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Review Article

A REVIEW ON *BRYOPHYLLUM PINNATUM*

Sheela S. Thorat *, Rutuja Rajendra Shah, Swapnali Arun Mohite, Naziya Rafik Patel
Adarsh College of Pharmacy Vita, Taluka - Khanapur, District – Sangli, Maharashtra, India
*Corresponding Author Email: ssheelathorat@gmail.com

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ABSTRACT

Bryophyllum pinnatum (family: Crassulaceae) was widely used in traditional medicine. They are found in especially in tropical Africa, India, China, Tropical America. The physiochemical study shows presence of alkaloid, flavanoid, lipids, organic acids, phenols, triterpene, glycoside and bufadienolides. It is widely used in treatment of haemostatic and wound healing. It is also used in treatment of immunomodulatory, CNS depressant, analgesic, anti-inflammatory, antidiabetic, anticonvulsant, anticancer, antiallergic, nephroprotective, hepatoprotective, antileishmanial, antiulcer activity. From this review of plant, it highlight the chemical constituent and medicinal uses of plant

Keywords: *Bryophyllum pinnatum*, chemical constituent, pharmacological activity

INTRODUCTION

Bryophyllum pinnatum plant belongs to family Crassulaceae, commonly used as traditional medicines. *Bryophyllum pinnatum* is derived from greek word Bryo means to sprout and phyllon means leaf. The secondary metabolites which are obtained from different parts of plant such as alkaloid, flavanoid, tannin, glycoside, phenolic compounds,which have therapeutic value. The plant are used in different pharmacological activities such as antidiabetic antihypertensive, antileishmanial, antimicrobial, analgesic, anticancer. These are also use in bleeding disorder and ulcer and diarrhea.[1]

Plant description

Plant Name: *Bryophyllum pinnatum*

Synonym: Kalanchoe Pinnata

Family : Crassulaceae

Common name: Zakham –e –hayat, Life plant, air or Maternity plant, love plant, Canterberry bells, Cathedral bells, Parnabija etc.

Vernacular Name
Sanskrit: Pashanabheda
English: Air plant
Hindi: Zakhmhaiyat, Patharchoor
Kannada: Gandukalinga
Tamil: Malaikalli, Ranakalli
Telgu: Ranapaluka
Marathi: Gayamari
Bengali: Koppatha, Patharkuch

Taxonomical classification [2]

Kingdom	Plantae
Subkingdom	Tracheobionta
Division	Spermatophyta
Subdivision	Magnoloiphyta
Class:	Mangnoliopsida
Subclass	Rosidae
Order	Saxifragales
Family	Bryophyllum

Geographical indication

It is perennial herb growing widely and used in Folkoric medicine in tropical Africa, Tropical America, India, China, Australia, Asia, Newziland, Philippines The plant grows all over India in hot and moist areas, especially in Bengal and Uttarakhand.

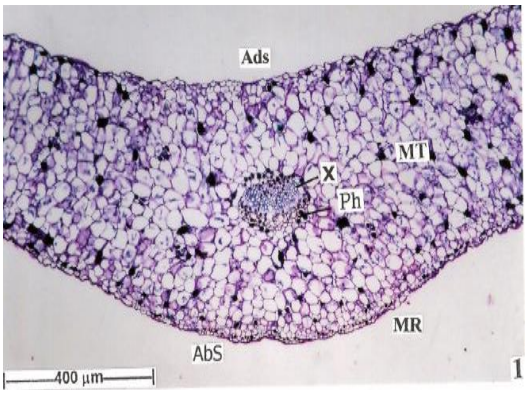
Macroscopical character [3]

It is a generally 1-1.5 m in height and having the stem is hollow four-angled and usually branched. Leaves are opposite in direction 10-20 cm long. The lower leaves are simple, whereas, the upper ones 3-7 foliate and are long-petiol. The leaves are furnished with rooting vegetative buds. Inflorescences terminal paniculate 10-40 cm. Flowers are mainly bell like pendulous. Calyx tubular, 2-4 cm; Corolla reddish to purple, 5 cm, base sparsely ciliate; lobes ovatelanceolate; stamens inserted basally on corolla; nectar scales oblong; follicles included in calyx and corolla tube. The fruit-pod with four septa and numerous, ellipsoid, smooth striate seeds within. The plant flowers grows month of Nov-Mar and fruits in April.

Figure 1 ***Bryophyllum pinnatum***

Microscopical character [4]

1. The microscopic character shows a the thin layer is present on abxial side and convex suface on the adaxial side. It has a thin and adaxial epidermal layer is of small, less prominent cells.
The ground tissue of midrib is parenchymatous. The cells are circular, angular and compact.
2. The vascular strand is single, small and hemispherical in shape .It consist of thick horizontal band of xylem and wide band of phloem.
3. Xylem element are narrow, angular, thin walled. The vascular bundles are in vertical and horizontal plane. The lamina is flat, The mesophyll are differentiated into palisade and spongy parenchyma. The stomata are anisocytic type, which are found in abundant form.
4. The longitudinal section of leaves shows presence of spiral vessels. The trichomes is absent on abaxial side and adaxial side.



Ads-Adaxial side, **X-** Xylem, **Ph-** Phloem, **MT-** Mesophyll tissue, **MR-** Midrib, **AbS-** Abaxial side

Fig. 2 Microscopical section of ***Bryophyllum pinnatum***

Chemical constituent

The plant contain alkaloid, flavonoid, tannin, phenolic compound, saponin glycoside[5],macro element such as magnesium, calcium, potassium, sodium, phosphorous, microelement such as iron, zinc, vitamin, ascorbic acid, riboflavin, thiamin, niacin. It also contain syringic acid, caffeic acid, 4 hydroxy -3-methoxy cinnamic acid, 4-hydroxy benzoic acid, parahydroxy cinnamic acid, para coumaric acid, ferulic acid, protocatechuic acid, phospoenolpyruvate, the leaves of plant also contain protocatechuic acid, astragalin, luteolin, rutin, kaemferol, quercetin, kaemferol-o-glycosides[6] Three flavonoid was isolated from plant responsible for antileishmanial activity. It also contain Bufadienolides such as Bryophyllin A,B,C, Bryophyllon.

Uses

The leaves of *Bryophyllum pinnatum* plant have been reported to possess antileishmanial anticancer, Immunosuppressive, anti-ulcer, anti-inflammatory and anthelmintic, antihistaminic, antifungal, analgesic antihypertensive, antidiabetic and antimutagenic activities. CNS depressant antibacterial and insecticidal actions. It was studied that the juice of leaves is used in hepatoprotective activity of plant and also used in treatment of jaundice. The nephrotoxicity in rats which may be due to its antioxidant and oxidative radical scavenging activities. It is also used for the treatment of kidney stones in India The plant was used in treatment of uterine contraction and also used in menstrual problem The leaves of plant also used in treatment of dysentery when it was used with ghee. The leaves of juice also used in cholera, also used in toothache and wound healing. The Quercetin has nephroprotective and antioxidant role in panfuti plant .The fatty acids present in *Bryophyllum pinnatum may* be responsible for immunomodulatory activity.

Pharmacological activity

1. **Antileishmanial activity**- Leishmania was main genus of protozoa. The infection caused by leishmania was spread worldwide.L.G.Rocha et.al studied the coumarin and quercetin was two molecules separated from methanolic extract of plant. The coumarin and quercetin was two main active constituent responsible for antileishmanial activity[7].
Quercetin a flavonoid was isolated from B. pinnatum which was responsible for activity The aglycone part of structure of quercetin and rhamnosyl unit linked at C-3 position shows antileishmanial activity.
Da Saliva et.al was studied the presence of three (quercitrin, quercetin, afzelin) flavonoid show antileishmanial activity by oral administration of extract in mice as compare to the intravenous administration or any other route of administration.

2. **Anticancer activity**- Bryophyllin (Bufadienolides) compound was isolated from B. pinnatum has anticancer activity against cancer cells[8].

3. **Hepatoprotective activity**-Yadav et.al was studied, The aq. extract or juice of leaves was more effective than ethanol extract of *B.pinnatum* by in vivo and invitro histopathological study of rat by oral route of administration. The ethanol extract of *B.pinnatum* showed the hepatoprotective activity.

4. **Nephrotoxicity activity**- The nephroprotective activity was studied by gentamicine induced nephrotoxicity in rats. The antioxidant and oxidative free radical scavenging activity was responsible for this activity. The kidney stone was also treated with the extract of B.pinnatum, as compare with standard compound.

5. **Antihypertensive activity** -The B.pinnatum was used in treatment of all types of hypertension like yoursbas of Western Nigeria. It was recorded on Trinidad and Tobago.

6. **Antiulcer activity**- Pal et.al was studied the methanolic extract of leaves possess the antiulcer activity. The gastroprotectives action produced by aspirin, ethanol, indomethacin, stress induced gastric ulcer in rats. The aspirin induced ulcer in pylorus ligated rat shows significant gastroprotective activity. The acetic acid induced gastric ulcer the methanolic extract produces the healing of gastric ulcer. The flavanoid was main active constituent responsible for activity. these are produces the free radical scavenging activity causes prevent the cell damage.

7. **Antidiabetic activity**- Ojewoles was studied the antidiabetic effect of aqueous extract of plant produces the hypoglycemia in rat, by streptozotocin induced diabetes mellitus. The zinc was

micronutrient which may be responsible for activity, it may also produces insulin malfunction.

8. **Immunosuppressive activity**- Ross Bergmann et.al was studied the aqueous extract of leaves produces significant inhibition of cell mediated and humoral mediated response in mice. The invitro study was done by spleen cells are pre treated with plant extract and allow to proliferated with mutagens and antigen, the specific antibody was used in this method The delayed type hypersensitivity was studied on ovalbumin .the topical administration of drug showed more effective than any other[9].

9. **Anti-inflammatory activity-** The pet ether, chloroform, methanol, extract and also isolated fraction such as flavonoid, alkaloid, phenolic acid fraction of leaves extract was given in dose of 50mg/kg each, orally once a day for a period of two days, by formaldehyde induced hind paw in rats, the indomethacin was used as standard drug. The methanolic extract of leaves shows more significant inhibition of formaldehyde induced edema as compared with standard drug.

10. **Neuropharmacological activities**- Radford et.al was studied the CNS depressant activity of aqueous extract of leaves could be due to presence of Bufadinolides, other water soluble constituent. The plant also showed sedative action

Salahdeen et.al showed aqueous leaf extract possess CNS depressant action. The rat treated with 50-200 mg/kg was found to be produces decrease in locomotor activity and also decrease in muscle tone the rats when treated with drug by intraperitoneal administration produces, it also produces alteration in behavior.

CONCLUSION

The study of *Bryophyllum pinnatum* revealed that, the plant show different chemical constituent such as flavanoid, tannin, glycoside, alkaloid. The plant shows different pharmacological activities such as antileishmanial, antidiabetic, anti-inflammatory, immunosuppressive, anticancer activity. It is also used in traditional medicine in treatment of blood disorder, also in treatment of kidney disorder, and also used in toothache. The review of this plant shows, the plants have different medicinal property.

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