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A REVIEW STUDY ON PASHANBHEDA IN THE TREATMENT OF VATASHTILA (BPH)

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ABSTRACT

In today's society, the prevalence of renal diseases is increasing at an alarming rate. Over the course of five years, it is predicted that 10% of males over the age of 70 have *Vatashthila* (BPH). *Vatashthila* (BPH) has increased from 18.8% to 24.5 % among the persons aged 60 and more, according to a survey performed in the United States. 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, *Vatashthila* (BPH), and calculi in the urinary system are efficiently treated with them. Some herbs aid in the preservation of renal function. Authentication of stated medicines by their Pharmacognostical data is essential before creating and suggesting such formulations in *Vatashthila* (BPH). This review paper may aid in validating and directing future research on these topics to a great extent.

Keywords: Pashanabheda, *mahakashaya*, *Vatashthila*, BPH, etc.

INTRODUCTION:

In today's society, the prevalence of *Vatashthila* (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 *Vatashthila* (BPH).[1 & 2] The prevalence of *Vatashthila* (BPH) in persons aged 60 and older increased from 18.8% to 26.5 percent during the 1986-1995 [3]. 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[4]. Diuretics are available in a wide range of modern therapies. These medications are not only effective, but they also have negative side effects.[5]. *Ayurvedic Mutrala* (diuretic) medicines are said to provide positive systemic effects in addition to the diuretic effect.

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) [6]. There is a list of ten medicines that have been mentioned. *Acharya Charaka* and Vruddha 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.

Bergenia ligulata

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

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

Kingdom: *Plantae,*

Division: *Magnoliophyta,*

Class: *Magnoliopsida,*

Order: *Saxifragales,*

Family: *Saxifragaceae,*

Genus: *Bergenia,*

Species: *ligulata*

It is a perennial herb that grows wild in India at great altitudes in the 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).

Vernacular names [7]

Assamese: Patharkuchi

Bengali: Himasagara, Patharchuri, Patrankur

Gujarati: Pakhanbheda, Pashanbheda

Hindi: Dakachru, Pakhanabhed, PakhanabhedaPatharcua, Silparo, Silpbheda

Kannada : Alepgaya, Hittaga, Hittulaka, Pahanbhedi, Pasanberu

Kashmiri : Pashanbhed

Malayalam: Kallurvanchi, Kallurvanni, Kallorvanchi

Marathi: Pashanbheda

Sanskrit: Ashmabheda,Nagbhita, Pashaanbheda, Silabheda

Tamil : Sirupilai

B. ligulata is a perennial herb that grows up to 50 cm tall and is succulent. It may be found between 1800 and 5100 meters in the temperate Himalaya (from Kashmir to Nepal) and is quite abundant in Pakistan, Central Asia, and East Asia [8.9, 10].

DESCRIPTION

B. ligulata is a perennial plant with short, thick, meaty, and procumbent stems, as well as a strong rootstock. At flowering season, the leaves are oval or circular, and 5-15 cm long (Flowering period March- May). Autumn leaves become a vivid crimson color with short stiff hairs and reach a length of around 30 cm. The upper and bottom surfaces of the leaves are hairy at first, but as they age, they become virtually hairless.

Flowers are white, pink, or purple, and measure 3.2 cm in diameter. They form a cymose panicle with a flexible blooming stem that is 10- 25 cm tall and leafless, with styles[11, 12].

MACROSCOPIC FEATURES

The rhizomes are firm, barrel-shaped, and cylindrical in form, approximately 1-3 cm long and 1-2 cm wide. Small roots, ridges, furrows, wrinkles, and root scars cover the exterior surface, which is brown in hue. It has a fragrant scent and astringent flavor [13, 14].

Features at a microscopic level: Cork is split into two zones in a transverse slice of the rhizome: outer and inner. The outer zone is made up of a few layers of slightly compressed brown-colored cells, whilst the inner zone is made up of multilayered thin walled, tangentially elongated, and colorless cells. Cork is

followed by two to three layers of secondary cortex and a single layered cambium. Most cortical cells contain huge rosette crystals of calcium oxalate (CaC2O4) and starch grains, while a small zone of parenchymatous cells has a few simple starch grains. There is no endodermis or pericycle, but there are vascular bundles organized in a ring.

Cambium is a continuous ring of thin-walled, tangentially elongated cells with two to three layers. Fibers, tracheid's, vessels, and parenchyma make up the xylem. Large pith comprised of round to oval parenchymatous cells containing starch grains with CaC2O4 crystals similar to those seen in the cortical area occupy the center. Perforation plates are seen on one or both ends of vessels with simple pits, and helical thickenings are found on tracheid's [11, 13, 14, 15.]

ETHNOMEDICAL CLAIMS AND TRADITIONAL USE:

The plant *B. ligulata* is used in various Indian languages, with local variants, to suggest that the plants grow between rocks, breaking them, or that they have lithotripsic properties.

According to ethnobotanical and ethnomedicinal literature, the roots of *B. ligulata* have cooling, laxative, analgesic, abortifacient, and aphrodisiac properties and are used in the treatment of vesicular calculi, urinary discharges, excessive uterine hemorrhage, bladder diseases, dysentery, menorrhagia, splenic enlargement, and heart diseases in Ayurveda

It's also an absorbent that's used to treat dysentery. When youngsters in Sind (Pakistan) are teething, the root is rubbed down and fed to them with honey. The leaves are crushed in a mortar in Indo-China, and the liquid is used to treat ear-aches. [16].

For *Vatashthila* (BPH), a hot water extract of the entire dried plant of *B. ligulata* has been used orally [17]. In Nepal, human adults were given 10 g of *B. ligulata* rhizome paste or juice, mixed with molasses, twice a day for 3-4 days as an anti-helminthic for the expulsion of roundworms and the treatment of colds[18, 19]. *B. ligulata* dried roots have been used topically for cuts, boils, wounds, and burns in India; its oral infusion has been used to treat dysentery; and its rootstock has been used as a masticator by human adults.[20]. Human adults use a decoction of fresh *B. ligulata* roots orally to cure *Vatashthila* (BPH), urinary problems, stomach disorders, and urogenital complaints[21, 22]. It is also claimed that its hot water extract has been utilized topically for the treatment of ophthalmia[23] 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 [24, 25, 26, 27, 28, 29]. (+)-afzelechin, leucocyanidin, gallic acid, tannic acid, methyl gallate [30], (+)-catechin, (+)-catechin -7-O-ß-D-glucopyranoside, 11-O- galloyl *bergenin*; and a lactone, Paashaanolactone[31]. It also includes sterols such as sitoindoside I, ß-sitosterol, and ß-sitosterol-D-glucoside, as well as glucose (5.6%), tannin (14.2-16.3%), mucilage, and wax. Coumarins: *bergenin*, 11-0-galloyl *bergenin*, 11-O-P-hydroxy-benzoyl *bergenin*; 11-O-brotocatechuoyl *bergenin*, 4-0-galloyl *bergenin*; 11-O-brotocatechuoyl *bergenin*; 11-O-brotocatechuoyl *bergenin*; 11-O-brotocatechuoyl berg (+) afzelechin, avicularin, catechin, eriodictyol-7-O—D-glucopyranoside, reynoutrin; Flavonoids: (+) afzelechin, 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 [31, 32].

Anti-Benign Prostrate Hyperplasia activity.

Experimental investigations [33,34,35] back up the traditional usage of *B. ligulata* for renal problems. In albino rats, the Anti-Benign Prostrate Hyperplasia activity of a methanolic extract of *B. ligulata* rhizomes and isolated components such *bergenin* were compared.

In vitro, *B. ligulata* rhizomes prevented BPH formation and aggregation of cells, as well as having an antioxidant effect against 1, 1-diphenyl-2-picrylhydrazyl free radical and lipid peroxidation.Methanolic extract (5–10 mg/kg) of *B. ligulata* rhizomes reduced the Cell formation in the renal tubules in a modified animal model (male wistar rats) of Anti-Benign Prostrate Hyperplasia activity caused by 0.75 percent ethylene glycol in drinking water. *B. ligulata* extract also reduced polyuria, weight loss, renal function impairment, and oxidative stress.[36] Both in kidney and urine components, a methanolic extract of *B. ligulata* with *bergenin* showed significant dissolving of Anti-Benign Prostrate Hyperplasia activity [37].The homogeneous precipitation technique was used to investigate the Anti-Benign Prostrate Hyperplasia activity of different extracts of *B. ligulata* and Dolichos biflorus separately and in combination in vitro. B. ligulata, on the other hand,

showed less activity, and the combination was not as effective as the separate extracts. The active constituents appear to be non-protein, non-tannin molecule/s, which may operate by inhibiting Anti-Benign Prostrate Hyperplasia activity [38], according to the results of this investigation. In rats, low doses of *B. ligulata* extract (0.5 mg/kg alcoholic extract) increase diuresis, whereas larger doses of 100 mg/kg decrease urine output and urea diuresis.The aqueous extracts of *B. ligulata* inhibited the development of Anti-Benign Prostrate Hyperplasia activity more effectively than Tribulus terrestris in a comparison investigation.

ANTIVIRAL PROPERTIES

Plants utilized in Nepalese traditional medicine, as well as B. ligulata, were tested for antiviral efficacy in ethno-pharmacological screens[39]. In-vitro viral systems, such as influenza virus/MDCK cells and herpes simplex virus/ cells, were used to test methanolic and hydro methanolic extracts, with ID5 extract showing the strongest antiinfluenza-viral activity.

The levels of serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT),[40] alkaline phosphatase (ALP), and total bilirubin were significantly lower in animals treated with alcoholic extract of *B. ligulata* roots compared to control, indicating that the extract has hepatoprotective properties. However, the mechanism of hepatoprotection is yet unknown[41].

THE ACTION OF A DIURETIC

The diuretic activity 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+, K+, and Cl-,[42] 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. The results showed that the alcoholic extract of *B. ligulata* roots had substantial antipyretic action at a dose of 500 mg/kg body weight when compared to conventional paracetamol at a dose of 20 mg/kg, with a significant drop in body temperature lasting up to 4 hours after delivery[43].

ANTITUMOR PROPERTIES

Another research looked at the anticancer efficacy of a hydroalcoholic extract of *B. ligulata* given intraperitoneally to rats.

The hydroalcoholic extract of *B. ligulata* displayed cytotoxic action with an ED50 on cell growth at a dosage of 20 mcg/ml, according to test findings against SARCOMA- WM1256 IM.

CARDIOPROTECTIVE PROPERTIES

The hypotensive activity of a *B. ligulata* hydroalcoholic 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 had a positive chronotropic and inotropic impact on the frog's heart. The extracts had a negative inotropic and chronotropic effect on continuous rabbit cardiac perfusion, resulting in a decrease in coronary flow.

The alcoholic extract had significant anti-bradykinin action (both in vivo and in vitro), but had no effect on 5-HT and acetylcholine responses in isolated guinea pig ileum. It enhanced the effects of adrenaline on the tracheal chain and ileum in guinea pigs.

ACUTE TOXICITY RESEARCH

The alcoholic extract of *B. ligulata* was tested on healthy Swiss albino mice with a body weight of 25-35 g utilizing the Up and Down or Stair case technique.[44] The highest non-lethal dosage was discovered to be 5 g/kg for a body weight of 48 kg. *Bergenin*'s functions[45].

Bergenin was shown to have a hepatoprotective effect when it was incubated in hepatocyte medium for 14 hours with 1.5mM galactosamine[46]. Hepatoprotective effects against galactosamine-intoxicated rat hepatocytes might be achieved by blocking the release of glutamic pyruvic transaminase and sorbitol dehydrogenase and boosting RNA synthesis[47]. *Bergenin* was evaluated in primary cultured rat hepatocytes for CCl4-induced cytotoxicity[48]. *Bergenin* inhibited the glutamic pyruvic transaminase and sorbitol dehydrogenase activity produced by CCl4-intoxicated hepatocytes.[49,50]

Foreign matter: Not More Than 3.0%

Total ash: Not More Than 18.0%

Acid insoluble ash: Not More Than 3.0%

Alcohol soluble extractive: Not Less Than 11.0%

Water soluble extractive: Not Less Than 22.0%

DOSAGE:

Powered rhizomes: 1-3 gm b.i.d.

For decoction: 20-30 gm rhizomes

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 and conservation, preservation measures, and suitable agro-technologies are critical. The necessity of the hour is to establish procedures for in-vitro culture and 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 and authenticity of *B. ligulata* and will assist to future research of this prospective clinical candidate, based on botanical, pharmacogenetic, phytochemical, and pharmacological data.

Conflict of interest – None

Source of Finance – Nil

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