



## Review Article

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# A review study on Pashanbheda in the treatment of Vatashtila (BPH)

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## ABSTRACT

BPH is a clinical condition that affects men as they get older and is common and progressive in nature. The LUTS (lower urinary tract symptoms) as well as bladder outlet obstruction have all been related to it in certain situations, including enlargement of the prostate. It is frightening to note that the incidence of kidney illnesses is expanding at an alarming pace in today's culture. Ten percent of men over the age of 70 are expected to have Vatashtila over the course of five years, according to projections (BPH). According to a study conducted in the United States, the prevalence of BPH has climbed from 18.8 percent to 24.5 percent among those aged 60 and over. Diuretics play a significant part in their therapy. *Acharya Charaka* describes a collection of ten plants called *mutravirechaniya mahakashaya* (great extractives of diuretics) under the 50 *Mahakashaya*, or great extractives. Urinary problems such as frequent urination, BPH, and calculi in the urinary system are efficiently treated with them. Some herbs aid in the preservation of renal function. This study basically focused on the Pashanbheda in the treatment of Vatashtila and its various properties which are study in this paper. Authentication of stated medicines by their Pharmacognostical data is essential before creating and suggesting such formulations in *Vatashtila* (BPH). This review paper may aid in validating and directing future research on these topics to a great extent.

**Keywords:** Ayurvedic, Pashanabheda, Mahakashaya, Vatashtila (BPH).

## INTRODUCTION

In today's society, the prevalence of Vatashtila (BPH) is increasing at an alarming rate. Over a five-year period, it is predicted that 14% of men over the age of 70 and nearly a third of men in their 80s would suffer Vatashtila (BPH). The prevalence of Vatashtila (BPH) in persons aged 60 and older increased from 18.8% to 26.5 percent during the 1986-1995. Diuretics play a significant part in their therapy. They are medicines that speed up the process of urine production. When administered to individuals with congestive heart failure, several medicines, such as digitalis, enhance urine output by mobilizing edema fluid. However, the word diuretic refers to a medication that works directly on the kidney [1]. Diuretics are available in a wide range of modern therapies. These medications are not only effective, but they also have negative side effects. Ayurvedic Mutrala (diuretic) medicines are said to provide positive systemic effects in addition to the diuretic effect [2,3].

Patients with LUTS should be subjected to a thorough physical examination, which should include a rigorous digital rectal examination, before being evaluated (DRE). DRE has been shown to be inaccurate in estimating the size of prostate as well as has been shown to underestimate the size of prostate; the bigger the prostate, the greater the likelihood that its size would be underestimated [4]. However, it is vital to assess the prostate since, despite the widespread use of DRE, only a small number of men are still found to have prostate cancer despite this. Further testing, such as an urine sample and just a serum PSA assay, should be conducted if the PSA is abnormal as part of the diagnosis and as a signal to differentiate men with BPH from those with prostate cancer, according to the physician's recommendations [4-6].

Located just below the base of the bladder and around the proximal section of the urethra, the prostate is a gland in the male reproductive system that is responsible for the production of testosterone. There are canals and follicles lined with columnar epithelial cells, and a fibrous-fibromuscular stroma made of connective tissue and smooth muscle surrounds the whole structure (PSS). As reported by the American

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Urological Association, the prostate makes a contribution to the formation of seminal fluid, where its secretions are crucial in optimising circumstances for conception by enhancing the viability of sperm in both the male and female reproductive tracts. In addition, the prostate contributes to the creation of seminal fluid. - All animals experience ejaculation when the prostatic smooth muscle (stromal smooth muscle) contracts, resulting in the release of prostatic secretions into the urethra. The contraction of the prostatic smooth muscle is seen in Figure 1.

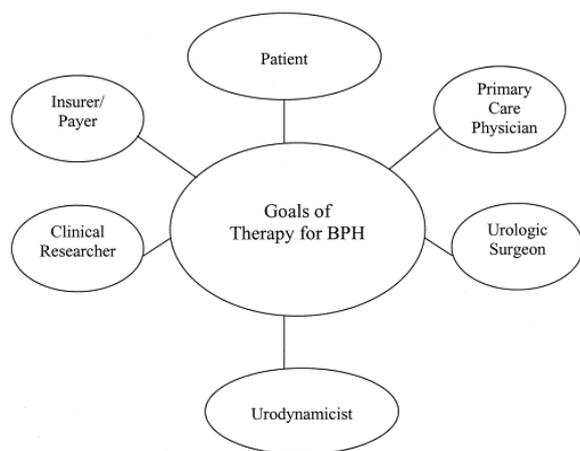


Figure 1: Illustrating the Goals Therapy for the Vatashtila (BPH) [9].

BPH evolves to the point that it produces problematic LUTS, if left untreated, symptoms such as frequent urination, urgency, nocturia, diminished and intermittent force of stream, and the sense of an incomplete bladder emptying may develop [7,8]. BPH refers to a histologic abnormality, especially the presence of stromal glandular hyperplasia, rather than a symptom of the condition.

All kinds of great extractives that treat various ailments or assist to contribute to positive health are described under the 50 Mahakashaya (great extractives). Similarly, a collection of plants known as 'mutravirechaniya mahakashaya' is prescribed (diuretics). There is a list of ten medicines that have been mentioned. Acharya Charaka and Vriddha Vagbhata wrote the Mutravirechaneeya Dashemani or Mutravirechana Mahakashaya. The 4th chapter of Charaka samhita Purvardha is used to evaluate the Ayurvedic diuretics group and its content. Mutravirechaniya (diuretic) is the 35th Mahakashaya (great extractive) of the total 50 [10,11].

### Bergenia ligulata

Engl.- Syn.- B. ciliate Sternb. - Saxifragaceae Bergenia ligulata Engl. - Syn. - B. ciliate Sternb. - Saxifragaceae Bergenia ligulate.

This plant is the primary botanical source of Pashanbheda, a traditional Indian medicine.

- Kingdom : Plantae
- Family : Saxifragaceae
- Genus : Bergenia
- Division : Magnoliophyta

- Class : Magnoliopsida
- Order : Saxifragales
- Species : ligulate

It is a perennial herb that grows wild in India at great altitudes in Himalayas, mainly in rocky regions and cliffs, between 1800 and 5100 meters. Alkaloids, steroids, flavonoids, terpenoids, tannins, glycosides, sugars, and saponins are among the phytochemicals found in the root. Thin layer and column chromatography were used to separate - Sitosterol, Stigmesterol, Tannic acid, and Gallic acid. Bergenin and Afzelechin are mostly produced by its rhizomes. It is shita (cooling) and brihana (bulk-increasing), and it is prescribed for mutrashmari (urinary calculi), prameha (diabetes), yonirog (vaginal diseases), and shula (colic).

### Names of Vernacular

- Bengali : Patrankur Himasagara, Patharchuri
- Gujarati : Pashanbheda, Pakhanbheda
- Assamese : Patharkuchi
- Hindi : Pakhanabhed, Silparo, Dakachru, PakhanabhedaPatharcua, Silpbheda
- Kannada : Alepgaya, Hittulaka, Hittaga, Pahanbhedi, Pasanberu
- Kashmiri : Pashanbhed
- Marathi : Pashanbheda
- Malayalam : Kallurvanchi, Kallorvanchi, Kallurvanni,
- Sanskrit : Ashmabheda, Nagbhita, Pashaanbheda, Silabheda
- Tamil : Sirupilai

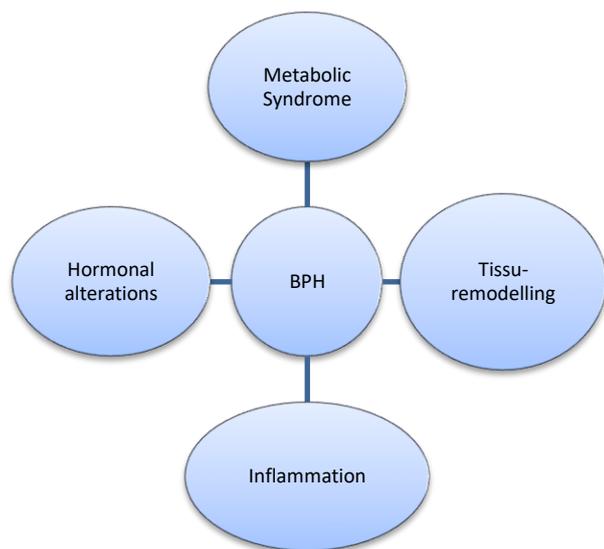
Bidens ligulata is succulent perennial plant that may grow up to 50.00 cm tall and is up to 50 cm wide. Between 1800 and 5100 metres above sea level in the temperates Himalaya be found in plenty in Pakistan, Central Asia, and East Asia, where it is found in abundance between 1800 and 5100 metres [12,13].

### Possible Options for BPH Treatment

BPH has been treated mostly surgically for the last 60 years, with ablative techniques being the most often used. As a result of newly acquired knowledge on epidemiology and pathophysiology as well as info gained from the endocrinology as well as urodynamic investigations, urologists have been involuntary to reevaluate the conservative guidelines on which together diagnosis and treatment have been founded [7,8].

As a consequence of the expanding older population in the general population, healthcare practitioners and the pharmaceutical industry have expanded their efforts to tackle age-related illnesses likes BPH. It is a male reproductive system accessory gland that is placed just below the bladder and surrounds the urethra. It is responsible for the

function of the male reproductive system. BPH, or benign prostatic hyperplasia, is a disorder characterised by extreme growth of the prostate in old age. Because BPH promotes obstructions of the bladder outflow, it eventually leads in LUTS. In many men, the development of LUTS and BPH is defined by a growth in prostate size, increasing symptoms, discomfort, and overall quality of life (QOL), as well as a decrease in flow rate and urodynamics, among other things [14]. as well as The growth of consequences likes acute urinary retention (AUR) as well as the necessity for surgical intervention, and lastly (Figure 2) [15].



**Figure 2:** Illustrating the Causes and Treatment of Benign Prostatic Hyperplasia

Many novel treatment options for BPH have emerged in the previous decade, including a number of innovative surgical procedures. There are now additional treatments alternatives than ever before, with slightly offensive surgical techniques new drugs, as well as innovative combinations of medical therapies all contributing to an increase in the number of therapy options that nevertheless range from careful waiting to open surgery. The therapy choices for BPH are as diverse as the symptoms that accompany the condition. BPH is seldom fatal, and the majority of experts feel that treatment should be focused on improving quality of the life. The goal of BPH treatment is to enhance excellence of life by alleviating symptoms and boosting maximal flow rate, as well as to slow the course of the illness and the development of new morbidities.

### Ayurveda and BPH

Ayurveda specifies two disorders known as mootrakruchra and mootraaghaata, which are thought to be related to the symptoms of prostatism and may be treated with herbs. In contrast to mootrakruchra, which is characterized by acute discomfort while passing urine, mootraaghaata is characterized by entire conquest or intermittent flow of the urine during urination. Mootrakruchra is a kind of strangury that occurs when passing urine. Natural remedies have a long history of usage in our nation to help men maintain good prostate health, and this is no exception. Gokshura (gokhru), whose scientific names are Tribulus terrestris, has been used in traditional medicine to treat urogenital disorders for centuries [16-18].

Take two tablespoons of the fruit and crush it finely before adding it to two cups of water and bringing it to a boil until only approximately half the water is left. I'd want you to have a cup of this. Those who choose may also take the drug with sugar and milk, if they so choose to do so. In addition to cooking in milk until thoroughly dissolved, gokshura may be eaten raw. In a same vein, two more botanicals ought to be included. Several investigations have proven that the herbs varuna and punarnava are effective in alleviating the symptoms of BPH, according to the researchers. Both of these have been shown to have a significant anti-inflammatory effect in a variety of clinical studies, particularly when it comes to the genito-urinary tract. If you are suffering from genito-urinary illness, Shilajit, a herbo-mineral combination spewed out of rocks in the lower Himalayas during hot weather, may be of particular use to you. Kshaaras are alkaline salts that are made from the ash of medicinal plants and are used in traditional medicine. These substances include yava-kshaara, a compound derived from the dried wheat plant before it blooms, which is one of the materials used to make them. Among the ingredients in this medication is a modified version of potassium carbonate, which is recommended for the treatment of enlargement of the glands, with a particular emphasis on the prostate [3,19,20].

Inadequate zinc consumption over a long period of time has also been associated to BPH. Protein-rich foods such as meat, eggs, and shellfish are excellent sources of zinc. Yassada bhasma, which is created by the calcinations of the zinc, is the particular medication used for this. A regular dosage of 125 - 250 mg taken with the honey which will provide relief from the condition for many months.

### DISCUSSION

Pashanbhed, also known as stone breaker, is an Indian plant that is widely used. The rhizome of this plant is the most often utilised portion for therapeutic reasons. As a result of its antilithic properties, pashanbhed is most often utilised in the treatments of kidney and urinary tract stones. In accordance with Ayurvedic principles, ingesting Pashanbhed powder promotes urine production and aids in the simple removal of stones owing to its Mutral (diuretic) properties.

Pashanbhed may also be useful in decreasing fever owing to its antipyretic qualities, as well as providing relief from cough due to its antitussive characteristics, among other things. Because of its antioxidant and antiulcer qualities, it may also be beneficial in the management of ulcers. Because of its anti-inflammatory properties, you may use Pashanbhed paste directly to the skin to control boils and inflammation.

Bidens ligulata is perennial plants that grows in clusters as well as has short, thick, meaty, procumbent stems as well as a robust rootstock. The leaves are oval or round in shape and 5-15 cm length throughout the blooming season. Autumn leaves become a vibrant red hue and have short stiff hairs that grow to a length of around 30 cm. The top and lower surfaces of the leaves are initially hairy, but as the leaves get older, they become practically hairless on both surfaces. Flowers are available in three colours: white, pink, and purple. They measure 3.2 cm in diameter. Their flowering panicle is a supple blossoming stem that is 10- 25 cm long and leafless, with styles on each side of the stem.

## Features of the Macroscopic

The rhizomes are solid and cylindrical in shape, measuring roughly 1 to 3 cm long and 1 to 2 cm broad. They are barrel-shaped and cylindrical in shape. Throughout the outer surface, which is a dark brown in colour, you can see little roots, furrows, ridges, wrinkles, and root scars. It has a pleasant fragrance as well as astringent taste. At the microscopic level, the following characteristics are present: An inner zone and an outer zone are distinguished in a transverse slice of the rhizome, which is separated into two zones: the outer zone and the inner zone. In contrast to the outer zone, which is formed of a few layers of brown-colored cells that have been compressed, the inner zone is composed of multilayered thin-walled, tangentially elongated, and colourless cells that have been multilayered and are tangentially extended as well. On the opposite side of the plant, two to three layers of secondary cortex and a single layer of cambium follow the cork layer, forming a layered structure.

Ca<sub>2</sub>O<sub>4</sub> rosette crystals and starch grains are found in abundance in the majority of cortical cells, whereas a tiny zone of the parenchymatous cells contains just a few simple starch grains. It does not have an endodermis or a pericycle, but it does have vascular bundles that are structured in a circular pattern. The cambium is a continuous ring of thin-walled, tangentially elongated cells with two to three layers that forms a ring around the body of the organism. The xylem is made up of fibres, tracheids, vessels, and parenchyma, among other things. At its core, a large pith composed of round to oval parenchymatous cells containing starch. The area between them is occupied by grains and Ca<sub>2</sub>O<sub>4</sub> crystals that are identical to those seen in the cortical region. Perforation plates may be seen on one or both ends of veins with simple pits, and helical thickenings and perforation plates can be found on one or both ends of vascular tracheids. Perforation plates can also be found on one or both ends of veins with simple pits.

## Ethnomedical claims and traditional use

There are many Indian languages that employ the plant *B. ligulata*, each with its own local variations, to indicate that the plants grow between rocks, shattering them, or that the plants have lithotriptic qualities. *B. ligulata* roots are employed in the treatment of vesicular calculi, urinary discharges, excessive uterus haemorrhage, bladder illnesses, dysentery, menorrhagia, splenic enlargement, and heart problems, among other conditions. Ethnobotanical as well as ethnomedicinal sources claim that it may also be used to cure dysentery due to its ability to act as an excellent absorbent. When children in Sind are teething, the root is rubbed down and given to them, together with honey, to alleviate the agony of the teething process. In Indo-China, earaches are treated using a liquid prepared from crushed leaves, which is taken from the mortar and pestle and applied topically.

In the treatment of Vatasthila (BPH), *ligulata* has been taken orally, and a hot water extract of the complete dried plant has been utilised to treat this ailment. As an anti-helminthic for the expulsion of roundworms and the treatment of colds, people in Nepal were given 10 g of *B. ligulata* rhizome paste or juice blended with molasses, twice a day for 3-4 days, as part of a therapy for both roundworms and colds. Traditionally in India, the dried roots have been used topically to cut and boil injuries as well as wound and burn healing; an oral infusion

has been used to treat diarrhoea; and its rootstock has been used as a masticator by individuals who are over the age of 18. Vatasthila (BPH), urinary issues, stomach illnesses, and urogenital symptoms are all treated with an oral infusion of fresh *B. ligulata* roots in humans. Also believed to be effective is the use of its hot water extract topically for the treatment of ophthalmia and externally for the treatment of boils.

## Phytochemistry

It is composed mostly of the phenolic component 'bergenin' (almost 0.9 percent) and other phenolic compounds in smaller amounts. "(+)-afzelechin, gallic acid, leucocyanidin, tannic acid, methyl gallate, (+)-catechin -7-O-β-D-glucopyranoside, (+)-catechin, 11-O-galloyl bergenin; and a lactone, Paashaanolactone. It also includes sterols such as sitoindoside I, β-sitosterol, and β-sitosterol-D-glucoside, as well as glucose (5.6%), tannin (14.2-16.3%), mucilage, and wax. Coumarins: bergenin, 11-O-galloyl bergenin, 11-O-P-hydroxy-benzoyl bergenin; 11-O-brotocatechuoyl bergenin, 11-O-brotocatechuoyl bergenin; 4-O-galloyl bergenin; 11-O-brotocatechuoyl bergenin; catechin, eriodictyol-7-O—D-glucopyranoside, reynoutrin; Flavonoids: (+) afzelechin, 11-O-brotocatechuoyl berg (+) afzelechin, avicularin, avicularin, catechin, eriodictyol-7-O—D-glucopyranoside, eriodictyol-7-O—D-glucopyranoside, 6-O-P-hydroxybenzoyl arbutin, 6-O-protocatechuoyl arbutin; 4-hydroxy benzoic acid; benzenoids: arbutin, 6-O-P-hydroxybenzoyl arbutin, 6-O-protocatechuoyl arbutin 3-(6'-O-P-hydroxy) lactone: Idehcxan-5-olide".

## Anti-Benign Prostrate Hyperplasia activity

The traditional use of the *B. ligulata* for the treatment of renal disorders has been supported by experimental studies. Anti-Benign Prostrate Hyperplasia activity of *B. ligulata* rhizomes and isolated components such as bergenin were tested against each other in albino rats to see which one was more effective. Rhizomes of *B. ligulata* inhibited the development of BPH and cell aggregation in vitro. When exposed to 1, 1-diphenyl-2-picrylhydrazyl free radicals and lipid peroxidation in the presence of lipid peroxidation, they showed antioxidant activity against these free radicals. Using an animal model of Anti-Benign Prostrate Hyperplasia activity induced by 0.75 percent ethylene glycol in drinking water, a methanolic extract (5–10 mg/kg) of *B. ligulata* rhizomes was shown to effectively inhibit the development of cells in the renal tubules, demonstrating that it is a safe and effective treatment option. In addition to other symptoms, *B. ligulata* extract has been demonstrated to alleviate polyuria, weight loss, renal function impairment, and oxidative stress, among other things.

A methanolic extract of *B. ligulata* combined with bergenin shown considerable reduction of Anti-Benign Prostrate Hyperplasia activity in both the kidney and urine components of the study. *B. ligulata* as well as *Dolichos biflorus* extracts were tested independently as well as in combination in vitro using the homogeneous precipitation methods to determine their anti-Benign Prostrate Hyperplasia (ABPH) efficacy. *B. ligulata*, on the other hand, had less activity, and the combination was shown to be less efficient than the individual extracts in the experiment. According to the findings of this inquiry, the active ingredients seems to be non-protein, non-tannin molecule/s, which may function by reducing Anti-Benign Prostrate Hyperplasia activity 38, which is thought to be the case. *B. ligulata* extract administered in

small amounts (0.25 mg/kg alcoholic extraction) increases diuresis in rats; however, high amounts (100mg per kg) reduce urine production and urea diuresis. According to the results of a comparative study, the aqueous extracts of *B. ligulata* reduced the development of Anti-Benign Prostrate Hyperplasia activity more effectively than *Tribulus terrestris* (tomato).

### Antiviral Properties

In ethnopharmacological screens, plants used in Nepalese traditional medicine, as well as *B. ligulata*, were examined for antiviral activity against a number of viruses. *B. ligulata* was shown to have antiviral activity against a variety of viruses. We used a range of in-vitro viral systems, including influenza virus/MDCK cells and herpes simplex virus/cells, to study the anti-viral activity of methanolic and hydro methanolic extracts, with ID5 extract displaying the most potent anti-influenza-viral activity. An alcoholic extract of *B. ligulata* roots was found to significantly lower levels of "alkaline phosphatase (ALP), serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT)", and total bilirubin in comparison to a control extract, indicating that the extract has hepatoprotective properties in animals. The actual mechanism of hepatoprotection, on the other hand, remains a mystery.

### The Action of a Diuretic

The diuretic activities of *B. ligulata* was determined using the Lipschitz technique and a Furosemide tablet (Aventis Pharma Limited, GIDC estate). *B. ligulata* roots (mg/kg body weight) were shown to be efficient in raising urine electrolyte concentrations of Na<sup>+</sup>, K<sup>+</sup>, and Cl<sup>-</sup>, indicating diuretic action. The active components found in the alcoholic extract of *B. ligulata* roots, such as flavonoids and saponins, were shown to be responsible for diuretic action.

### Antipyretic Properties

The antipyretic activity of wistar rats 50 was tested using the Brewer's Yeast induced pyrexia technique. Results indicated that when a dosage of 500.00 mg/kg body weight of *B. ligulata* roots was compared to a dose of 20 mg/kg of standard paracetamol, the alcoholic extracts of *B. ligulata* roots produced a significant reduction in body temperature that lasted for up to 4 hours after administration.

### Antitumor Properties

Another research looked at the anticancer efficacy of a hydroalcoholic extract of *B. ligulata* given intraperitoneally to rats. Test results against "SARCOMA-WM1256 IM" cells revealed that the hydro-alcoholic extracts of the *B. ligulata* exhibited cytotoxic activities with an ED50 on cell development at a doses of 20.00 mcg/ml, with an ED50 on cell growth at a dosage of 20.00 mcg/ml.

### Cardioprotective Properties

Hypotensive activities of a *B. ligulata* hydro alcoholic extract was tested in a variety of animal models. In dogs, a 50 mg/kg dosage administered intravenously resulted in positive hypotensive activity. The extract showed a beneficial effect on the frog's heart in both the chronotropic and inotropic domains. Using the extracts, we found that they had a negative inotropic and chronotropic impact on continuous rabbit

cardiac perfusion, which resulted in a reduction in coronary flow. The alcoholic extract, on the other hand, had no effect on the 5-HT and acetylcholine responses of isolated guinea pig ileum, despite the fact that it displayed considerable anti-bradykinin action in other experiments. It amplified the effects of adrenaline on the tracheal chain and the ileum in guinea pigs, but it had no impact on people, according to the findings.

### Acute Toxicity Research

To investigate the effects of an alcoholic extract of *B. ligulata* on healthy Swiss albino mice, tests were carried out utilising the Up and down or Stair case approaches on healthy Swiss albino mice. When tested on a 48 kg body weight, the maximum non-lethal dosage was found to be 5 g/kg, which was at the time the largest non-lethal dose that had ever been discovered. The following is a list of Bergenin's capabilities. Bergenin, an antioxidant, was shown to have a hepatoprotective effect after being incubated for 14 hours in hepatocyte medium containing 1.5 milligrammes of galactosamine, according to research. It is possible to exhibit hepatoprotective effects against galactosamine-intoxicated rat hepatocytes by suppressing the release of glutamic pyruvic transaminase and sorbitol dehydrogenase and by boosting RNA synthesis in the presence of galactosamine. CCl<sub>4</sub> treatment of primary cultured rat hepatocytes for a prolonged length of time was used to test the cytotoxicity of Bergenin in these cells. Bergenin therapy resulted in an inhibition of glutamic pyruvic transaminase and sorbitol dehydrogenase activity in hepatocytes that had been exposed to CCl<sub>4</sub>-induced toxicity:

- Foreign matter: Not More Than the 3.00%
- Alcohol soluble extractive: Not Lesser Than 11.0%
- Acid insoluble ash: Not More Than 3.00%
- Total ash: Not More Than 18.00%
- Water soluble extractive: Not Less Than 22.00%
- Dosage
- For decoction: 20.00-30.00 gm rhizomes
- "Powered rhizomes": 1 to 3 gm b.i.d.

### CONCLUSION

*B. ligulata*, also known as Pashanbheda, is a highly regarded temperate medicinal plant. Many plants have the same name in different parts of the world. To obtain the intended therapeutic effect while minimizing adulteration, appropriate identification and standardization are required. The usage of these plants on a regular basis may result in a fast decrease of their population. They will go extinct from their native habitats if they are over-exploited. As a result, strategic considerations on judicial usage as well as preservation measures, conservation, and suitable agro-technologies are critical. The necessity of the hour is to establish procedures for in-vitro culture as well as micropropagation of this critically endangered yet therapeutically promising candidate. Today, there is a complete absence of standards, including genuine identification of plant species. Only contemporary scientific factors like as taxonomic, pharmacokinetically, and phytochemical qualities may be relied upon. Such research will not only give precise scientific information for identifying problematic medications, but will also assist in establishing adequate drug standardization guidelines, which is a critical requirement at this time. The current review will aid in the appropriate identification as well as authenticity of *B. ligulata* and will

assist to future research of this prospective clinical candidates, based on botanical, pharmacogenetic, phytochemical, and pharmacological data.

#### Conflict of Interest

None declared.

#### Financial support

None declared.

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