera gel (97.5%) significantly reduced UV-induced erythema after 48 hours, being superior to 1% hydrocortisone in placebo gel. In contrast, 1% hydrocortisone in cream was more efficient than Aloe vera gel.18 Aloe also has antithromboxane activity, yet it maintains prostaglandin ratio without causing injured blood vessels to collapse.

- **Antineoplastic effects:** Anti-leukemic and anti-mutagenic effects of aloe in vitro have been attributed to di (2-ethylhexyl) phthalate (DEHP).19 Promotion of apoptosis has been reported in vitro as a possible anti-neoplastic mechanism.20 Aloe appears to affect detoxification of reactive metabolites by liver and other organs.3

- **Antioxidant effects:** Antioxidant properties have been attributed to aloesin derived from Aloe vera.2,3,4 Based on cell-line research, APS-1, a polysaccharide from Aloe vera var. chinesis, also showed free radical scavenging and other antioxidant properties.21

- **Cardiovascular effects:** Calcium isocitrate, isolated from Aloe saponaria, has been shown to be inotropic in rat and rabbit hearts.5

- **Endocrine effects:** Constituents of Kitachi aloe leaf pulp and skin have been found to stimulate beta-cells in diabetic mice, thereby lowering blood glucose levels.7

- **Radioprotective effects:** Wang et al. suggested that aloe polysaccharides may have a radioprotective effect on non-malignant cells via its ability to modulate the cell cycle.22,23

- **Other effects:** In a study of topical application for up two weeks, Aloe barbadensis Miller extracts increased the water content of the stratum corneum of the arms of human volunteers, although transepidermal water loss was not altered.24

- **Aloe latex:** Aloe latex contains anthraquinone glycosides (aloins, aloe-emodin and barbaloin) that act as potent stimulant laxatives.25,26,27,28,29,6,30 These water soluble glycosides are split by intestinal bacteria into aglycones, which are believed to exert a more powerful laxative effect than other herbs, including senna, cascara, or rhubarb root. One of these compounds, aloe-emodin-9-anthrone, has been shown to increase the water content in rat large intestines.31 This appears to be a more important cathartic mechanism than increased intestinal motility (which has also been proposed).26,27

- **Cytotoxic effects:** The anthraquinone glycosides have been studied for their cytotoxic effects. For instance, aloe-emodin induced apoptosis in T24 human bladder cancer cells, which is thought to be mediated through the activation of p53, p21,Fas/APO-1, Bax and caspase-3.9 In human malignant melanoma cells, aloe-emodin inhibited NAT1 activity in intact cells in a dose-dependent manner.10 In human lung carcinoma cells, aloe-emodin is thought to induce DNA damage through generation of reactive oxygen species.11

- **Based on in vivo angiogenesis assays,** Cárdenas et al. reported that aloe-emodin may behave as both an anti-tumor and an anti-angiogenic compound.32 Aloe-emodin is thought to inhibit endothelial cell proliferation, but this effect is not cell specific, since aloe-emodin also inhibits tumor cell proliferation. Cell migration and invasion are not remarkably affected by aloe-emodin. On the other hand, aloe-emodin has different effects on endothelial and tumor cell gelatinases. Two main targets of the pharmacological action of aloe-emodin as an anti-angiogenic compound seem to be urokinase secretion and tubule formation of endothelial cells.

**Pharmacodynamics/Kinetics:**
Anthraquinone glycosides, which are absorbed well only after digestion by intestinal bacteria, are eliminated in the urine, bile, feces, and breast milk. The half-life of aloe-emodin is approximately 48-50 hours.33

**References**
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