



## *Aloe barbadensis* Miller a valuable ingredient for traditional uses and toxicological properties - A Review

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### ABSTRACT

*Medicinal plants play an important role for health care. Medicinal plants have ability to cure both infectious and noninfectious diseases. According to an estimate about 25% of medicines are derived from plants. The objective of the present study was to evaluate the useful properties of Aloe barbadensis Miller (Aloe Vera) by giving data of this plant. Aloe Vera is a very useful plant. It is used in herbal medicines for various purposes. Aloe Vera crop do not require much water content it can grow easily in low water. Aloe Vera was used in folk medicines. Now a day, it is widely used by humans in medicines. It is used as a dietary supplements, beauty products etc. it is also helpful to cure many diseases like cancer tumor elimination, erase inflammation, improvement of digestive health as well as circulatory health, it also regulate blood pressure, support in dental health etc. It is an attempt to make good and vast knowledge of aloe Vera. This review helps to know the properties of this valuable plant.*

**Keywords:** *Aloe Vera, Medicinal plants, Biofuels, Gel.*

### INTRODUCTION

*Aloe vera* is a succulent plant species that probably originated in northern Africa. The species does not have any naturally occurring populations, although closely related aloes do occur in northern Africa.[1] The species is frequently cited as being used in herbal medicine since the beginning of the first century AD. Extracts from *A. vera* are widely used in the cosmetics and alternative medicine industries, being marketed as variously having rejuvenating, healing or soothing properties. There is, however, little scientific evidence of the effectiveness or safety of *A. vera* extracts for either cosmetic or medicinal purposes, and what positive evidence is available is frequently contradicted by other studies.[2][3][4][5]

#### Description

*Aloe vera* is a stemless or very short-stemmed succulent plant growing to 60–100 cm (24– 39 in) tall, spreading by offsets. The leaves are thick and fleshy, green to grey-green, with some varieties showing white flecks on the upper and lower stem surfaces.[6] The margin of the leaf is serrated and has small white teeth. The flowers

are produced in summer on a spike up to 90 cm (35 in) tall, each flower being pendulous, with a yellow tubular corolla 2–3 cm (0.8–1.2 in) long.[6][7] Like other *Aloe* species, *Aloe vera* forms arbuscular mycorrhiza, a symbiosis that allows the plant better access to mineral nutrients in soil.[8]

#### Taxonomy and etymology

The species has a number of synonyms: *A. barbadensis* Mill., *Aloe indica* Royle, *Aloe perfoliata* L. var. *vera* and *A. vulgaris* Lam.[9][10] Common names include Chinese Aloe, Indian Aloe, True Aloe, Barbados Aloe, Burn Aloe, First Aid Plant.[7][11][12][13][14] The species epithet *vera* means "true" or "genuine".[11] Some literature identifies the white spotted form of *Aloe vera* as *Aloe vera* var. *chinensis*:[15][16] however, the species varies widely with regard to leaf spots and it has been suggested that the spotted form of *Aloe vera* may be conspecific with *A. massawana*. [17] The species was first described by Carl Linnaeus in 1753 as *Aloe perfoliata* var. *vera*, [18] and was described again in 1768 by Nicolaas Laurens Burman as *Aloe vera* in *Flora Indica* on 6 April and by Philip Miller as *Aloe barbadensis* some ten

days after Burman in the *Gardener's Dictionary*. [19]

Techniques based on DNA comparison suggest that *Aloe vera* is relatively closely related to *Aloe perryi*, a species that is endemic to Yemen. [20] Similar techniques, using chloroplast DNA sequence comparison and ISSR profiling have also suggested that *Aloe vera* is closely related to *Aloe forbesii*, *Aloe inermis*, *Aloe scobinifolia*, *Aloe sinkatana*, and

*Aloe striata*. [21] With the exception of the South African species *A. striata*, these *Aloe* species are native to Socotra (Yemen), Somalia, and Sudan. The lack of obvious natural populations of the species has led some authors to suggest that *Aloe vera* may be of hybrid origin. [22]

### Distribution

The natural range of *Aloe vera* is unclear, as the species has been widely cultivated throughout the world. Naturalised stands of the species occur in the southern half of the Arabian Peninsula, through North Africa (Morocco, Mauritania, and Egypt) as well as Sudan and neighbouring countries, along with the Canary, Cape Verde, and Madeira Islands. This distribution is somewhat similar to the one of *Euphorbia balsamifera*, *Pistacia atlantica*, and a few others, suggesting that a dry sclerophyl forest once covered large areas, but has been dramatically reduced due to desertification in the Sahara, leaving these few patches isolated. Several closely related (or sometimes identical) species can be found on the two extreme sides of the Sahara: Dragon trees (*Dracaena*) and *Aeonium* being two of the most representative examples. The species was introduced to China and various parts of southern Europe in the 17th century. [23] The species is widely naturalised elsewhere, occurring in temperate and tropical regions of Australia, Barbados, Belize, Nigeria, Paraguay and the United States [24] It has been suggested that the actual species' distribution is the result of human cultivation.

### Cultivation

*Aloe vera* has been widely grown as an ornamental plant. The species is popular with modern gardeners as a putatively medicinal plant and due to its interesting flowers, form, and succulence. This succulence enables the species to survive in areas of low natural rainfall, making it ideal for rockeries and other low-water use gardens. The species is hardy in zones 8–11, although it is intolerant of very heavy frost or snow. [25] The

species is relatively resistant to most insect pests, though spider mites, mealy bugs, scale insects, and aphid species may cause a decline in plant health. [26][27] In pots, the species requires well-drained sandy potting soil and bright sunny conditions; however, aloe plants can burn under too much sun or shrivel when the pot does not drain the rain. The use of a good-quality commercial propagation mix or pre-packaged "cacti and succulent mix" is recommended, as they allow good drainage. [28] Terracotta pots are preferable as they are porous. Potted plants should be allowed to completely dry prior to re-watering. When potted aloes become crowded with "pups" growing from the sides of the "mother plant," they should be divided and re-potted to allow room for further growth and help prevent pest infestations. During winter, *Aloe vera* may become dormant, during which little moisture is required. In areas that receive frost or snow, the species is best kept indoors or in heated glasshouses. Large scale agricultural production of *Aloe vera* is undertaken in Australia, [29] Bangladesh, Cuba, [30] the Dominican Republic, China, Mexico, [31] India, [32] Jamaica, [33] Kenya, Tanzania and South Africa, [34] along with the USA [35] to supply the cosmetics industry with *Aloe vera* gel. This plant has gained the Royal Horticultural Society's Award of Garden Merit. [36]

### Uses

Preparations made from the plant *Aloe vera* are often referred to as "aloe vera". [37] Scientific evidence for the cosmetic and therapeutic effectiveness of aloe vera is limited and when present is frequently contradictory. Despite this, the cosmetic and alternative medicine industries regularly make claims regarding the soothing, moisturizing, and healing properties of aloe vera. [38] Aloe vera gel is used as an ingredient in commercially available lotions, yogurt, beverages, and some desserts, [39][40][41] although at certain doses, it has toxic properties when used either for ingested or topical applications. [42]

### Folk medicine

Early records of *Aloe vera* use appear in the Ebers Papyrus from 16th century BC, [14] in both Dioscorides' *De Materia Medica* and Pliny the Elder's *Natural History* written in the mid-first century AD [14] along with the *Juliana Anicia Codex* produced in 512 AD. [39] The species is used widely in the traditional herbal medicine of many countries. [4] *Aloe vera*, called *kathalai* in Ayurvedic medicine, is used as a multipurpose skin treatment. This may be partly due to the

presence of saponin, a chemical compound that acts as an anti-microbial agent.<sup>[43]</sup>

#### **Dietary supplement**

Aloin, a compound found in the exudate of some *Aloe* species, was the common ingredient in over-the-counter (OTC) laxative products in the United States prior to 2003, when the Food and Drug Administration ruled that aloin was a class III ingredient, thereby banning its use.<sup>[44]</sup> *Aloe vera* has potential toxicity, with side-effects occurring at some dose levels either when ingested or applied topically.<sup>[42]</sup> Although toxicity may be less when aloin is removed by processing, *aloe vera* that contains aloin in excess amounts may induce side-effects.<sup>[4][5][45]</sup> A 2-year National Toxicology Program (NTP) study on oral consumption of non-decolorized whole leaf extract of *Aloe vera* found evidence of carcinogenic activity in male and female rats. The NTP says more information is needed to determine the potential risks to humans.<sup>[46]</sup>

*Aloe vera* juice is marketed to support the health of the digestive system, but there is neither scientific evidence nor regulatory approval to support this claim. The extracts and quantities typically used for such purposes appear to be dose-dependent for toxic effects.<sup>[42]</sup>

#### **Phytochemicals**

*Aloe vera* leaves contain phytochemicals under study for possible bioactivity, such as acetylated mannans, polymannans, anthraquinone C-glycosides, anthrones, anthraquinones, such as emodin, and various lectins.<sup>[4]</sup> Emodin (although not obtained from *Aloe vera*) has been shown to have insecticidal properties.

#### **Commodities**

*Aloe vera* is now used on facial tissues, where it is promoted as a moisturiser and/or anti-irritant to reduce chafing of the nose of users suffering hay-fever or cold. It is common practice for cosmetic companies to add sap or other derivatives from *Aloe vera* to products such as makeup, tissues, moisturizers, soaps, sunscreens, incense, shaving cream or shampoos.<sup>[39]</sup> Other uses for extracts of *aloe vera* include the dilution of semen for the artificial fertilization of sheep,<sup>[54]</sup> as a fresh food preservative,<sup>[55]</sup> or for water conservation in small farms.<sup>[56]</sup> It has also been suggested that biofuels could be obtained from *Aloe vera* seeds.<sup>[57]</sup> *Aloe* is also used as a food substance, possibly for its gelling properties.

#### **Preliminary research**

*Aloe vera* may be effective in the treatment of wounds. Evidence on the effects of its sap on wound healing, however, is limited and contradictory. Some studies, for example, show that *aloe vera* promotes the rates of healing, while, in contrast, other studies show that wounds to which *aloe vera* gel was applied were significantly slower to heal than those treated with conventional medical preparations. A 2007 review concluded that the cumulative evidence supports the use of *aloe vera* for the healing of first to second degree burns.<sup>[62]</sup> Topical application of *aloe vera* may also be effective for genital herpes and psoriasis. However, it is not effective for the prevention of radiation-induced injuries.

Gels from *Aloe vera* have been compared to those derived from other *aloe* species and with other plants belonging to the family Asphodelaceae. *Bulbine frutescens*, for example, is used widely for burns and a host of skin afflictions. *Aloe vera* extracts might have antibacterial and antifungal activities, which possibly could help treat minor skin infections, such as boils and benign skin cysts and may inhibit growth of fungi causing tinea. For bacteria, inner-leaf gel from *aloe vera* was shown in one study to inhibit growth of *Streptococcus* and *Shigella* species in vitro. In contrast, *aloe vera* extracts failed to show antibiotic properties against *Xanthomonas* species.

Although claimed to be effective, *Aloe vera* has not been proven to offer protection for humans from sunburn, suntan, or other damage from the sun. In studies on mice, *aloe vera* polysaccharides preserved the number and morphology of immunosuppressive and dendritic cells in skin damaged by ultraviolet exposure.

Compounds extracted from *aloe vera* may act as an immunostimulant in cats and dogs, but this treatment has not been confirmed or scientifically tested in humans.

In a double-blind clinical trial, both the group using an *aloe vera* containing dentifrice and another using a fluoridated dentifrice had a reduction of gingivitis and plaque, but no statistically significant difference was found between the two. Preliminary research has assessed whether *aloe vera* extracts affect blood glucose or blood lipids,<sup>[73]</sup> and in acute hepatitis,<sup>[45]</sup> effects that may be associated with compounds such as mannans, anthraquinones or lectins. Other preliminary studies have evaluated whether oral *aloe vera* gel may affect ulcerative

colitis, but this research remains inconclusive.

### **Toxicity**

Ingestion of *aloe vera* may be associated with diarrhea, electrolyte imbalance, kidney dysfunction, or drug interactions, while topical application may induce contact dermatitis, erythema, or phototoxicity.<sup>[4][46]</sup>

## **ALOE VERA BENEFITS FOR BEAUTY**

### **Enhances skin health**

Pampering the skin with Aloe Vera provides wonderful benefits for the skin. Therefore, it is widely used as a main ingredient in many beauty products and cosmetics to enhance the skin tone.

### **Moisturiser**

The amazing moisturising substances in the plant provide ample hydration, getting rid of dead cells, keeping the skin soft, supple and glowing.

### **Pigmentation**

They reduce dark spots pigmentation dark patchy, dry flaky skin and freckles rendering a healthy glow to the face.

### **Acne**

The anti-inflammatory properties of Aloe Vera prevent the outbreak of acne and pimples, healing the lesions and the acne scars effectively.

### **Wrinkles**

Aloe Vera has the capability of stimulating the production of collagens and elastins, resulting in skin rejuvenation and reduction of fine lines and wrinkles.

### **Complexion**

Aloe Vera is a wonderful remedy for removing suntan and for promoting a glowing even complexion devoid of dark patches.

### **Anti-aging**

Aloe Vera revitalises the skin, prevents ageing by eliminating dead cells and promoting a skin as good as new.

### **Stretch Marks**

Aloe Vera works wonders with stretch marks by eliminating traces of them.

### **Nails**

A good massage to lacklustre nails with Aloe Vera helps strengthen and restore their sheen.

### **Oily skin**

Aloe Vera with astringent properties reduces excessive production of the sebaceous glands thus reducing the oil production on the face.

## **ALOE VERA BENEFITS FOR HEALTH**

### **Eliminates Cancer Tumour**

Aloe Vera helps terminate cancer cells and tumors as Polysaccharides, a substance, found in Aloe

Vera with increased production of nitric oxide, a chemical, with an ability to weaken and reduce cancer tumours. Acemannan, a phytonutrient found in Aloe Vera has anti-cancer properties with an ability to quicken the obliteration of cancer cells and tumors. They also help recoup from lethal cancer treatments.

### **Cures Radiation Burns**

Aloe Vera acts as a curative to burns obtained from Radiotherapy treatment for cancer. Internal and external uses of Aloe Vera quicken the healing process and provide immense relief.

### **Eases Inflammation**

Regular consumption of Aloe Vera juice for over fifteen days help alleviate symptoms of inflammation in the body such as rheumatism, arthritis and inflammation of the eyes and ears. External application of the gel helps ease muscle and joint pain.

### **Boosts Nourishment**

This wonder herb has the capacity to augment the antioxidant effects of certain vitamins such as vitamins E and C. This is due to its ability to enhance the quality of blood and help carrying the essential nutrients and the oxygen efficiently to the body's tissues and cells.

### **Promotes Digestive Health**

Polysaccharides provide therapeutic benefits. Consumption of Aloe Vera juice provides relief from digestional disorders.

It eliminates gastrointestinal disorders such as heart and acid reflux, stabilises the alkaline acid in the body, prevents symptoms of irritable bowel syndrome, acts as a laxative and avoids constipation. Hence, Aloe Vera offers excellent cure for ulcers, Celiac and Crohn's diseases.

### **Improve Circulatory Health**

A sedentary lifestyle combined with a diet rich in junk food containing high amounts of salt, saturated fats and hydrogenated oils lead to clumping of the blood cells leading to life threatening diseases. These clumps obstruct sufficient supply of oxygen and other essential nutrients to the cells, tissues and the brain due to an obstruction caused by clumping of blood cells in the circulatory system. Nevertheless, Aloe Vera helps ease blood stickiness making the blood less sticky thus promoting circulatory health.

### **Regulates Blood Pressure**

With its ability to reverse blood stickiness, and promoting circulatory health by making the

**Figure. 1**

blood flow smoothly, preventing the heart from pumping forcibly. Aloe Vera helps lower high blood pressure.

#### **Prevents Heart Attack and Stroke**

Since Aloe Vera enhances the quality of blood by making it less sticky and prevent clumping of the blood cells, they prevent the risk of developing heart attacks and stroke.

#### **Manage Diabetes**

Since Aloe Vera contains antidiabetic properties, they help manage diabetes by stabilising blood sugar levels. They also augment circulatory health thus preventing numbness in the hands and legs, one of the major symptoms of diabetic peripheral neuropathy.

#### **Prevents Cholesterol and Triglycerides**

Aloe Vera helps balance blood chemistry improving the viscosity of the blood. This helps maintain healthy triglyceride and cholesterol levels, improving cardiac performance.

#### **Protects renal health**

According to recent studies Aloe Vera, is beneficial for particular kinds of renal diseases as they help flush out excess water from the body. They prevent renal diseases caused by Type 2 diabetes. This was evident in rats with diabetic induced kidney disease who when ingested with aloe vera showed remarkable improvement in their condition. They protect the body against the risk of kidney stones by defending oxalates from invading the body.

#### **Encourages Gynaecological Health**

The miracle herb aids healthy functioning of the uterus and regulates menstruation and cure fibroids and ovarian cysts with herbal treatment. Since they contain antimicrobial properties, they impede fungal bacterial and viral infections like herpes and Candida infections thereby preventing vaginal itching. The plant's anti-inflammatory substances protect against gynaecological related inflammations.

#### **Provides First Aid solution**

Aloe Vera comes in handy and acts as an excellent first aid solution. They make excellent dressing for wounds by increasing the blood flow, protecting the skin against harmful bacteria and infections thus hastening the healing process. They also cure third degree burns, reinstate normal skin and prevent blisters. They protect the tissue damage from frostbite and protect the skin from the harsh rays of the sun preventing sunburns.

#### **Treats Skin Ailments**

Aloe Vera is very effective in treating and preventing skin disorders, due to its ability to seep through the multiple layers of the skin. Therefore, it is beneficial for disorders such as herpes, eczema, psoriasis, Lichen Planus, dermatitis and skin allergies.

#### **Support Dental Health**

Aloe Vera is useful for strengthening the gums and promoting strong healthy teeth. Most toothpaste

available in the market contains Aloe Vera as the main ingredient therefore preventing bad breath. As an alternative remedy, massaging the gums and teeth with Aloe Vera may be very useful.

### CONCLUSION

The present study has showed the properties and uses of Aloe Vera due to which it is called as 'A Miracle plant'. It contains more over 200 constituents like sterols, amino acids, antraquinones, vitamins, minerals, saponines, lignin, polysachharides etc Which is beneficial to humans that's why it is also known as 'nature's tonic'.

### REFERENCE

1. Akinyele BO, Odiyi AC "Comparative study of the vegetative morphology and the existing taxonomic status of *Aloe vera* L.". *Journal of Plant Sciences*, **2007**, 2 (5): 558–563.
2. Ernst E "Adverse effects of herbal drugs in dermatology". *Br J Dermatol*, **2000**, 143 (5): 923–929.
3. Marshall JM "Aloe vera gel: what is the evidence?". *Pharm J*, **1990**, 244: 360–362.
4. Boudreau MD, Beland FA "An Evaluation of the Biological and Toxicological Properties of *Aloe Barbadensis* (Miller), Aloe Vera". *Journal of Environmental Science and Health Part C*, **2006**, 24: 103–154.
5. Vogler BK, Ernst E "Aloe vera: a systematic review of its clinical effectiveness". *Br J Gen Pract*, **1999**, 49 (447): 823–8.
6. Yates A. *Yates Garden Guide*. Harper Collins Australia, **2002**.
7. Random House Australia *Botanica's Pocket Gardening Encyclopedia for Australian Gardeners* Random House Publishers, Australia
8. Gong M, Wang F, Chen Y "[Study on application of arbuscular-mycorrhizas in growing seedings of Aloe vera]". *Journal of Chinese medicinal materials*, **2002**, 25 (1): 1–3.
9. "Aloe vera, African flowering plants database". Conservatoire et Jardin botaniques de la Ville de Genève. **2008**, 06-20.
10. "Taxon: Aloe vera (L.) Burm. f.". Germplasm Resources Information Network, United States Department of Agriculture. **2008**, 07-16.
11. Ombrello, T. "Aloe vera". Archived from the original **2008**, 06-21.
12. Liao Z, Chen M, Tan F, Sunl X and Tang K Microproagation of endangered Chinese aloe *Plant Cell, Tissue and Organ Culture*, **2004**, 76(1):83–86.
13. Jamir T. T., Sharma H. K., Dolui A. K. "Folklore medicinal plants of Nagaland, India". *Fitoterapia*, **1999**, 70 (1): 395–401.
14. Barcroft and Myskja *Aloe Vera: Nature's Silent Healer*. BAAM, USA, **2003**.
15. Wang H, Li F, Wang T, *et al*. "[Determination of aloin content in callus of *Aloe vera* var. *chinensis*]". *Journal of Chinese medicinal materials*, **2004**, 27 (9): 627–8.
16. Gao W, Xiao P "[Peroxidase and soluble protein in the leaves of *Aloe vera* L. var. *chinensis* (Haw.)Berger]". *China journal of Chinese materia medica*, **1997**, 22 (11): 653–4, 702.
17. Lyons G. "The Definitive *Aloe vera*, vera". Huntington Botanic Gardens. Archived from the original, **2008**.
18. Linnaeus, C. *Species plantarum*, exhibentes plantas rite cognitatas, ad genera relatas, cum differentiis specificis, nominibus trivialibus, synonymis selectis, locis natalibus, secundum systema sexuale digestas, **1753**, 2.
19. Newton L. E "In defense of the name *Aloe vera*". *The Cactus and Succulent Journal of Great Britain*, **1979**, 41: 29– 30.
20. Darokar MP, Rai R, Gupta AK, Shasany AK, Rajkumar S, Sunderasan V, Khanuja SPS "Molecular assessment of germplasm diversity in Aloe spp. using RAPD and AFLP analysis". *J Med. Arom. Plant Sci.* **2003**, 25 (2): 354–361.
21. Treutlein J., Smith G. F. S., van Wyk B. E., Wink W. "Phylogenetic relationships in Asphodelaceae (Alooideae) inferred from chloroplast DNA sequences (rbcL, matK) and from genomic finger-printing (ISSR)". *Taxon* **2003**, 52: 193.
22. Jones WD, Sacamano C. *Landscape Plants for Dry Regions: More Than 600 Species from*

- Around the World*. California Bill's Automotive Publishers. USA. **2000**.
23. Farooqi and Sreeramu Cultivation of Medicinal and Aromatic Crops (Revised Edition). Orient Longman, India. **2001**, p. 25.
  24. "Global Compendium of Weeds *Aloe vera* (Aloeaceae)". Global Compendium of Weeds. Archived from the original on 3 June **2008**.
  25. "BBC Gardening, *Aloe vera*". British Broadcasting Corporation. Retrieved **2008**, 07-11.
  26. "Pest Alert: *Aloe vera* aphid *Aloephagus myersi* Essi.". Florida Department of Agriculture and Consumer Services. Archived from the original on 12 June **2008**.
  27. "Kemper Center for Home Gardening: *Aloe vera*". Missouri Botanic Gardens, USA.
  28. Coleby-Williams, J. "Fact Sheet: *Aloes*". Gardening Australia, Australian Broadcasting Corporation. Archived from the original on 6 July **2008**.
  29. "*Aloe vera* producer signs \$3m China deal". Australian Broadcasting Corporation. Retrieved **2008**, 07-08.
  30. "More Medicinal Plants Grow in Ciego de Ávila". *invasor.cu*. Retrieved **2008**, 06-25.
  31. "Korea interested in Dominican 'aloe vera'". DominicanToday.com—The Dominican Republic News Source in English. Retrieved **2008**, 07-19.
  32. Vaibhav Varma. "India experiments with farming medicinal plants". *channelnewsasia.com*. Retrieved **2008**, 06-25.
  33. "Harnessing the potential of our aloe". Jamaica Gleaner, *jamaica-gleaner.com*. Retrieved **2008**, 07-19.
  34. "Kenya: Imported Gel Hurts Aloe Vera Market". *allafrica.com*. Retrieved **2008**, 06-25.
  35. "US Farms, Inc. – A Different Kind of Natural Resource Company". *resourceinvestor.com*. Retrieved **2008**, 07-19.
  36. "RHS Plant Selector Aloe vera AGM / RHS Gardening". *Apps.rhs.org.uk*. Retrieved **2012**, 11-09.
  37. Langmead, L; Feakins, RM; Goldthorpe, S; *et al*. "Randomized, double-blind, placebo-controlled trial of oral aloe vera gel for active ulcerative colitis".
  38. *Alimentary pharmacology & therapeutics*, **2004**, **19**, 7: 739–47.
  39. Kunkel. G. Plants for Human Consumption. Koeltz Scientific Books 1984 ISBN 3-87429-216-9.
  40. Reynolds, T. *Aloes: The Genus Aloe*. CRC Press, **2004**.
  41. Liza Armstrong. "Clean and green". Australian Broadcasting Corporation. Archived from the original on 24 May **2008**.
  42. "Yagua unveils cosmeceutical beverage". Decision News Media. Retrieved **2008**-06-20.
  43. Cosmetic Ingredient Review Expert Panel "Final report on the safety assessment of AloeAndongensis Extract, Aloe Andongensis Leaf Juice,aloe Ferox Leaf Juice, and Aloe Ferox Leaf Juice Extract". *Int J Toxicol*, **2007**, 26: 1–50.
  44. "Kathalai". Tamilnadu.com. 7 February **2013**.
  45. Bottenberg MM, Wall GC, Harvey RL, Habib S "Oral aloe vera-induced hepatitis". *The Annals of pharmacotherapy*, **2007**, 41 (10): 1740–3.
  46. "Aloe Vera – Side Effects and Cautions". National Center for Complementary and Alternative Medicine. Retrieved **2011**,10-07.
  47. Boudreau, M.D; Beland, F.A; Nichols, J.A; Pogribna, M *Toxicology and carcinogenesis studies of nondecolorized whole leaf extract of Aloe Barbadosis Miller (Aloe vera) in F344/N rates and B6C3F1 mice (Drinking water study)*, Peer review draft NTP TR 577, National Institutes of Health, retrieved 6 March **2013**.