



A comprehensive review on Pashanabheda vis-à-vis *Bryophyllum pinnatum* (Lam.) Oken in Ayurveda

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Abstract:

Pashanabheda or stone breaker is a popular Indian drug. Pashanabheda is assigned to various source plants because of controversial name. One of the source plant *Bryophyllum pinnatum* is commonly known as *Kalanchoe pinnata*. Its an environmental weed from the family Crassulaceae (Stonecrop) but traditionally used as a medicine in different regions of India mainly to treat urinary stones. In costal Karnataka regions, the plant is locally known as kaadu basale (wild spinach) which is widely used in urinary stones in the place of main source of Pashanabheda. Different synonyms and vernacular names of pashanabheda reveals its elaborated characters, properties and its useful part as leaf. Vatapatri is one the variety and also synonym for pashanabheda. In a view of all the above information, maximum properties of pashanabheda matches with *Bryophyllum pinnatum*. From the evidence of toxicological study *Bryophyllum pinnatum* can be use safely in maximum dosages of any classical preparations. *Bryophyllum pinnatum* is cost effective, have abundantly growing capacity, easily available, easily replaceable drug. So the present work is about trying to validate the drug *Bryophyllum pinnata* which is one of the source plant for Pashanbheda.

Keywords: Pashanabheda, *Bryophyllum pinnatum*, Source plant, Ashmari.

Introduction:

Pashanabheda or stone breaker is a popular Indian drug. It is called as stonebreaker as it can dissolve kidney stones or plant can emerge out after breaking the stone¹. Pashanabheda is a controversial name, as it is assigned to various source plants such as, *Bergenia ligulatum*, *Aerva lanata*, *Bryophyllum pinnatum*, *Coleus aromaticus*, *Homonoia riparia*, *Rotula aquatic*, *Ocimum basilicum*, *Iris pseudacorus*, *Ammania baccifera*². From these source plants *Bryophyllum pinnatum* is commonly known as *Kalanchoe pinnata*. An environmental weed from the family Crassulaceae (Stonecrop) but traditionally used as a medicine in different regions of India mainly to treat urinary stones. The traditional practitioners in various parts of the world use this plant in

numerous conditions like hypertension, skin disorders, asthma, cold, insect stings, abscesses etc³. *Bryophyllum pinnatum* is also referred as Vatapatni by later nigantukara⁴. In costal Karnataka regions, the plant is locally known as Kaadu Basale(Wild spinach) which is widely used in urinary stones in the place of authentic source of Pashanabheda. Most of the traditional practitioners in costal Karnataka, Unani and Ayurveda physicians use this plant in conditions like: Raktasrava (bleeding disorders), Ashmari (renal calculi), Vrana (ulcers), Atisara (diarrhea)^{5,6}. As the plant is known for its ethno-botanical importance and proved pharmacological activities such as Anti-Diabetic activity, Wound healing property, lithotriptic activity, Hepato-protective activity, Anticancer property etc⁷. In a view of all the above information, the present work is under taken to establish *Bryophyllum pinnatum* is one of the standard source plant for Pashanabheda.

Word meaning:

- *Bryophyllum pinnatum*: Derived from Greek word- Bryo means to sprout & phyllon is a leaf i.e. ability to propagate via leaf cutting, pinnatum is from Latin word -feathered, winged⁸.
- Pashanabheda: Pashana –*pashati pidayatyaanena iti*, means by which pain is produces. Pashanabhedi-*paashanam ashmarim bhinatti iti*, one which is helps to cut or dissolve the stone. *vruksha visheshaha* and which is one of the variety of tree⁹.

Types:¹⁰

1. Ashmabhedaka¹¹- Hima, tikta. Indication-Sharkara, Shishna Shoola
2. Vatapatni- *Vatasyeva patram yasya*¹²-sh.ka 251-52
Bryophyllum pinnatum, hima, goulya indication- meha, mutrakrichra
3. Shilavalka¹³-Indication-balya, vrana, deepana. Synonyms-shilaja, shailavalkala.
4. Chatushpatni¹⁴-Indication-vrana, mutrakrichra, ashmari. Synonyms- Kshudrapashana, parvati.

Synonyms:



1. *Bryophyllum pinnatum*:

Synonyms	Word meaning
<i>Bryophyllum calcicola</i>	<i>Calcicola</i> ¹⁵ -A plant that grows best in calcareous soil (occurring chiefly on chalk and limestone).
<i>Bryophyllum calycinum</i> Salisb	<i>Calycinum</i> ¹⁶ - evergreen shrub.
<i>Bryophyllum germinans</i> Blanco	<i>Germinans</i> ¹⁷ - capacity to grow or develop.
<i>Bryophyllum pinnatum</i>	<i>Pinnatum</i> ¹⁸ - feathered, winged
<i>Cotyledon calycina</i>	<i>Cotyledon</i> -An embryonic leaf in seed-bearing plants, one or more of which are the first leaves to appear from a germinating seed ¹⁹ . <i>Calycina</i> ²⁰ - plant with woolly stems and leaves
<i>Cotyledon calyculata</i>	<i>Calyculata</i> ²¹ - temperate bog shrub with evergreen leathery leaves
<i>Cotyledon pinnata</i> ¹⁸	Feathered, winged
<i>Cotyledon rhizophylla</i> ²²	Feathered, winged
<i>Crassula pinnata</i>	<i>Crassula</i> ²³ -having opposite leaves and flowers with petals separate or connate only at the base.

<i>Kalanchoe brevicalyx</i>	Kalanchoe –Any plant producing miniature plants along the edges of the leaves ^{24,25}
<i>Kalanchoe calcicola</i>	<i>Calcicola</i> ¹⁵ - A plant that grows best in calcareous soil.
<i>Kalanchoe floripendula</i>	<i>Floripendula</i> ²⁶ - a plant, especially a rose, which bears dense clusters of flowers.

2. Pashanabheda^{27,28}:

Synonyms	Word meaning
Ashmantaka ²⁹	<i>Ashma</i> –stone, <i>Antaka-vinasham karoti</i> - one which destroy the stone
Kuddala ³⁰	<i>Kum- bhumi, dalati</i> - breaks, one which helps to break
Shlakshnatwak ³¹	<i>Shlakshna</i> -Soft, leaf
Yamalapatra ³²	<i>Yalamam yamjam patramasya</i> . One which is twin leaves.
Ambuda ³³	<i>Ambu jalam dadaai</i> . One which gives water.
Induka ³⁴	<i>Induriva shuklatvat</i> - white like moon.
Amlapatraka	Leaves are sour in taste.
Indushaphari ³⁵	Indu- white, Shafari- variety of fish
Pilupatraka ³⁶	<i>Peelu-bhedanam</i> -one which breaks. <i>Peelu yukta patram asya</i> . Leaves which have breaking property.
Shilantaka ³⁷	<i>Shila</i> - stone, <i>Antaka- vinasham karoti</i> - one which destroy the stone.
Pashanataka	Pashana- stone, <i>Antaka-vinasham karoti</i> - one which destroy the stone.
Ashmabhedana ³⁸	<i>Ashmam prastharam bhivaa jaayate iti</i> -One which break open the ground and sprout.
Ashmaghna ³⁹	<i>Ashmanam paashaanam hanti bhinnati iti</i> -one which destroy the stone by its dissolving property.
Giribhid- giri-hill, stone. Bhid-breaking	<i>Giri</i> -hill, stone. <i>Bhid</i> -breaking
Bhinnayojani	<i>Bhinna</i> - pieces. <i>yojani</i> -joining. One which helpful for wound healing.

3. Vatapatri^{40, 41, 42}:

Synonyms	Word meaning
Kshudrapashanabheda	<i>Ksudra</i> - inferior or Variety of pashnabheda can use in its absence
Parvati	Related to hill, grown in hill.
Asmaketu	<i>Ketu</i> - Shooting, Destroying stones.
Kandarodbhava ⁴³	<i>Kandara- kena jalena deeryate</i> .one which helps to dissolves in the water.
Girija	One which originated in hill
Chatushpatri	Sprouts from all the directions of the leaf edge
Nagabhū ⁴⁴	<i>Naga-Nage parvate bhavam. Bhu</i> - excisits. One which exists in hill.
Girubhu	One which exists in giri.
Shailodbhava	<i>Shaila</i> - hill, one which is originated in hill.
Nagaja	One which originated in parvata.

Mohini ⁴⁵	<i>Mohayati soundaryadi neti.</i> One which attracts from its beauty.
Airavati ⁴⁶	One which is have relation with water.
Inani	<i>Vatapatri vruksha</i> -leaf like vatavruksha patra
Godhavati ⁴⁷	Gudyate pariveshtayate baahuryaya-one which is very stong

Vernacular names^{48,49}

Language	Name	Derivation
Sanskrit	Pashanabheda, vatapatri, Parnabeeja	<ul style="list-style-type: none"> • Vatapatri-<i>vatasya yeva patra, pashanabheda visheshaha.</i> leaf which is thick like vata vriksha patra and its one of the synonym for pashanabheda. • Parnabeeja-leaf its self is seed
Hindi	Zakhmhaiyat, Pathharchoor, Ahiraavan, Mahiraavan	<ul style="list-style-type: none"> • Zakhmhaiyat - heals wounds • Pathharchoor -dissolves stones • Ahiraavan- • Mahiraavan-
English	Air plant	leaves that absorb water and nutrients from the atmosphere
Kannada	Gandukalinga, Kadu basale	Kadu basale -wild spinach
Gujarati	Khathkhathambo	One which absorb water from environment.
Malayalam	Elamulachi	Ela- leaf, mulachi- bud comes from leaf.
Tamil	Malaikalli, Ranakalli	<ul style="list-style-type: none"> • Malai- mountain, kalli- thorn, Act like mountain thorn. • Rana- blood, one which act as thorn for blood disorders
Telugu	Ranaphala	Ranam-Battle field, Phala- rules, one which rules the battle of ashmari
Marati	Ghaymaari	Ghay- wound, maari- healer, wound healer
Bengali	Pathar kuchi. Koppatta	<ul style="list-style-type: none"> • Pathar kuchi-Kuchi- small pieces ,one which do stones in to small pieces. • Koppatta- kop-one which help for chop or cut

Taxonomical classification⁵⁰

Class	Name
Kingdom	Plantae
Sub kingdom	Tracheobionta – Vascular plants
Division	Spermatophyta – seed plants
Sub division	Magnoliophyta – Flowering plants
Class	Magnoliopsida – Dicotyledons
Subclass	Rosidae
Order	Rosales
Family	Crassulaceae – stonecrop
Genus	Bryophyllum
Species	<i>Bryophyllum pinnatum</i>

Varga^{51,52,53}:

Sl.No	Author/Book	Varga
1.	Charaka	Mutravirechaniya
2.	Sushruta	Virataradi Gana
3.	Bhavaprakasha Nigantu	Haritakyadi varga
4.	Nigantuadarsha	Pashanabhedadi
5.	Rajanigantu	Prabhadradi varga
6.	Dhnavatari Nigantu	Guduchyadi varga
7.	Kaiyyadeva Nigantu	Aoushadhi varga
8.	Priyanigantu	Shatapushpadi Varga

Family features:

The family Crassulaceae which means the plant of crassula tribe; the leaves are fleshy & succulent^{54,55}. The family has 25 genera & 450 species. The plants of this family are herbs/ under shrubs. Stem & branches are usually with fleshy & succulent. Leaves are alternate/ opposite, simple less commonly pinnately divided, ex stipulate. Flowers are usually cymose, hermaphrodite/ rarely unisexual & regular. Calyx is free, 4-5 fid/ 4-5 partite. Petals are as many as sepals & alternate to the monopetalous corolla. Carpels are as many as petals & are opposite to them with a hypogynous gland/ scale at the base. Fruits are follicles & membranous with few seeds.

Habitat⁵⁶:

It's a native of Madagascar and southern Africa, Naturalised throughout the tropics of the world.

Morphology:

Bryophyllum pinnatum is a succulent glabrous herb 0.3-1.2 m high. Stems obtusely four angled, older one are light coloured & younger ones are reddish speckled with white. Leaves are variable & decussate lower are usually simple/ compound, upper ones are 3-5/7 foliolate with long petio led. Petioles are united by a ridge around the stem. Leaflets are ovate/ elliptic with crenate/ serrate margin. Flowers are pendent, in large spreading panicles with opposite stout branches, pedicels slender. Sepals are red striated, green at the base & pale green above. Petals are reddish purple, swollen & octagonal at the base, lobes triangular. Filaments green at the base, pinkish below the anthers. Anthers are hastate, black. Styles green. Fruit are enclosed in a persistent papery calyx & corolla. Seeds are small, oblong-ellipsoid, smooth.

Chemical composition⁵⁷:

- Leaves- Pcoumaric, ferulic, syringic, caffeic and p-hydroxybenzoic acid, karpferol, quercetin Quercetin-3-L-rhamnosido-L-arabinofuranoside isolated, quercetin-3-diarabinoside and kaempferol-3-glucoside isolated. The wax hydrocarbons alcohols and fatty acids obtained from the wax of leaves. A flavone glycoside quercetin-3-O-alpha-L-arabinopyranosyl-alpha-L-rhamnopyranoside isolated. A new cytotoxic bufadienolide-1,3,5-orthoacetae-bryophyllin.
- Swarasa(fresh juice of leaves)-Calcium sulphate, Acid tartrate of potassium
- Kalka- Calcium oxalate⁵⁸

PROPERTIES:1. Pashanabheda^{59,60,61,62}:

Sl.No	Author/Book	Rasa	Guna	Virya	Vipaka	Karma	Roganata
1.	Bhavaprakasha Nigantu	Tikta Kashaya	Hima, Grahi, Pratioosha ka	-	-	Bastishodhana, Bhedana, Vrunashodhaka, Vrunaropaka, Raktasthambhaka	Arsha, Gulma, Krichrashmari, Hridruja, Yoniroga, Prameha, Plihashoola, Vruna
2.	Nigantu Adarsha	Tikta, Kashaya	-	Sheeta	Katu	Mootravirechaniya, Basti Shuddhikara, Tridoshagnana	Mootrakrichra, Hridroga, Gulma, Arsha, Yoniroga, Prameha, Vrunahara
3.	Raja Nigantu	Madura, Kashaya	Sheeta,	-	-	Pittahara	Pramehajit, Vidaha, Trishna, Vishamajwara, Visha, Arti, Chardhi, Bhootajith
4.	Dhanvantari Nigantu	Tikta	Shita	-	-	Shishna Shulajith	Sharkara, Hridroga, Gulma, Pliha, Arsha, Basti Shuddhikara
5.	Kaiyyadeva Nigantu	Tikta, Kashaya	Hima	-	-	Bhedana, Bastishodhana	Arsha, Gulma, Krichrashmari, Hridruja, Yoniroga, Prameha, Plihashoola, Vruna

2. Vatapatri⁶³:

SI No.	Author	Rasa	Guna	Veerya	Vipaka	Karma	Rogagnata
1.	Bhavaprakasha Nigantu	Kashaya	Ushna	Ushna	-	-	Yoni, mutra gadapaha

Doshakarama: Tridosha shamaka, vata shamaka due to its snighaguna. Pittashamaka because of kashaya, tikta and shita virya . Kaphahara because of kashaya, tikta rasa and katu vipaka⁶⁴.

Part used : Patra (Leaves)⁶⁵, moola(Root)⁶⁶

Dosage:

- Swarasa/ fresh juice-2.5 to 5ml⁶⁷
- Leaves powder 12gm ⁶⁵

Pharmacological activities⁶⁸:

Antimicrobial activity ,Anticancer property, Antihypertensive activity, Anti- Diabetic activity, Wound healing property, Antilithogenic activity, Hepato-protective activity, Anti-inflammatory activity, Cytotoxicity of testis, Uterine Contractility, Immunosuppressive effect, Neuropharmacological activity.

Medicinal uses^{69,70}:

- Leaves- haemostatic, refrigerant, emollient, mucilaginous, vulnerary, depurative, constipating, anodtne, carminative, antiinflammatory, disinfectant and tonic, cuts, wounds, haemorrhoids, menorrhagia, discoloration of skin, boils, sloughing ulcers, ophthalmia, burns, scalds, corn, diarrhea, dysentery, vomiting and acute inflammations.
- Pulp of the leaves or the juice is applied on traumatic injuries to arrest the bleeding and promote the healing of wounds.
- Juice of its leaves contract the minute arteriols and arrest bleeding which may be external or internal like wound, atisaara(dysentery), ashmari(urolithiasis), visoochika(cholera).
- On traumatic wounds trauma, sprain, abscess and insect bits the heated leaves are crushed and applied. Its reduces the oedema and promotes the wound healing without leaving a scar.
- In dysentery- leaves juice and cumin seeds are given along with the double amount of ghee. It arrests the bleeding, as well as stimulates the intestines, raktapitta(bleeding disorders), piles and menorrhagia.
- Raktaatisara(bloody dysentery)- swarasa mixed with jeeraka and ghee

Ethno-botanical importance⁷⁰:

- In Odisha the plant is identified as Basampatri, its leaves are used in flatulence.
- Thukotali is the local name in poojapura (Kerala), people use crushed leaves externally to apply over the burn wound.
- Similarly in West Bengal & Andhra Pradesh the matured leaves are made warm and are placed over the wounds and tied.
- In konkan the leaf juice is used in dysentery with ghee.
- Two tea spoon of leaf juice is given in renal calculi .
- In chota Nagpur the steamed leaf juice is used in cough along with ghee/ garlic. The leaves are treated with palm oil & used externally in sore eyes.

Preparation^{71,72,73}:

Sl. No.	Yoga	Author	Ingredients	Anupana	Matra	Indication
1.	Pashanabheda swarasa	Sharanghadhara	Pashanabheda	-	1pala (48ml)	Ashmari
2.	Pashanabheda kwatha	Vruhan nigantu ratnakar	Pashanabheda	Mixed with shilajatu and sharkara	2pala (96ml)	Ashmari, Pittashmari
3.	Pashanabhedad i kashaya	Gadanigraha-mootrakrichra	Pashanabheda, yashtimadhu, ela, pippalimoola, erandamoola, sita, vasa, gokshura and haritaki	-	2pala (96ml)	dukhasaha/ mutrakrichra which is difficult to treat.
4.	Pashanabhedad i kashaya	Vangasena - Ashmari	Pashanabheda, varuna twak, gokshura, brahmi	shilajatu, karkataka beeja, trapusha beeja, guda	2pala (96ml)	Durbhedyashmari (ashmari which is difficult to dissolve).
5.	Pashanabhedad i kashaya	Vruhan nigantu ratnakar - mutrakrichra	Pashanabheda, aragvadhya, dhanvaayasa, haritaki and gokshura	Honey	2pala (96ml)	Pain and burning sensation of Mutrakrichra
6.	Pashanabhedad i kwatha	Vruhan nigantu ratnakar - mootrakrichra	pashanabheda, varuna twak, gokshura, eranda moola, kshudra dwaya(brahati and kathakari), kshuraka mula	Curd	2pala (96ml)	Mootravibanda, shukrashmari and sharkara.
7.	Pashanabhedad i kwatha	Yogaratnakar - Mutrakrichra adhikara	pashanabheda, trivrut, haritaki, duralabha, pushkaramoola, gokshura, palasha, shringhataka, karkati beeja.	-	2pala (96ml)	Niruddha mootra (obstruction of urine).
8.	Pashanabheda churna	sharangadhara	Pashanabheda	Ushna jala	1karsha (12gm)	Ashmari
9.	Pashanabhedada dhya churna	Chakradatta-Ashmari	Main ingredient is Pashanabheda	Ushna jala	1karsha (12gm)	Asmari
10.	Pashanabhedada dhya Kalka	Chakradatta-Ashmari	Same as pashanabhedada dhya churna	-	1karsha (12gm)	Ashmari
11.	Pashanabheda paaka	Yogaratnaka-Ashmari	Main ingredient is pashanabheda	Ushna jala	1pala (48gm)	ashmari bhedana, mootrakrichra, vatarakta, mootraghata, prameha,

						madhmeha, adhogata raktapitta, bastiroga, kukshiroga, teevraashmari (complicated kidney stones).
12.	Pashanabhedaa dhya grutam	Chakradatta-Ashmarya	Main ingredient is pashanabheda	Ushna jala	1pala (48gm)	Immediate effect in Vataja ashmari for dissolution
13.	Pashanavajra rasa	Yoga ratnakara-Ashmari	Main ingredient is pashanabheda	Ushna jala	1valla (375mg)	Ashmarihara
14.	Pashanabhinna rasa	Rasaratna samucchaya. chap.17	Main ingredient is pashanabheda	Ushna jala	1valla(375mg)	Ashmari bhedana (dissolving)
15.	Pashanabhedi rasa	Rasaratna samucchaya. chap.17	Main ingredient is pashanabheda	Ushna jala	1valla(375mg)	Ashmari pathana (expelling)

Toxicological study⁷⁴:

Toxicological and Reversibility Studies of *Bryophyllum pinnatum* Leaf Extract on Biochemical, Peroxidation and Histopathologic Parameters in Rodents: The aqueous leaf extract of *B. pinnatum* (BP) is effective as herbal medicine for hypertension, diabetes and convulsions, for which there has not been reliable subchronic toxicity data. This study aimed to study possible health effects of subchronic use of BP, as a predictor of long-term use in humans. Methods: Acute 24h oral (in mice) and 90 day-subchronic toxicity (in rats) tests were conducted as predictors for human outcome. Following 90 days, and 21 days reversibility tests, biochemical- ALP, ALT and AST, LDH, direct bilirubin, uric acid and creatinine were measured; oxidative stress- CAT, SOD), MDA; and histopathologic parameters were determined. No mortality was recorded up to 5g/kg of BP in acute toxicity test. After 90 days, 1000 mg/kg BP, caused significant, but reversible increases in all ALP, AST, ALT, LDH, uric acid, and creatinine.

Discussion: Pashanabheda is extremely controversial drug with reference to the exact identity of the plant. Many sources of this plant are explained by different authors depending on the region. Source plant means specific plant species. Rajanigantu elucidated about four varieties of pashanabheda ; among these Vatapatri is the fourth variety of pashanabheda which is identified as *Bryophyllum pinnatum*. As the name Pashanabheda gives the hint about its ability of stone breaking capacity. It not only emerges out after breaking the stony land but also in the same intensity it can dissolve the kidney stones internally. Same information's available from different synonyms of *Bryophyllum pinnatum* like *Bryophyllum calcicola*, means the drug growing environment as calcareous soil. Several synonyms of pashanabheda like Ashmantaka, shilantaka, pashanataka, ashmabhedana, ashmaghna also elaborates, how the drug sprouts out after breaking stone and even its stone breaking property internally. Many synonyms of vata patra like girija, parvati, naagabhu, giribhu and shailodbhava explains about the habitat of the drug as it grows in stony mud or mountain area and also stone dissolving property of the drug. In the same way synonyms like giribhid and shilantaka of pashanabheda matches with synonyms of vatapatri. Synonyms like Shlyaksha Twak, Yamalapatri, Pilupatri, Amla Patri, Chatuspatri, Vatapatri emphasizes on the useful part of the drug as leaf, its morphological appearance, its stone dissolving property, identification features, taste and also gives the hint about its vegetation by its leaf.

So these classical synonyms derivation matches with the root derivation of botanical name like *Kalanchoe brevicalyx* and *Bryophyllum germinans*, *Cotyledon calycina* of *Bryophyllum pinnatum*. Mohini and Induka synonyms explains about the attractive beauty of the drug and which suits with synonyms like *Bryophyllum calycinum*, *Cotyledon calyculata*, *Kalanchoe floripendula* of *Bryophyllum pinnatum*. Different vernacular names like pattarchur, pattar kurchi, malai kalli explains about stone dissolving or stone breaking properties of the drug. It also narrates that the most useful part of the plant is leaf in the local area. Wound healing properties are explained by names like Zhakhmhaiyath, Ranakalli, Ranapala, Ghaymaari. Mainstream nigantukara describes Tikta, Kashaya rasa of Pashanabheda; kashaya rasa of vatapatri which establish its action in ashmari roga, by mitigation of kapha dosha. Even though ashmari roga is tridoshaja vyadhi but is produced specially due to the necessary involvement of kaphadosha. The drug possess karmas such as Bastishodhana, Bhedana, Mootravirechaniya, Tridoshagna. So that Pashanabheda is considered as the best drug for expelling out stones from urinary tract (*Basti ashmari hanana karma adwitiya*). Vata patri is considered as variety as well as synonym of pashanabheda. Hence it can be concluded as *B.pinnatum* is one of the standard source plant for Pashanbheda.

Chemical compositions leaf extract of *B. pinnatum* shows the presence of Calcium sulphate, Acid tartrate of potassium, are helpful to dissolve the kidney stones. Toxicology study of *B. pinnatum* in rodents proved that no mortality was recorded up to 5g/kg in acute toxicity test. After 90 days, 1000 mg/kg, caused significant, but reversible increases in all ALP, AST, ALT, LDH, uric acid, and creatinine. So safely one can use the maximum dosages of any classical preparations from *B. pinnatum*, which is defiantly not exceeding 5kg in 90days. *B.pinnatum* is also pharmacologically proved for its Antimicrobial activity, Wound healing property, Antilithogenic activities and which are further supporting evidence that, it is one of the best drug in urinary calculi. As *B.pinnatum* is copiously growing species, also cost effective and easily available drug. The progressive usage of the drug won't disturb the ecosystem, rather reduces burden over the routinely prescribed classical drugs, thus preventing them from the verge of extinction. So numerous different classical preparations of Pashanabheda can be efficiently substituted by *Bryophyllum pinnatum*.

Conclusion:

From the present study we can conclude that Pashanabheda is one the best drug for urinary stones with the maximum attributes leading to stone dissolving properties which matches with Antimicrobial activity, Wound healing property, Antilithogenic activities of *Bryophyllum pinnatum*. However still further research is required to delineate the mechanism of action of *Bryophyllum pinnatum* as potent source plant for pashanabheda so that all the different classical preparations from pashanabheda can be substituted by *Bryophyllum pinnatum*.

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