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Bryophyllum Pinnatum : A Miraculous Herb

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Abstract:

Cissus quadrangularis and Bryophyllum pinnatum, members of the Crassulaceae family, are notable for their medicinal properties and diverse applications in traditional medicine. This paper explores the pharmacological activities, chemical composition, and therapeutic potential of Bryophyllum pinnatum, highlighting its roles in treating conditions such as kidney stones, diabetes, and various wounds. The paper delves into the herb's Ayurvedic properties, detailing its actions, doshaghata, and efficacy against specific diseases, alongside its morphological characteristics. The investigation further assesses the plant's antileishmanial, anticancer, anti-diabetic, anti-ulcer, and antihelmintic properties, supported by experimental studies. Despite the promising results, the necessity for further research and clinical validation is emphasized to enhance understanding and integration of Bryophyllum pinnatum in contemporary medical practices. This comprehensive review of Bryophyllum pinnatum underscores its potential as a valuable herbal remedy, while also addressing the need for standardization and clinical assessments to ensure safety and efficacy in therapeutic applications.

Keywords: Antihelmintics ,Bryophllum pinnatum, Taxonomy,Triterpenoids, Glycosides, Xeromorphic, Vata and kapha

Introduction:

Cissus quadrangularis (1) paclitaxel against cancer(2), and etc are some of the herbal plants that serve as medicines. The family consists of 33 genus and 1500 species which are distributed worldwide, except for Australia and the Pacific Islands. This family paper for xeromorphic characteristics which leads to adapt to bright light and water scarcity. The department of the research of biochemical, Ecophysiological and also the various aspects related to the Crassulacean Acid Metabolism (CAM), which is considered as a evolutive in the adaptation of the pathway of photosynthetic carbon assimilation, has been helped by the herb.(3)

The family of the Crassulaceae are commonly used as traditional medicines. The ancient Greek word bryo means to sprout out and phyllon means the leaf, which is what the term "Bryophyllumpinnatum" signify. The secondary metabolites obtained from different parts of the plant have therapeutic value.(4) The studies show that it has many effects on the body.

Common names:

Air plant, airplant, Canterbury bells, cathedral bells, curtain plant, floppers, good luck leaf, green mother of millions, leaf of life, life plant, live leaf, live leaf plant, live plant, live-leaf, Mexican love plant, Mexican loveplant, miracle leaf, resurrection plant, sprouting leaf.(5,6,7)

Synonyms:

Bryophyllumcalycinum, Kalanchoepinnatum, Bryophyllum pinnatum(4,8,9,10) Cotyledon pinnata Lam., Sedum madagascaricumClus, Parnabeeja (5,11) B. germinans, B. pinnatum, C. calyculata, C. pinnata, C. rhizophilla, Crassuviafloripendia, Crassulapinnata, Sedum madagascariense, Verea pinnata(12).

Taxonomy:

Kingdom:Plantae – Plants

Sub kingdom: Tracheobionta – Vascular plants

Intra kingdom: Stretophyta-Land plants

Division: Spermatophyta – seed plants

Subdivision:Magnoliophyta – Flowering plants

Infra division:

Angiospermae- flowering plants, angiosperms, plantas com flor, angiosperma, plantesfleurs, angiospermes, plantes fruits

Class: Magnoliopsida – Dicotyledons

Subclass: Rosidae

Order: Rosales

Family: Crassulaceae – stonecrop

Genus: Bryophyllum

Species: Bryophyllumpinnatum (lam.) Oken.(5,7,9,10,12)

The Ayurvedic properties:

Rasa: Kashaya (Astringent), Amla (Sour)

Guna: Laghu (Light)

Virya: Sheeta (Cool)

Vipaka: Madhura (Sweet)

Doshaghnata: Vatakaphahara (Balancing Vata and Kapha Doshas)

Karma (Action): Ashmarighna (stone breaking, often referring to its potential in treating kidney stones), Vranaropaka (wound healing), Mootrala (diuretic), Shonita sthapana (hemostatic, stops bleeding), Rakta stambaka (stops bleeding), Grahi (astringent, useful in diarrhea and promoting absorption).

Rogaghnata (efficacy in diseases): Ashmari (kidney stones), Atisara (diarrhoea), Raktasrava (bleeding disorders), Visuchika (a type of intestinal disorder, often associated with dysentery) These Ayurvedic properties indicate that Kalanchoe pinnata has a cooling character (Sheeta Virya) and astringent taste (Kashaya Rasa), making it potentially beneficial in conditions associated with excessive heat and bleeding.(13) This herb is also known for its healing and diuretic properties. The balance of Vata and Kapha doshas indicates its potential to resolve disorders related to these energies in the body.(14)

Plant description:

The height of the herb is about 1. 2m. It has the various parts. The description is illustrated as below.

Stem:

The stem of herb is four angled. The aged stem is of lighter colour where as the juvenile stem is of reddish speckled with white in mix.(12).

Leaves:

An important part is the leaves. They are dark green in colour.The leaf blade is pinnately compounds with 3-6 leaflets which is 10-30 cm; petiolules are 2-4 long; and the leaflet blades are elliptic with a 3-4 cm margin crenate. There are buds on the leaves. These are also long, thick, and ribbed. The lower usually simple or occasionally compound, 8 to 12 cm in size, the upper usually is 7 to 9 cm late, long pointed, and the petioles are united by a ridge round within the stem. The leaflets can be crenate or serrate. The leaves often produce buds which are furnished with root, stems and leaves, which once become a new plant.(7,9)

Flowers:

These are cylindric in shape, and pendulous(10) reddish purple, pendent in large spreading panicles with opposite stout branches. At the end base, there is red and green, striated, pale green, and triangular teeth. The corolla was swollen and octagonal at the base. There is a green base and a pink anther. The Sepals are green at the base and pale green above. The petals are octagonal at the base and reddish purple.(7,9)

Fruits:

There are fruit in a calyx and corolla. The fruit-pod with four septa and numerous, ellipsoid, smooth striate seeds are inside.(9) The fruit has a lot of seeds.(15)

Geographical Distribution:

The plant is bought from different parts of the world. In India it is found in the hills of North-Western India, Deccan and Bengal,(12) as well as in the tropical India, Africa, China, Australia and tropical America(6). It is a native of the Philippines and is known as katakataka or kataka-taka.(9)

Cultivation:

The bryophyllum pinnatum is an indoor ornamental plant. It can't survive hard frost and won't thrive in environments that have a temperature below 10 C (50 F). The roots are prone to rot if the soil is not well drained.

Chemical composition:

The plant has a number of elements, including alkaloid, flavonoid, tannin, phenolic compound, saponin glycosides, magnesium, calcium, potassium, sodium, phosphorous, microelement, iron, zinc, and ascorbic acid, riboflavin, thia. It was also found to have syringic acid, caffeic acid, para cinnamic acid, para coumaric acid, ferulic acid, and protocatechuic acid. The antileishmanial activity was shown by the three flavonoid that were isolated from the plant. It was observed that it has Bufadienolides such as Bryophyllin A,B,C, and Bryophyllon.(4,5,8,10,12,16)

Toxicity:

The plant is called a life plant because it can cause cardiac poisoning in some animals.(17) The anthelmentic activity, chloroform, methanoic and aqueous extract of plant root cause paralysis and death of worms shows antihelmentic activity.(18) The presense of alkanes, sterols and triterpenoids are shown.

Medicinal applications:

The juice of the leaves is used as a remedy for a variety of conditions. The wound healing activity was evaluated with scalpels.(19)Body pain, skin problems are some of the condition it has been used.

The plant bryophyllum is used for detachment of umbilicus of infants. it has antiinflamatory, antimicrobial, antitumour, antiulcer, insecticidal, antidiabetic, antioxidant properties.(20) Bryophyllum pinnatum leaves were boiled in water extract obtained problems used to treat fever,headache,stomach pain.this plant is mostly effective against the kidney stone or the stomach problems.

Pharmacological activities:

1)Antileishmanial:

The importance of flavenoids for the antileishmanial activity was demonsrated by isolation of quercitrin which separated by methanolic extract of plant. The three flavonoids (quercitrin,quercitrin,ofzelin)shows the Antileishmanial Activity(21).

2)Anticancer activity:

The extract of the plant shows some activity. Various studies show that B. pinnatum has bufadienolides that are potent chemopreventive agents.The antiproliferative activity is shown by the methanolic-aqueous extract of the plant .(22) The chloroform extract of the leaf can be used as an anti-HPV molecule which induces the apoptosis.The crude leaf extract shows the growth inhibitory activity . So this, These methanolic extract can be used for treating the HPV infection and cancer of cervix. (23)

3)Anti-diabetic activity:

The aqueous extract of the leaf in four different doses and glibenclimide showed the anti-diabetic activity in diabetic rat.The four doses of aqueous extract and Glibenclimide is more potent and effective when compared to others.(24)

4)Activity on kidney stone:

There is a diuretic effect associated with the traditional use of Bryophyllum pinnatum. Increased urine output may help clear out minerals and other components that contribute to stone formation.(25) According to some research, the plant's ability to relax smooth muscle may help with the flow of stones through the urethra.(26)

5)Antihelmintics property:

Antihelmintic activity A large population is affected by Helminthic infections. Antihelmintic activity is shown by the presence of the tannins in the Bryophyllum pinnatum. The death of worms is caused by the methanol and aqueous extract of Bryophyllum pinnatum root which shows a antihelmintic property. The various studies on worms (pheretima posthuma) showed that the whole plant of b.pinnatun has potential antihelmintic activity.(27)

6)Anti-ulcer activity:

The studies show that the extract of B. pinnatum leaves has terminate the growth of acute wounds in the stomach and duodenum of rats and guinea pigs. The healing rate of acetic acid in rats is increased by using this extract.(28**)**

7)Wound healing activity:

The leaf extract of the plant in alcohol, water, petroleum ether in dose of 400mg/kg orally showed that re-sutured incision, healing of wound in albino rat for consecutive 10 days. In comparison to control group the three extracts displayed remarkable increase in breaking the strength of incision wound. For excision wound model the water extract is applied topically for 21 days till the formation of eschar. (29)

Conclusion:

The healing attributes of bryophyllum pinnatum have been used in traditional medicine to tackle many health concerns. The investigation explores the plant's ethnomedicinal uses, as well as its established pharmacological effects. The analysis examines both clinical applications and toxicological considerations. The review shows the effectiveness of the plant in addressing conditions like diabetes, depression, insomnia, and more.

The standardization and clinical assessment for numerous conditions, as indicated by experimental studies, remain pending despite the fact that the plant's effectiveness in pregnancy management is supported by existing clinical evidence. There is need for more research to evaluate the efficacy of the extracts and products. This gap will contribute to a more comprehensive comprehension of the plant's potential and facilitate its integration into clinical practice.

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