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POLYPODIUM VULGARE LINN. A VERSATILE HERBAL MEDICINE: A REVIEW

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ABSTRACT

Polypodium vulgare Linn. also called as Bisfaij in Unani system of medicine is a perineal fern growing to a height of 30cm. *Polypodium vulgare* Linn. rhizome is used in European, American, Chinese, and Unani and Ayurveda traditions. It is claimed to be efficacious in jaundice, dropsy, scurvy and combined with mallows it removes hardness of the spleen. The distilled water of the roots and leaves is considered good for ague (malarial fever), and the fresh or dried roots, mixed with honey and applied to the nose, were used in the treatment of polypus The fresh root is used in the form of decoction, or powder for melancholia and also for rheumatic swelling of the joints. The rhizome extract was found to possess anti-epileptic activity. The ecdysones present in the rhizome (0.07%-1% dry weight)was seen to act topically on a wide variety of arthropods and caused abnormal molting and death, so ecdysone analogues may be useful not only as insecticides but also miticides. The aqueous extract of *Polypodium vulgare* Linn. was found to possess analgesic activity, protective effect in various neurological and neurodegenerative disorders, stimulatory effect on the adrenoceptors, and antioxidant properties.

INTRODUCTION: The use of *Polypodium vulgare* as a drug dates back to ancient Greece. Theophrastus and Dioscorides, both mentioned its purgative properties in the classical texts. The Greek physician Dioscorides, writing in the 1st century AD, noted that polypody was used to purge phlegm and was an ingredient of a plaster applied to dislocated fingers and to sores that occur between the fingers [1].

Pliny (2637) says that the root of polypadion , known to us as *filicula,* is used medicinaly, being fibrous and of a grass green colour within, about the thickness of the little finger, and covered with cavernous suckers like those on the arms of the polypus [2]. The Persians call the plant Tashtiwan and Baspaik; the latter name in the Arabic form of Basfaij is now current throughout the East as the name of the drug , and is used by Ibn Sina and the Arabian physicians. The Arabian names for the plant are, Azras-el-kalb "dog's tooth," in allusion to the toothed appearance of the leaves, kathir-el-rijl "many –footed," and Thakib- el-hajar "penetrating stones" [3].

In Germany there was a myth in ancient times that the plant sprang from the milk of goddess Freya, and in more recent times the virgin Marry was credited with its origin. Owing to the sweetness of the rhizome , it is , in some parts of France , called "reglisse" or "liquorice".

Polypodium vulgare rhizome is used in European, American, Chinese, Unani and Ayurvedic traditions, the medicinal and therapeutic uses of the drug is thoroughly documented in old classical texts. The thick

stems were earlier used as remedy for the disease of air passages, such as cough, colds, adenoids, and multitude of other purposes. The stem has a sweet taste like that of liquorice, as indicated in Danish and Swedish names, but an acrid after-taste [4]**.** The polypod rhizome was cooked with milk and sugar against the common cold , and with liquorice and candy-sugar as a cure against respiratory catarrhs [5]. *Polypodium vulgare* rhizome was also used as a sweetener [6].

The American Indians used root tea for pleurisy, hives, soar throats, stomachaches; poultice root for inflammations. Historically, root steeped in milk was used as a laxative for children [7]. *Polypodium vulgare* was considered an important drug for lung and liver ailments. Tea made from the rhizome was used for liver ailments, pleurisy, worms [8]**.**

Polypodium vulgare is a perineal fern growing to a height of 30cm(1 ft). It is tolerant fern to drought and can withstand successive dry periods in its life cycle. It has slender knotty rhizomes and curving fronds that are dotted with brown spores (sori) on their lower surface [1]. The name is derived from poly (many) and pous, podos (a foot) [9, 10]. The rhizome has a distinctive taste, rather like liquorice [11]. The root has a unique, rather unpleasant odour, and a sweet flavor at first, but then becomes nauseating [8].

Polypodium vulgare is tetraploid, and it is believed to have arisen by chromosome doubling of a sterile diploid hybrid between two species which are not known in Europe One of the parent species may be the North American *Polypodium virginianum*, or *Polypodium glycyrrhiza*. Biochemical data point to a species from eastern Asia as the second possible parent [12].

Botinical Description:

Taxanomical classification:

Kingdome	:	Plantae
Division	:	Pteridophyta
Class	:	Pteridopsida
Order	:	Polypodiales
Family	:	Polypodiaceae
Genus	:	*Polypodium*
Species	:	*P. vulgare*

Binomial name : *Polypodium vulgare* Linn.[13].

Vernacular names:

Azrasul kalb	:	Arabic
Saquibal Hajer	:	Arabic
Kasirul arjil	:	Arabic
Teshmeez	:	Arabic
Barzia	:	Arabic
Bispaik	:	Persian
Bazbodia	:	Latin
Pishnen	:	Barbary
Ashtiwan	:	Egyptian
Khankali, Kala bichwa, Bisfaija	:	Hindi
Common polypod	:	English [14, 15]

Distributional Range: *Polypodium vulgare* is native to Europe, Africa and eastern Asia, mostly in northern or upland areas. The common polypody is found up to an altitude of 2000 m. *Polypodium vulgare* is a common species almost throughout Scandinavia, especially in the southern part of the area, and along the Atlantic cost of Norway nearly to the North Cape. The total area of the species is not well known according to the present delimitation. There are some closely related species found in America and eastern Asia. *Polypodium vulgare* is almost found in every country of Europe [4]**.**

Morphological Description: *P. vulgare* is a small, winter green fern, and may grow into large colonies. They are terrestrial or epiphytic ferns, with a creeping, densely hairy or scaly rhizome bearing fronds at intervals along its length. The fern is rather thick, creeping and ramifying having scaly stems, and long stalked, usually 10-30 cm. The stem scales are narrowly triangular, red-brown in colour, variable in size, usually up to 4 mm long.

It has long, glabrous, dull green, pinnatisect to pinnatifid leaves, borne alternately in two rows on the upper side of the stem. The veinlets usually divide 2-3 times. The blades of leaves are one to three times longer than the petiole. The texture of leaves is firmly herbaceous to slightly leathery. The pinnae are entire, with entire or crenate margins, more deeply serrate. It has round; brownish yellow to rusty brown sori in two rows on the dorsal side, one on each side of the midrib, mainly in the upper half of the blade.

These are deep reddish brown when the sporangium is yellow and mature, appearing as a thin brown line when seen with hand lens. The spores are strikingly yellow, bean-shaped, with a warty – folded surface 60-75 µm long [4].

Polypodium vulgare Linn. rhizome occurs in pieces of various lengths, and thickness of a quill. The rhizome is flattened, of a yellowish-brown colour externally, green internally, but when old yellowish. The upper surface of the rhizome is studded with tubercles, to some of which a portion of the base of the frond still adheres. The under surface is more or less spinous from the remains of broken radicles. The taste is sweetish, astringent, nauseous, and somewhat acrid. Under microscope, the rhizome is seen to consist of a delicate cellular structure containing much starch and green granular matter. It is traversed by large bundles of scalariform vessels [2]**.**

Pharmacology: According to the Unani system of medicine *Polypodium vulgare* Linn. rhizome is administered in various forms like powder, decoction etc the dosage also varies:

Powder : 6-10gm

Decoction : 10-15gm [15, 16]

Most of the Unani physicians are of the view that the temperament of the *Polypodium vulgare*, is hot in second degree and dry in third degree H^2D^3. [16,17,18] **a**nd the fallowing pharmacological effects have been observed:

Cholagog [19]
Expectorent [1, 20]
Purgative, Diuretic, Laxative [21]
Digestive [16]
Antispasmodic [19]
Antiepileptic [22]
Hypothermic and antipyretic [22]
Analgesic activity [22]

Phytochemical studies: Phytochemical research has shown that *Polypodium vulgare* Linn. rhizome contain butyric, hexoic, lauric and succinic acids, methyl salicylate [8, 23] butyric, isovaleric and α-methylbutyric esters; a fatty oil acting as an energetic purgative; a resin [24] another resin containing benzylic alcohol and its esters which is strongly anthelmintic (a glucoside samambain [1, 22, 25, 26] and saponins Cyclolanostanic triterpenes-cyclolaudenol, 9(11)-fernene, 22-hopene and 17, 21-epoxyhopane have been isolated from rhizomes.

Polypodin A (ecdysterone), polypodin B(5β-hydroxy ecdysterone), glucocaffeic acid, polydine have also been isolated and have been found to offer certain characteristic medicinal properties to the rhizome of Polypodium vulgare [3]. The saponin osladin has been found in Polypody rhizomes, and is responsible for the sweet taste . In addition to osladin, another saponin, polypodosaponin, has been isolated from the rhizomes [27].

Medicinal use:

Apprient (*Mushile balgam wa sauda*): It purges out black bile without causing gripes, phlegm and aqueous chime. Due to this property the drug has wide application in bilious disorders [16, 18, 28, 29].

Cardio tonic (*Muqawwie Qalb*): It improves the functioning of the heart by purifying the heart muscles from toxic effects of abnormal black bile and over all gives the patient a sense of well being [16, 18, 28, 29].

Digestiv (*Haazim*): The rhizome of *Polypodium* has been found to assist in digestive processes and mainly helps in the digestion of milk by causing first it precipitation and later fallowed by its dissolution and thus relives the patient of flatulence and dyspepsia [16, 18, 28, 29].

Antispasmodic (*Dafae qoulanj*): *Polypodium vulgare* has been used as an antispasmodic agent and has found effective in various types of colics. Along with some other drugs like Aniseed and Liquorice , it is found to give relief in cough and bronchospasm [16, 18, 28, 29].

Antiepileptic: The drug has been found to be effective in epileptic disorders along with Amaltas and drug has been reported to be effective in cracks of inter phalyngeal spaces, claw hand, acne, indolent tumours and rheumatic pain on topical application. The drug has been used also in powder form as snuff in polypus of nose [30].

Other functions*:* The drug is beneficial in piles, leprosy and melancholia when used with amaltas in decoction form. In rheumatic disorders, it has been recommended along with chicken soup or qurtum [16, 18, 28, 29].

New Research:

Antiviral Properties: An extract of polypody rhizome, in a preliminary study, showed the antiviral properties tested on cell culture (Buffalo Green Monkey) [31].

As an insecticide: The ecdysones present in the rhizome (0.07%-1% dry weight) of *Polypodium vulgare* act topically on a wide variety of arthropods and cause abnormal moulting and death , so ecdysone analogues may be useful not only as insecticides but also miticides [32].

Neuro-psychopharmacological activity: The aqueous extract of the *Polypodium vulgare* Linn showed Neuro psychopharmacological activity. Its administration showed decreased alertness, mild passivity and decreased locomotor activity in mice and rats [22].

Anti-epileptic Activity: The polypod rhizome extract was found to possess anti-epileptic activity [22].

Anti pyrectic Activity: The extract caused gradual fall in rectal temperature of rats. Furthermore, administration of the extract in the same dose significantly prevented or reduced the pyrexial response of TAB injection in rabbits [22].

Analgesic Activity: The aqueous extract of *Polypodium vulgare* was found to possess analgesic activity by increasing the reaction time in rats, post administration [22].

Hypotensive Activity: At low doses the extract produced a fall in blood pressure in anaesthetized dogs, which was rapid in onset and short in duration. However, a fall followed by a rise in blood pressure was observed with high doses.

The hypotensive effect appears to be due to vasodilatation due to ß-adrenergic receptor stimulation. It has been suggested that the hypotensive activity mentioned above, may be caused by catechins [22].

Antibiotic Activity: The polydin present in dried polypody rhizome has been found to possess antibiotic activity and hence used in cough and cold [27].

Precaution: *Polypodium vulgare* is considered harmful for kidneys and lungs. It also sometimes causes nausea [16, 18, 28, 29].

CONCLUSION: The rhizome of *Polypodium vugare* Linn. has been used in a multitude of diseased conditions since from ages. The medicinal property of the *Polypodium vulgare* has been variedly described in different types of traditional medicines like Unani, Ayurveda, European and American. The traditional use of the rhizome has been thoroughly documented in classical texts of different traditional systems of medicine. The rhizome were earlier used as a remedy for diseases of the air passages, such as coughs, colds, adenoids, and a multitude of other purposes like melancholia and also for rheumatic swelling of the joints.

Polypody root is a laxative [21] In Europe herbal medicine, it is used as a treatment for hepatitis and jaundice, and as a remedy for indigestion and loss of appetite [26]. It was found to be efficacious in jaundice, dropsy and scurvy and combined with mallows removes polypus and hardness of the spleen [33]. Polypody root is described as a soothing, demulcent stimulant, influencing the mucous membrane of the alvine canal and respiratory organs **.** The polypody root has a proved tonic effect in dyspepsia and is alterative in skin diseases. The saponin in the fresh plant of polypody acts as a cough suppressant [34].

Phytochemical studies have shown that the rhizome of test drug Bisfaij (*Polypodium vulgare* Linn.) contains different pharmacologically active constituents: Polypodin A and polypodin B having protective effect in various neurological and neurodegenerative disorders**.** Caffic acid from Bisfaij (*Polypodium vulgare* Linn.) has stimulatory effect on the adrenoceptors, and has antioxidant properties [35].

Polypodin A attenuates the neuroleptic effect of apomorphine in laboratory animals [36]. The test drug contains saponins, flavonoids, tannins and other constituents which have been shown to possess activity against many CNS disorders [37, 38].

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