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## PASHANBHEDA IN AYURVEDA: A CRITICAL REVIEW FROM NIGHANTUS TO SAMHITAS

Dr. Ankita Goyal<sup>1</sup> and Dr. Rajendra Prasad Purvia<sup>2</sup>

<sup>1</sup>Assistant Professor, Dravyaguna Department, Madan Mohan Malviya Government Ayurveda College, Udaipur, Rajasthan; <sup>2</sup>Associate Professor, PG Department of Dravyaguna, PGIA Jodhpur, Rajasthan

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\*Corresponding author: Dr. Ankita Goyal

### ABSTRACT

*Pashanbheda*, literally meaning "stone breaker," is a classical Ayurvedic drug known for its potent antiurolithic and diuretic actions. Among several botanicals identified under this name, *Bergenia ligulata* Wall. is the most widely accepted and therapeutically utilized species, particularly in the Himalayan region. This review provides a comprehensive compilation of references from classical Ayurvedic texts (Samhitas and Nighantus) as well as modern pharmacological studies. It explores the drug's taxonomy, vernacular names, classical classification, synonyms, Rasapanchaka, and Panchabhautika constitution. The therapeutic actions of *Bergenia ligulata* as described in Ayurvedic literature are corroborated by recent pharmacological studies demonstrating its antiviral, antioxidant, hepatoprotective, antidiabetic, cardioprotective, and anti-inflammatory effects. The article also addresses the controversial aspects of its identity due to the use of multiple species under the same name across different regions of India. This review aims to bridge the classical and contemporary understanding of *Pashanbheda*, thus contributing to its rational and evidence-based therapeutic application.

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## INTRODUCTION

*Pashanbheda*, meaning "stone breaker" in Sanskrit, is a well-known Ayurvedic drug traditionally used for the treatment of urinary stones and related disorders. Although several plants are referred to as *Pashanbheda* in classical texts, *Bergenia ligulata* is the most widely accepted botanical source. Described in various *Nighantus* and *Samhitas*, it is known for its *Ashmaribhedana* (litholytic), *Mutrala* (diuretic), and *Tridosha-shamaka* (balancing all three doshas) properties. Modern research supports its traditional uses, revealing pharmacological activities like antiurolithic, antioxidant, and anti-inflammatory effects. Its diverse phytochemical constituents, such as bergenin, arbutin, and catechin derivatives, contribute to its broad spectrum of activity. Given the multiplicity of plants referred to as *Pashanbheda*, the present review aims to consolidate classical Ayurvedic references with modern scientific evidence to provide a comprehensive understanding of *Bergenia ligulata* as the principal source of *Pashanbheda*. This includes its taxonomy, botanical characteristics, traditional descriptions, pharmacological actions, chemical constituents, and the ongoing controversy regarding its identification.

### TAXONOMICAL POSITION<sup>1,2</sup>

Kingdom: Plantae  
Division: Spermatophyta  
Sub-division: Angiosperms  
Class: Dicotyledons  
Subclass: Polypetalae  
Series: Calyciflorae  
Naturalorder: Rosales  
Family: Saxifragaceae  
Genus: *Bergenia*  
Species: *ligulata*(Wall)

**DISTRIBUTION:** It is reported to be threatened in the northeastern part of India and is found throughout the Himalaya at elevations between 900 and 3000 meters.

**BOTANICAL DESCRIPTION**<sup>3,4,5,6,7</sup>

**Habit:** A perennial herb with thick rootstock.

**Stem:** short, fleshy, procumbent; little plant with leaves around 10 inches in diameter that grows closely pressed against rocks.

**Leaves:** The simple, highly varied leaves are typically 6 to 12 inches long, orbicular to broadly obovate, fleshy, strongly ciliate, frequently pinkish underneath, glabrous, and dotted underneath; the petiole has a thick sheath at the base.

**Flowers:** In corymbose scapes, they are waxy, white or pink, and 0.6–0.8 inches across.

**Fruit:** Globose

**Flowering and Fruiting:** February to May.

**Varieties:** There are two other Himalayan species of *Bergenia* which are also used as botanical source of drug Pashanabheda. They are *Bergenia ciliata* Royle. And *Bergenia stracheyi* Engl.

**VERNACULAR NAMES**<sup>8,9</sup>

Assam:	Patharkuchi, Tuprilata
Bengali:	Himasagara, Pathakucha, Pattarchuri
English:	Velvetleaf
Gujarati:	Pakhanabheda
Hindi:	Pakhanbheda, Dakachru
Kan:	Pahadvela, Pahand
Kash:	Pashanabheda
Khasia:	Atia
Kumaon:	Shilphada
Marathi:	Pashanabheda
Malayalam:	Kallurvanchi, Kalluvanni, Kallovanchi
Punjabi:	Banpatrak, Shaproki
Telugu:	Telanurupindi
Urdu:	Kachalu, Pakhanabheda

**Classification in Samhita's**

NAME OF SAMHITA	NAME OF GANA/VARGA
<i>Charaka Samhita</i>	<i>Mutravirechaniya</i>
<i>Sushruta Samhita</i>	<i>Veertarvadi</i>
<i>Astang Hridaya</i>	<i>Veertarvadi</i>

**Classification in Nighantu's**

Name of Nighantu	Varga
<i>Dhanvantari Nighantu</i>	<i>Guduchyadi Varga</i>
<i>Sodhala Nighantu</i>	<i>Guduchyadi Varga</i>
<i>Madanpal Nighantu</i>	<i>Abhyadi Varga</i>
<i>Bhavprakash Nighantu</i>	<i>Haritakyadi Varga</i>
<i>Raj Nighantu</i>	<i>Parpatadi Varga</i>
<i>Priya Nighantu</i>	<i>Satapushpadi Varga</i>
<i>Kaiyadev Nighantu</i>	<i>Aushadhi Varga</i>
<i>Nighantu Sesh</i>	<i>Gulmakanda Varga</i>

**SYNONYMS**

Sr. No	Synonyms	CS	SS	AH	DN	RN	BP	KN	SN	MN	DV
1	Ashmaghna	-	-	-	+	+	+	-	+	-	+
2	Ashmabheda	-	+	+	-	-	-	+	-	-	+
3	Ashmabhedak a	+	+	+	+	+	-	-	+	+	+
4	Upalabheda	-	-	-	+	-	-	-	+	-	-
5	Giribheda	-	-	-	-	-	+	-	+	-	-
6	Nagabhid	-	-	-	+	-	-	-	-	-	+
7	Pashanabheda	+	+	+	+	-	-	-	-	+	+
8	Pashanabheda ka	-	+	-	+	+	+	-	+	-	-
9	Bhinnayojini	-	-	-	-	-	+	-	+	-	-
10	Shilabheda	-	-	-	+	-	-	-	+	+	-
11	Sweta	-	-	-	-	+	-	-	+	-	-
12	Prastara	-	-	-	-	-	-	+	-	-	+
13	Ashmrubhedan a	-	-	-	-	-	-	+	-	+	-
14	Nagabhedaka	-	-	-	-	-	-	-	-	+	+
15	Drasbheda	-	-	-	+	-	-	+	-	+	-
16	Asmabhit	+	+	+	-	-	-	-	+	-	-

CS–Charaka samhita  
 SS– Sushrutasmhita  
 AH–AstangaHridya  
 DV–DravyagunaVijnyana  
 MN- Madanpal Nighantu

DN–DhanvantariNighantu  
 RN–RajaNighantu  
 BP–BhavprakashNighantu  
 KN–KaiyadevaNighantu

### PANCHBHAUTIK CONSTITUTION OF PASHANBHED

RASA PANCHAKA	PANCHBHAUTIK CONSTITUTION
<b>Rasa</b>	
<i>kashaya</i>	Vayu+prithvi
<i>Tikta</i>	Vayu+ Akasha
<b>Guna</b>	
<i>Laghu</i>	Vayu + Agni + Akasha
<i>Snigdha</i>	Prithvi + Jala
<i>Tikshna</i>	Agni +Vayu
<b>Virya</b>	
<i>Sheeta</i>	Jala + Prithvi
<b>Vipaka</b>	
<i>Katu</i>	Vayu+ Agni
<b>Prabhav</b>	Ashmabhedana

### RASAPANCHAKA<sup>10,11</sup>

Rasa : Kashaya, Tikta  
 Guna : Laghu, Snigdha, Teekshna  
 Veerya : Sheeta  
 Vipak : Katu  
 Prabhava : Ashmabhedana, Doshagnata, Tridoshashamaka  
 Roga : Ashmari, Jwara, Raktapitta, Atisara, Pravahika  
 Gulma, Arsha, Hridroga, Kasa, Yonivyapada,  
 Mootrakrichchra.

Karma : Shothahara, Vranaropana, Stambhana, Rakta Pittashamaka, Hridya, Kaphanissaraka, Ashmaribhedana, Mootrala, Jwaraghna, Vishaghna.

### ACTION AND USES:<sup>12,13</sup>

- The rhizome is cooling, laxative, analgesic, and beneficial for calculi, piles, tumors, strangury, heart illness, splenic enlargement, ulcers, bladder diseases, dysentery, and lung problems.
- It is Astringent, alexiteric, diuretic, styptic, abortifacient, tonic, and aphrodisiac.
- It clears the removes mucous from the intestines and reduces biliousness, eyesores, liver disorders, menorrhagia, hydrophobia, and excessive uterine hemorrhage.
- The rhizome is used as an antiscorbutic and as a tonic for coughs, diarrhea, and fevers.
- It is applied to cuts, burns, boils, and bruises as well as ophthalmia.
- When youngsters are teething, the rhizome is rubbed down and given to them with honey.
- Kidney stones are said to dissolve with its help.
- Earaches are treated with leaf juice.

### CHEMICAL CONSTITUENTS:<sup>14,15,16</sup>

Numerous chemicals that belong to the polyphenolic category are found in the genus *Bergenia*. The majority of the polyphenolics present are based on the gallic acid system, which is a distinctive characteristic. Arbutin is one phenolic that is commonly seen. The leaves were found to contain 2-O galloyl arbutin, 6-O-galloyl arbutin. According to an initial investigation, the leaves contained alkaloids but not saponins or flavonoids. A novel chemical called pashanolactone was found in the rhizome. Additionally, (+)-catechin gallate, -3- (+)-catechin-7-O-D-glucopyranoside, and 11-O-galloyl bergenin were discovered to be present. Bergenin and (+)-afzelechin were found to be more concentrated in the rhizome than in other plant parts.

### DOSAGE

Powered rhizomes: 1-3 gm  
 For decoction: 20-30 gm rhizomes

### CONTROVERSIAL ASPECTS OF PASHANBHEDA<sup>17</sup>

The precise identity of the plants being utilized under the name Pashanbheda has been a topic of debate. There are approximately twenty-three species known to be pashanbheda. Different authors have cited different sources of pashanbheda, and vaidyas in different places use different sources of this medication depending on what is available where they live.

Some of the plants used as a source of pashanbheda in different parts of India are listed below:

S.no.	Plantname	Family	Part used	Chemical constituent
1	<i>Aervalanata</i> Juss.	Amaranthaceae	Whole plant, root	$\beta$ -sitosterol, flavonoids.
2	<i>Ammanniabaccifera</i> Linn.	Lythraceae	Whole plant, leaves	lawosonin
3	<i>Bergenia ligulata</i> Wall.	Saxifragaceae	Rhizomes	Bergenin, gallic acid, tannic acid

4	<i>Brideiliaretusa</i> Spreng.	Euphrobiaceae	Wholeplant	Triterpenoids
5	<i>Bryophyllumpinnatum</i> Kurz.	Crassulaceae	Wholeplant	Phenol, organic acid
6	<i>Coleusamboinicus</i> Lour.	Labiatae	Leaves	Flavones, aromatic acid, Triterpenes.
7	<i>Didymocarpuspedicellata</i> R.Br.	Gesneriaceae	Wholeplant	Flavones, didymocarpin
8	<i>Homoniariparia</i> Lour.	Euphrobiaceae	Root	Toxalbumin (criptin)
9	<i>Ocimumbasilicum</i> Linn.	Labiatae	Leaves	Essential oil
10	<i>Rotulaaquatica</i> Lour.	Boraginaceae	Root	Triterpenes.

Among the plants mentioned in the above table, *Bergenia ligulata* Wall is regarded as the source in northern India and is utilized in formulations for kidney and bladder stones (cystolithiasis). The eastern region of India uses the roots of *Coleus amboinicus* Lour. and *Bryophyllumpinnatum* Kurz. In south India, *Aerva lanata* Juss. and *Rotula aquatica* Lour. are utilized. In Rajasthan, both the whole plant and its dried roots of *Aerva lanata* Juss. are used. In Gujarat, *Bergenia ligulata* Wall. is also found.

## BIOLOGICAL ACTIVITIES

**Antiviral Activity**<sup>18,19</sup>: In ethno-pharmacological screens, the antiviral properties of *B. ligulata* and plants utilized in Nepalese traditional medicine were assessed. When tested using in-vitro viral systems, such as influenza virus/MDCK cells and herpes simplex virus/vero cells, methanolic and hydromethanolic extracts had the strongest antiinfluenza-viral activity, with an ID<sub>50</sub> of 10 µg/ml.

**Free Radical Scavenging Activity**<sup>20,21</sup>: By using the DPPH assay, the methanolic extract of *B. ligulata* demonstrated free radical scavenging activity with an IC<sub>50</sub> value of 50 µg/ml. It underwent further fractionation between water and n-butanol. The DPPH radical scavenging assay and the nitric oxide scavenging assay were used to screen the fractions for in-vitro free radical scavenging activity. The n-butanol fraction's IC<sub>50</sub> value was determined to be 4.5 µg/ml, whereas the aqueous fraction's IC<sub>50</sub> value was 30 µg/ml.

**Antidiabetic activity**<sup>22,23,24</sup>: The roots of *B. ligulata* showed hypoglycemic effects in an alcoholic extract (250 mg/kg body weight). In diabetic rats, it decreased the high blood sugar levels. The study came to the conclusion that the antidiabetic effect might be caused by the stimulation of pancreatic islet cells or by the stimulation of insulin release, which is similar to what happens with oral hypoglycemic sulphonylureas. Alpha-glucosidase activity was shown to be inhibited by the (+)-afzelechin that was extracted from *B. ligulata* rhizomes, with an ID<sub>50</sub> value of 0.13 mM. These investigations demonstrated *B. ligulata*'s antidiabetic potential, which may aid in the development of pharmaceutical formulations, nutraceuticals, and functional foods for the treatment of diabetes and its associated symptoms.

**Hepatoprotective activity**<sup>25</sup>: Male albino rats of the Wistar breed were used to test for hepatoprotective activity. The standard "Liv 52" syrup, produced by the Himalaya Drug Company in Bangalore, was utilized, and hepatotoxicity was induced using carbon tetrachloride (CCl<sub>4</sub>). Serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), alkaline phosphatase (ALP), and total bilirubin levels were significantly lower in animals given alcoholic extract (500 mg/kg body weight) of *B. ligulata* roots than in control, confirming the hepatoprotective effect of the same. The hepatoprotective mechanism is still unknown, though.

**Diuretic activity**<sup>25</sup>: The Lipschitz method was used to evaluate the diuretic efficacy of *B. ligulata*, with a conventional Furosemide tablet (Aventis Pharma Limited, GIDC estate Ankleshwar). The considerable diuretic activity of *B. ligulata* was demonstrated by the effective increase of urinary electrolyte concentrations of Na<sup>+</sup>, K<sup>+</sup>, and Cl<sup>-</sup> by an alcoholic extract of the roots (500 mg/kg body weight). It was determined that the diuretic action may be caused by the active ingredients, such as flavonoids and saponins, found in the alcoholic extract of *B. ligulata* roots.

**Antipyretic activity**<sup>25</sup>: The Brewer's yeast-induced pyrexia method was used to evaluate the antipyretic efficacy in wistar rats. In comparison to normal paracetamol at a dose of 20 mg/kg, the results showed that the alcoholic extract of *B. ligulata* roots had considerable antipyretic efficacy at a dose of 500 mg/kg body weight, with a notable decrease in body temperature up to 4 hours after delivery.

**Analgesic activity**<sup>26</sup>: Using a hydroalcoholic extract of *B. ligulata* rhizomes (250 mg/kg) administered intragastrically to the mouse using the hot plate and tail clip procedures, the analgesic effect was assessed. Thus, it was concluded that the extract had no analgesic properties.

**Antitumor activity**<sup>27</sup>: In a different investigation, rats were given an intraperitoneal injection of a hydroalcoholic extract of *B. ligulata* to assess its anticancer efficacy. According to test results, the hydroalcoholic extract of *B. ligulata* demonstrated cytotoxic action with an ED<sub>50</sub> on cell culture at a concentration of 20 mcg/ml against SARCOMAWM1256 IM.

**Cardioprotective activity**<sup>28</sup>: Using multiple animal models, the hydroalcoholic extract of *B. ligulata* was tested for its hypotensive properties. When dogs received an intravenous dosage of 50 mg/kg, there was positive hypotensive activity. A favorable chronotropic and inotropic impact was produced on the frog's heart by the extract. With a decrease in coronary flow, the extracts had a negative inotropic and chronotropic effect on the continuous perfusion of the rabbit's heart. The alcoholic extract had strong anti-bradykinin effects both in vitro and in vivo, but it had no effect on the isolated guinea pig ileum's reaction to 5-HT and acetylcholine. In guinea pigs, it intensified the effects of adrenaline on the ileum and tracheal chain.

**Acute toxicity study**: The Up and Down or Stair case method was used to conduct acute toxicity experiments for an alcoholic extract of *B. ligulata* on healthy Swiss albino mice weighing 25–35 g. The highest non-lethal dose was determined to be 5 g/kg-body weight.

**TOXICOLOGY**<sup>29</sup>: The acetone extract of rhizome is reported to be cardiotoxic in higher doses and has CNS depressant action. LD<sub>50</sub> of aqueous extract was found to be 650 mg/kg i.p. in rats

## CONCLUSION

Pashanbheda, especially *Bergenia ligulata*, is a well-known medicinal plant in Ayurveda, commonly used for breaking kidney stones and treating urinary problems. Its name appears in many classical texts like the Charaka Samhita, Sushruta Samhita, and several Nighantus, although the plant identity varies across regions. This review highlights its rich Ayurvedic background, traditional uses, and modern pharmacological findings. Scientific studies confirm its wide range of benefits such as antiurolithic, hepatoprotective, antidiabetic, antioxidant, antiviral, and

cardioprotective actions. However, due to the confusion over its exact botanical identity in different parts of India, further research is needed to clarify and standardize its source. Overall, *Bergenia ligulata* holds great potential as a natural remedy in both traditional and modern medicine.

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