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## A Review On Salubrious Properties Of Bryophyllum Pinnatum

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**Abstract:-** Bryophyllum pinnatum is a common astringent in the Ayurvedic medical system. The plant is well recognized for its hemostatic and wound-healing qualities and is used extensively in traditional medicine to treat a wide range of illnesses. It is both an exotic and native plant. Plants are naturally occurring across the nation. Kalanchoe pinnata is a succulent plant native to Madagascar that is sometimes referred to as cathedral bells, air plant, life plant, miracle leaf, and Goethe plant [citation needed]. It has been claimed that Bryophyllum pinnatum leaf extract possesses antihypertensive and antiulcer effects. Antitumorous, antiulcerous, antibacterial, antifungal, antihistamine, antiviral, febrifuge, gastroprotective, immunosuppressive, insecticidal, muscle relaxant, sedative, and CNS depressant are just a few of the pharmacological activities that plants have been found to possess. Nevertheless, in order to confirm, future efforts need focus more on in vitro and in vivo investigations as well as clinical trials. conventional knowledge in the context of a logical phytotherapy.

**Key words:** - Bryophyllum pinnatum, anti-inflammatory, Neuropharmacological activities, immunosuppressive

### Introduction: -

Bryophyllum pinnatum is also known as Kalanchoe pinnata. (1) This succulent perennial grows to a height of around 1 meter (39 in) and has thick, cylindrical stems with fresh growth that has a reddish tinge. It flowers for most of the year.[3] The feminine version of the adjective pinnatus, which means "pinnate" in Latin, is the specific epithet "pinnata". (2)

**Leaves:** -This species has thick, fleshy, elliptical leaves that are curled, have a serrated or crenate edge, and are frequently reddish in color. (3)



**Fruits:** - The fruits are 10–15 mm follicles located in the persistent corolla and calyx. (3)

Leaves of Bryophyllum pinnatum

**Flowers:** - The Flowers are red-orange flowers. The calyx is made up of a long tube that is red at the base and has four tiny triangular lobes at the end that are veined with yellowish green (or green dotted with reddish brown). The tubular corolla, which has four lobes that reach a length of 5 cm (2.0 in), is ended by a strong constriction that divides the subspherical part of the ovoid part. It has streaks of reddish-purple tint and a yellowish hue. The corolla is fused to the eight stamens, which are roughly 4 cm (1.6 in) long and arranged in two whorls. The ovary consists of four thin-styled carpels that are somewhat joined together in the middle. (4)



**Flowers of *Bryophyllum pinnatum***

#### **Chemical constituents:**

Bryophyllin A, bersaldegenin-3-acetate, and bryophyllin C are examples of bufadienolide chemicals that have been isolated from *Bryophyllum pinnatum*. (5) Additionally, bryophyllin C exhibited insecticidal qualities. (6) Triterpenes, steroids, phenanthrene, flavonoids, flavones, chalcones, taraxasterol, aurones, phenolic acid, caffeic acid, syringic acid, malic, oxalic, and ferulic acid have all been found in phytochemical analyses of *Kalanchoe pinnata*. Phenanthrene and bufadienolides are harmful substances. There have been reports of two calves who died from severe cardiac arrhythmia and ataxia after being given *K. pinnata* for 48 hours. (7)(8)

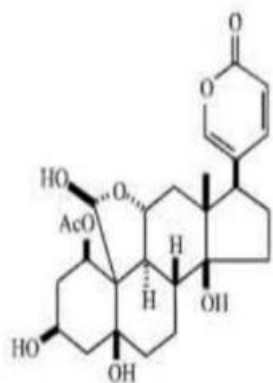


Fig 1. Bryophyllin

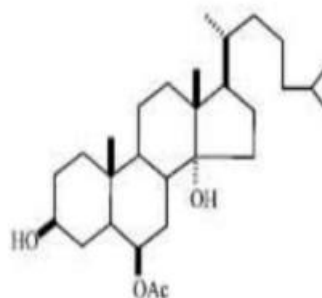


Fig 2 Bryophyllol

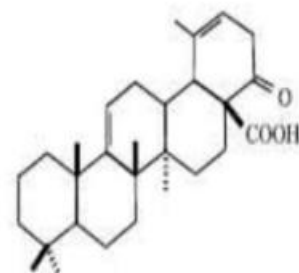


Fig 3 Bryophollone

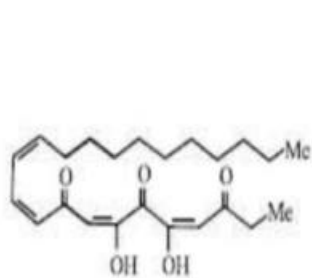


Fig 4 Bryophollenone

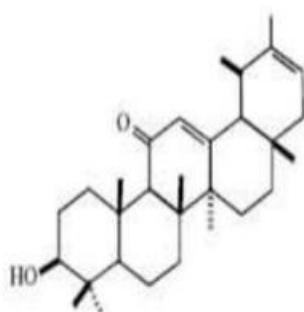


Fig 5 Bryophynol

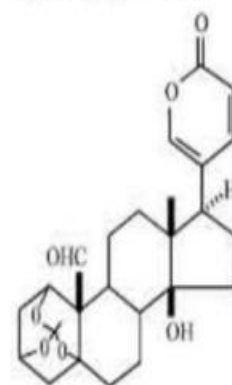


Fig 6 Bersaldegenin

### Chemical Constituents of *Bryophyllum pinnatum*

Name of Drug in other languages :- (9,14)

Languages	Name of drug
Assamese	Dupar tenga Pategoja
Bengali	Kop Pata
English	Air Plant Canterbury Bells Cathedral Bells Donkey Ears Floppers Leaf of Life Life Plant Mexican Love Plant Resurrection Plant
Hindi	Amar Poi अमर पोई
Malayalam	Elamarunna
Manipuri	Manahidak মনাহিদাক Manahidak
Other	Air Plant Canterbury Bells Cathedral Bells Donkey Ears Floppers Goethe Plant Katakataka Leaf Of Life Life Plant Mexican Love Plant Miracle Leaf Ranakalli Resurrection Plant
Tamil	Runakkalli
Urdu	Zakhmhaiyat ज़ख्महायात

### System of Medicines Used In :- (9,14)

*Bryophyllum pinnatum* is used in Ayurveda, Siddha, Traditional chinese medicine.



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## Pharmacological Studies :-

### Herbal Tonic :-

Niacin, riboflavin, thiamine, and ascorbic acids are all present in good amounts in the plant. Natural ascorbic acid is vital for the body performance i.e. normal formation of intercellular substances throughout the body, including collagen, bone matrix and tooth dentine (15,16). Ascorbic acid and proper connective tissue metabolism are therefore linked to the clinical signs of scurvy, which include bleeding from the mouth and gastrointestinal tract mucous membranes, anemia, and joint discomfort (16). In a study a herbal composition comprised of extracts of number of herbs including B.Pinnatum acts as a tonic to improve respiration, aid in the elimination of toxins and improves overall vitality (17).

### Antileishmanial activity:-

Protozoa of the genus Leishmania infections are a serious global health concern, with a high endemicity in developing nations. The incidence of the disease has increased since the emergence of AIDS. Quercitrin, a flavonoid is responsible for the antileishmanial activity of B.Pinnatum. Plants may provide protection against leishmaniasis by activating macrophages' reactive nitrogen intermediate pathway, rather than by directly affecting the parasite itself (18, 19).

### Hepatoprotective and Nephroprotective:-

Juice of the fresh leaves is used very effectively for the treatment of jaundice. The protective effect on gentamicin-induced nephrotoxicity in rats which may involve its antioxidant and oxidative radical scavenging activities (20).

### Neuropharmacological activities:-

B.Pinnatum has been used since 1921 in traditional medicine as an antipsychotic agent (21, 22, 23). When compared to methanolic extract, the anticonvulsant effect of the aqueous leaf extract was shown to be either reduced or absent. The methanolic fraction has a strong central nervous system depressing effect. Given that alcohol is known to have a depressive effect on the hypoglossal nerve output associated with respiration in humans and other species. Thus, it is plausible that the methanolic extract's inhibitory effect on CNS activity is partially attributable to the compound of B. pinnatum and its correspondingly greater dose (23–28).

Radford et al investigated that the CNS depressant activity of aqueous leaf extract could be due to the presence of bufadienolide and other water soluble constituents in the extract (29). Thus the herb possesses remarkable central depressant, skeletal muscle and minor anticonvulsant actions with an acute toxicity higher than 500mg/Kg and 2000mg/Kg when given intraperitoneally and orally (29,30).

### Antimutagenic activity:-

Plant has potent antihistamine and antiallergic activity. The methanol extract of the leaves has also been reported to have histamine receptor (H1) antagonism in the ileum, peripheral vasculature and bronchial muscle (31) and protect against chemically induced anaphylactic reactions and death by selectively blocking histamine receptors in the lungs (32,33).

### Anti-ulcer activity:-

Flavonoids, the potent water-soluble antioxidants and free radical scavengers, which prevent oxidative cell damage, have strong anticancer activity (34,35,36,37). Bersaldegenin-1,3,5-orthoacetate inhibited growth of several cancer cell lines (38,39). As antioxidants, flavonoids from these plants provide anti-inflammatory activity (15) and are used for the treatment of wounds, burns and ulcers in herbal medicine.

Adesanwo et al in his study showed a significant reduction in incidence of ulceration and mean basal and histamine stimulated gastric acid secretion in a dose dependent manner thus justifying its use as an anti-ulcer agent in folklore medicine (40).

Antibacterial activity: -

Due to presence of phenolic compounds indicate that the plant possess anti-microbial activity. Ofokansi et al. (2005) reported that plant is effective in the treatment of typhoid fever and other bacterial infections, particularly those caused by *S. aureus*, *E. coli*, *B. subtilis*, *P. aeruginosa*, *K. aerogenes*, *K. pneumoniae* and *S. typhi*. These findings supported its use in treating the placenta and navel of newborn baby, which not only heals fast but also prevent the formation of infections (41, 42,43). Pure isolated alkaloids and their synthetic derivatives are used as basic medicinal agents for their analgesic, antispasmodic and bactericidal effects (35). Schmitt et al showed the antimicrobial activity of decoct of leaves against gram-positive bacteria by dilution tube method (42).

#### **Antidiabetic Activity:-**

The presence of zinc in the plants may imply that the plants can play important roles in the management of diabetes caused by insulin failure (42,43). Ojewole evaluated the antinociceptive effect of the herb's aqueous leaf extract by the 'hot-plate' and 'acetic acid' test models of pain in mice. The anti-inflammatory and antidiabetic effects of the plant extract were investigated in rats, using fresh egg albumin-induced pedal oedema, and streptozotocin -induced diabetes mellitus. The herb's flavonoids, polyphenols, triterpenoids, and phytosterols are thought to account for the plant's antinociceptive, anti-inflammatory, and anti-diabetic activities. It is thought to have antinociceptive and anti-inflammatory actions by blocking the release, synthesis, and/or production of inflammatory cytokines and mediators such as prostaglandins, histamine, polypeptide kinins, and others (44).

#### **Immunosuppressive effect:-**

The fattyacids present in *B.Pinnatum* may be responsible atleast in part, for its immunosuppressive effect in vivo (45). Almeida et al in an investigation also found that leaf extracts inhibited invitro lymphocyte proliferation and showed in vivo immunosuppressive activity (45, 46). An attempt to identify the immunosuppressive substances present in *B.Pinnatum* guided by the lymphoproliferative assays. From the ethanolic extract a purified fraction (KP12SA) found twenty-fold more potent to block murine lymphocyte proliferation than the crude extract. Thus provides evidence that saturated fatty acids present in herb plays an important role on lymphocyte proliferation, which explain its immunosuppressive effect in vivo (47).

#### **Antihypertensive activity:-**

Herb possesses hypotensive activity and lend credence to the folkloric use of the herb in the management of hypertension. Calcium was the most abundant macro element present in the plant. Normal extracellular calcium concentrations are necessary for blood coagulation and for the integrity, intracellular cement substances (48). The leaves extracts also caused dose-dependent, significant reductions in the rate and force of contractions of guinea-pig isolated atria. Additionally, they non-specifically inhibited contractions of the rat isolated thoracic aortic strips induced by potassium and receptor-mediated agonist drugs, as well as contractions induced by electrical field stimulation (ES). The herb's antihypertensive properties seem to be mostly attributed to cardiodepression and vasodilation (44,49).

#### **Analgesic, Anti-inflammatory and Wound Healing activity :-**

Saponin has the property of precipitating and coagulating red blood cells. Some of the characteristics of saponins include formation of foams in aqueous solutions, hemolytic activity, cholesterol binding properties and bitterness (15,50). Tannins have astringent properties, hasten the healing of wounds and inflamed mucous membranes. These perhaps, explain why traditional medicine healers in Southeastern Nigeria often use herb in treating wounds and burns (51). Igwe et al. found that the aqueous extract had no severe toxic effects, raised rats' pain thresholds through hot plate or thermal methods, and, in a dose-dependent manner, prevented or lessened mice's writhing or abdominal stretches brought on by phenylbenzoquinone. Additionally, the extract had weaker or inferior anti-inflammatory activity than aspirin (52).

### Uterine Contractility:-

B.Pinnatum is more effective and has less side effects than traditional labor inhibitors in preventing preterm delivery. (53). The plant should not be used in pregnancy. Though not supported by clinical research, it has traditionally been used during childbirth and may stimulate the uterus. Also because of immune modulating actions, should not be used chronically for long periods of time, or by those with a lowered immune system.

### Insecticidal, Fungitoxic and Phytotoxic activity :-

Supratman et al isolated bufadienolides: bryophyllin A and bryophyllin C from B. Pinnatum and showed strong insecticidal activity against third instar larvae of the silkworm (93). The extracts increased significantly the plant height, shelf life, relative water content and chlorophyll contents of the cowpea seedlings during both the wet and dry season. On the other hand, the extracts significantly reduced transpiration rate and stomata aperture of treated plant in both seasons.

### B. Pinnatum Formulation (55)

- 1.shampoo
- 2.Gel
3. Churna

### Conclusion:-

B. Pinnatum or Kalanchoe is widely used divine herb. Modern pharmacological studies have generally confirmed the traditional use of B. Pinnatum and their extracts in ailments: inflammations, ulcers, fungal, viral and microbial infections, an impaired immune system, diabetes mellitus, spasms and insecticidal properties. Bryophyllum Pinnatum is also available in market with the combination of other drugs.

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