

Habitat diversity, Morphological and systematic analysis of multipotential species of *Aloe barbadensis* Mill. (Liliaceae) from the Southern Western Ghats of Tamil Nadu, India

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ABSTRACT:

The present paper highlights the habitat variability, morphological features, systematic analysis and multi potentiality of *Aloe barbadensis* Mill. were collected from Nilgiri district of Southern Western Ghats of Tamil Nadu, India. The epiphytic nature of *Aloe barbadensis* Mill. is quite interesting than other habitats.

Keywords:

Aloe barbadensis, Habitat diversity, Southern Western Ghats, Nilgiri, Tamil Nadu.

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INTRODUCTION

Most of the Angiosperm species shows varied habitat specificity such as Lithophytes, Chasmophytes, Psammophytes, Hydrophytes, Xerophytes, Parasites and Epiphytes (Annaselvam and Parthasarthy, 2001; Das *et al.* 2006). Angiosperms have been so successful in terrestrial and aquatic ecosystems that they represent majority of the herbs and shrubs and many of the trees as well. Depend up on their mode of nutrition and attachment pattern they are of different types and shows variety of growth forms and also adapted to various habitats for their survival (Rao, 1994).

The species *Aloe barbadensis* Mill, comes under the family liliaceae. Most of the members of the family liliaceae are herbs, sometimes climbers and rarely as shrubs. The roots are fibrous, tuberous or a creeping rhizome. Leaves various, cauline or radical and sometimes functionally replaced by cladodes, fleshy, usually parallel veined. Flowers usually regular and 2-sexual, axillary or terminal solitary. Fruit become berry, seeds globose or flattened. The main characteristic feature of the species *Aloe barbadensis* Mill. having thick and fleshy leaves. The margins of the leaves become spinous and forming rosettes. It is introduced from tropical Africa and naturalized in India growing and run wild, especially in hedge- rows in the drier localities up to 2,500 feet (Gamble and Fischer, 1915-1936).

Aloe barbadensis Mill. is a semi-tropical plant which looks more like a cactaceous member of lily family which usually grows in the African continent. There is an evidence to suggest that *Aloe barbadensis* originated from the warm, dry climates of Africa (Moon, 1824). Now the plant is much more widespread and can be found growing throughout Europe and North America as well as South America, the Middle East, China, India, Pakistan and Australia (Eldridge, 1978). The habitat of *Aloe vera* means Woodlands, Mediterranean forests and Scrub according to the World Wildlife Federation (Balakrishnan,1974).

The *Aloe barbadensis* Mill. habitat needs direct rays of the sun and a well drained soil. When these plants are grown outdoors then it needs warmth sun rays and protection from the winters. Sometimes the habitat is destroyed due to various factors. The reasons are settlement of area by humans and deforestation (Wilfred and Claudia, 2007). It disturbs the natural balance of the area and destroys most of the species of *Aloe vera* plants. The *Aloe vera* plants consist mostly of 95% water

they are not found in cold habitat regions and they are mostly found in tropical and subtropical regions of the country (Frame, 2003).

RESULTS:-

Habitat diversity of *Aloe barbadensis* Mill

The *Aloe barbadensis* Mill. is a perennial plant with fleshy leaves. A native of North Africa. It is planted as hedge in house premises and also run wild in the desert conditions and poorest soils and also extensively cultivated throughout India for its medicinal value. The habitat variability of the *Aloe barbadensis* Mill, reveals that it is not only in terrestrial habitat but also in rocky habitats as chasmophytes in the Southern Western Ghats of Coimbatore district of Tamilnadu by Binu Thomas et al. (2009). The present study observed that the species *Aloe barbadensis* Mill. shows an interesting epiphytic habitat of *Aloe barbadensis* Mill. in the blue mountains (2,240 meters above sea level) of Nilgiri District of Southern Western Ghats of Tamil Nadu shows an interesting epiphytic habitat of *Aloe barbadensis* Mill. It is well established in tree trunks of *Grevillea robusta* Cunn. (Proteaceae). The nature of unusual/uncommon habit of *Aloe barbadensis* Mill in epiphytic habitat is luxuriant when comparing with the same species grown as terrestrial habitat of neighbouring area of Nilgiri district. The interactions between climate and vegetation results in the marvelous vegetation in Nilgiri district is very important in the contribution of biodiversity of the Western Ghats (Plate-1)

Systematic and Morphological analysis of *Aloe vera* (Liliaceae).

Aloe barbadensis Mill. f.,Fl. Ind. 83.1768; *Aloe perfoliata* L., Sp. Pl. 320. 1753; Gamble's Fl. Pres. Madras 1520. 1928; Henry *et al.*, Fl. Tamil Nadu 37.1989; ("Kathalai").

The dwarf plant with radical rosettes leaves, ensiform, 40-60 × 2-8 cm, succulent, spiny. Scapes 1-3; racemes to 40 cm. Flowers bisexual, yellow, 2.5-3.5 cm long. Perianth-tube terete, 1-1.5 cm, somewhat curved; lobes 6, orange, oblong, 1 × 0.5 cm, 3- nerved. Stamens 3 + 3. Ovary 3-celled; ovules α , axile; style elongate to 2.5 cm; stigma obscurely lobed. Capsule ellipsoid-oblong to 1.5 × 1 cm.

The *Aloe barbadensis* Mill. plant has thick juicy leaves with sharp points, which grow to a height of twelve to sixteen inches. The leaves of *aloe vera* have no stem and are greenish in color. Too much water in the soil makes the leaves pale and sunlight again restores the color. Too much



Plate 1. Epiphytic nature of *Aloe barbadensis* Mill. on tree trunks of *Grevillea robusta* Cunn.

water is not good for survival of the plant. The leaf tissues having a gel known as *aloe gel*. The leaves of the plant appear to be sword type and have small harmless spines on the entire edge of the plant. The leaves of *Aloe barbadensis* Mill. is made up of four layers such as *Rind*- the outer part of protective layer, *Sap*- a layer of bitter fluid which helps to protect the plant from animals, *Mucilage Gel*- the inner part of the leaf that is filleted out to make Aloe gel and *Inner gel*- It contains 8 essential Amino acids (Shen et al., 2001). The root and the leaves both are fibrous as it holds enough water in it and the leaves have dots on the entire surface. The plant bears fruit which are triangular in shape and has many seeds in it

Importance of *Aloe barbadensis* Mill. in various aspects

Using as Indoor Plant

Aloe barbadensis Mill needs direct sunlight for growth. Some people keep it as indoor plant but the plant has to be kept in sunlight every alternate day (Kapoor and Sharga, 1993).

Used for rock gardening

The xerophytic species like *Aloe barbadensis* Mill.

is also used for rock gardening or rockery (Binu Thomas et al., 2011).

***Aloe barbadensis* Mill. is used in alternative medicines and in home first aid**

A brief account of *Aloe barbadensis* Mill. reported to be used in folk medicine in different parts of India as well as mentioned in the literature.

DISCUSSION AND CONCLUSION

Aloe barbadensis Mill. usually found in terrestrial habitat but the studies on the diversity and distribution of chasmophytic plants from coimbatore district of Tamil Nadu shows that the plant like *Aloe barbadensis* Mill. also lives in rock crevices (Binu Thomas et al., 2009). The present study on the habitat variability of *Aloe barbadensis* Mill. reveals that, it also found on tree trunks. The epiphytic nature of the highly medicinal plant like *Aloe barbadensis* Mill. was proved through the present observation. This plant also shows a xerophytic nature. The tissues of the plant body stores large amount of water, thereby it can withstand at any environmental conditions.



| No. | The Various Medicinal Uses of <i>Aloe barbadensis</i> Mill. | Referrals |
|-----|--|---|
| 1 | It is helpful in curing any type of burns, skin wounds and scalds. <i>Aloe barbadensis</i> Mill. lotion suggests effectiveness for treating seborrheic dermatitis when applied to the skin | Grindlay and Reynolds, 1986; Janardhanan, 1963. |
| 2 | It is also very useful in the treatment of vaginal infections, blisters, sties, herpes, insect bites, allergic reactions, urticaria, rashes, athlete's foot, conjunctivitis, dry skin, fungus and sores | Voglar and Ernst, 1999. |
| 3 | It is beneficial in recovering fast after the surgery | Shekhawat and Anand, 1984. |
| 4 | <i>Aloe barbadensis</i> Mill. is also used in treating frostbite, psoriasis, warts, eczema, shingles, acne, preventing scarring and wrinkles from aging, sunburns, rosacea and screening out X-ray radiation | Okyar et al., 2001. |
| 5 | The leaf juice has the property to enhance the immune system in our body | Hu et al., 2003. |
| 6 | It also assists cancer patients by stimulating the development of non-cancerous cells and white blood cells | Paulsen, et al., 2005. |
| 7 | <i>Aloe Gel</i> may treat recurrent ulcers, reduce pain and increase the amount of time between the appearances of new ulcers | Habeeb et al., 2007. |
| 8 | It may aid healing of mild to moderate skin burns and ulcers. The <i>Aloe Gel</i> has a dramatic ability to heal wounds, ulcers and burns by putting a protective coating on the affected areas and speeding up the healing rate | Bhalla et al, 1982. |
| 9 | Dried latex from the inner lining of Aloe leaves has been used traditionally as a laxativ, wash hair | Janardhanan, 1963. |
| 10 | The extracts from <i>Aloe barbadensis</i> Mill. in a hydrophilic cream may be an effective treatment of genital herpes in men | Rai, 1985. |
| 11 | The leaf pulp of the plant has been used to cure boils, spleen disorders, as vermifugal breast tissue hardening; constipation, rheumatism, jaundice, fever, piles, gonorrhoea, liver and menstrual complaints; sexual utility. | Bhalla et al, 1982; Sebastian and Bhandhari, 1989; Rai, 1985; Bhatt and Sabnis, 1987. |
| 12 | The leaf mucilage either alone or with honey is given orally twice in a day to cure liver disorders. It is also given orally for sunstroke and for improving digestion | Khanna and Ramesh kumar, 2000. |

The Critical screening of literature reveals that the *Aloe barbadensis* Mill. is usually found in terrestrial habitat with various ecological conditions. A very little report for the habitat diversity of *Aloe barbadensis* Mill. As it is found in the rocky habitat. It indicates that the plant has xerophytic nature and water storing capacity in their cells. So it can withstand at any environmental situation with extreme ecological conditions. Present paper highlights the interesting epiphytic nature, habitat diversity and multi-potentiality of *Aloe barbadensis* Mill. There is no exhaustive account on the epiphytic nature of *Aloe barbadensis* Mill. So that the epiphytic nature and its multi-potentiality is quite interesting to the existing knowledge. It also indicates the possibilities of *Aloe barbadensis* Mill. to occur in some other habitats also. So that conserve our biodiversity through sustainable utilization for future.

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