Aloe Vera

Species (Family)

Aloe barbadensis Mill., *Aloe ferox* Mill. and hybrids with *Aloe africana* Mill. and *Aloe spicata* Baker (Liliaceae)

Synonyms

Aloe Gel, *Aloe vera* Tourn. ex L., *Aloe vera* (L.) Webb

Parts Used

Leaf gel

Pharmacopoeial and Other Monographs

Martindale 32nd edition[G43]
PDR for Herbal Medicines 2nd edition[G36]
WHO volume 1 1999[G63]

Legal Category (Licensed Products)

Aloe vera is not included in the GSL.

Constituents[G2,G6,G22,G41]

Aloe vera is reported to contain mono- and polysaccharides, tannins, sterols, organic acids, enzymes (including cyclooxygenase),[1] saponins, vitamins and minerals.[2]

Carbohydrates Glucomannan and other polysaccharides containing arabinose, galactose and xylose.

Lipids Includes cholesterol, gamolenic acid and arachidonic acid.[1] The polar, non-polar and fatty acid composition has been investigated.[1]

Food Use

Aloe vera is not used in foods.

Herbal Use

Traditionally, aloe vera has been used in ointments and creams to assist the healing of wounds, burns, eczema and psoriasis.[G2,G6,G41,G64]

Dosage

None documented.

Pharmacological Actions

Aloe vera refers to the mucilaginous tissue located in the leaf parenchyma of *Aloe vera* or related *Aloe* species. However, many documented studies for *Aloe vera* have utilised homogenised leaf extracts which therefore combine aloe vera with aloes, the laxative preparation obtained from the bitter, yellow juice also found in the leaf (*see* Aloes). Unless otherwise specified, the following studies will refer to a total leaf extract.

In vitro and animal studies

Gel preparations have been reported to be effective against radiation burns, skin ulcers and peptic ulcers.[2] However, the gel was also found to be ineffective against drug- and stress-induced gastric and peptic ulcers in rats.[2]

Anti-inflammatory activity has been observed in various rat and mouse models that received subcutaneous injections of *Aloe vera* leaf extract.[3] A positive response was noted in wound-healing (10 mg/kg, rat; 100 mg/kg, mouse), mustard oedema (10 mg/kg, rat) and polymorphonuclear leukocyte infiltration (2 mg/kg, mouse) tests, although no activity was demonstrated in the antifibrosis test (cotton pellet granuloma) (400 mg/kg, rat).

Anti-arthritic and anti-inflammatory activity has been documented for a cream containing homogenised *Aloe africana* leaves, ribonucleic acid, and ascorbic acid, following topical application to rats which had been injected (day 0) with *Mycobacterium butyricum* to cause adjuvant arthritis.[4] This model is considered a good experimental tool for studying rheumatoid arthritis.[4] The cream was found to be active when applied both as a prevention (days 1–13) and as a regression (days 21–35) treatment.[4] Subsequent work suggested that anthraquinone compounds (anthraquinone, anthracene and anthranilic acid) may be the active components in the aloe leaf mixture.[5] These compounds are, however, constituents of aloes rather than aloe vera (*see* Aloes). Aloe vera juice (presumably containing the anthraquinones contained in aloe preparation) has been applied directly to open pressure sores to assist in

their healing.[6] The aloe vera extract exhibited an anaesthetic reaction, antibacterial action and increased local microcirculation.[6]

Endogenous cyclooxygenase in *Aloe vera* has been found to convert endogenous arachidonate to various prostanoids, namely PGE_2 (major), TXB_2, PGD_2, $PGF_{2\alpha}$, and 6-keto-$PGF_{1b\alpha}$.[1] The production of these compounds, especially PGE_2, has been associated with the beneficial effect of an aloe extract on human bronchial asthma[8] (see below).

Hypoglycaemic actions have been documented for aloes extracts (*see* Aloes).

Clinical studies

Enhancement of phagocytosis in adult bronchial asthma has been attributed to a non-dialysable fraction of the extract, consisting of active components that are a mixture of polysaccharide and protein or glycoprotein.[7] Despite the nature of these proposed active components, it has been proposed that activity of the fraction may be related to the previous observation that aloe vera synthesises prostaglandins from endogenous arachidonic acid using endogenous cyclooxygenase.[1] In this current study,[7] activity of the aloe vera extract required dark storage at 4–30°C for a period of 3–10 days.[3] These conditions are reported to be favourable for the hydrolysis of phospholipids, thus releasing arachidonic acid for synthesis of prostanoids.[1] In addition, activity was dependent on patients not having received prior treatment with a corticosteroid.[8] The gel has been reported to be effective in the treatment of mouth ulcers.[8]

Side-effects, Toxicity

None documented.

Contra-indications, Warnings

Hypoglycaemic activity has been documented for an aloe vera extract, although it is unclear whether this is associated with the true aloe vera gel or aloes extract.[9]

Pregnancy and lactation The external application of aloe vera gel during pregnancy is not thought to be any cause for concern. However, products stated to contain aloes extracts or aloe vera may well contain gastrointestinal stimulant anthraquinone components that are well recognised as the active constituents in aloes (laxative). As such, ingestion of such preparations during pregnancy and lactation should be avoided.

Pharmaceutical Comment

Aloe vera is obtained from the mucilaginous tissue in the centre of the *Aloe vera* leaf and consists mainly of polysaccharides and lipids. It should not be confused with aloes, which is obtained by evaporation of water from the bitter yellow juice that is drained from the leaf. Unlike aloes, aloe vera does not contain any anthraquinone compounds and does not, therefore, exert any laxative action. Studies have reported an anti-inflammatory and anti-arthritic action for total leaf extracts but the activity seems to be associated with anthraquinone compounds. Hypoglycaemic activity has been reported for aloe vera extract. Aloe vera is a source of gamolenic acid. The literature on burn management with aloe vera gel preparations is confused and further studies are required.[10]

References

See also General References G5, G6, G18, G19, G22, G29, G31, G32, G36, G41, G43, G63 and G64.

1 Afzal M *et al.* Identification of some prostanoids in *Aloe vera* extracts. *Planta Med* 1991; 57: 38–40.
2 Parmar NS *et al.* Evaluation of *Aloe vera* leaf exudate and gel for gastric and duodenal anti-ulcer activity. *Fitoterapia* 1986; 57: 380–381.
3 Davis RH *et al.* Biological activity of *Aloe vera*. *Med Sci Res* 1987; 15: 235.
4 Davis RH *et al.* Topical effect of aloe with ribonucleic and vitamin C on adjuvant arthritis. *J Am Pod Med Assoc* 1985; 75: 229–237.
5 Davis RH *et al.* Antiarthritic activity of anthraquinones found in aloe for podiatric medicine. *J Am Pod Med Assoc* 1986; 76: 61–66.
6 Cuzzell JZ. Readers' remedies for pressure sores. *Am J Nurs* 1986; 86: 923–924.
7 Shida T *et al.* Effect of Aloe extract on peripheral phagocytosis in adult bronchial asthma. *Planta Med* 1985; 51: 273–275.
8 Plemons JM *et al.* Evaluation of acemannan in the treatment of aphthous stomatitis. *Wounds* 1994; 6: 40–45.
9 Ghanam N *et al.* The antidiabetic activity of aloes: preliminary clinical and experimental observations. *Hormone Res* 1986; 24: 288–294.
10 Marshall JM. Aloe vera gel: What is the evidence? *Pharm J* 1990; 244: 360–362.