Ethnomedicinal Uses of Some Pteridophytic Species From North India

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Abstract

During ethnobotanical explorations of different forest divisions from 1998 to 2005 in Uttar Pradesh and Uttarakhand states of northern India, the authors have recorded a large number of information regarding the uses of higher plants for medicine. This field study has also yielded information on some 11 pteridophytic species that are widely used by the tribal and other rural communities of the area as folk medicines for treatment of various disorders. A comparison with relevant literature revealed that many uses are hitherto new or imperfectly known. Hence, an attempt has been made to highlight ethnomedicinal value of such species in the present report. It lists eleven species of medicinal ferns. Each entry has been provided with correct botanical and prevalent local names, habit and habitat, claimed medicinal use (s) and other observations.

Keywords: Folk medicine, Medicinal ferns, Pteridophytes, Uttar Pradesh, Uttarakhand.

Introduction

Pteridophytes, which include the ferns and fern allies, are a group of ancient vascular plants with worldwide distribution. They are represented by about 305 genera, comprising more than 10,000 species all over the world (Singh and Viswanathan, 1996; Parihar and Parihar, 2006). Pteridophytic vegetation greatly contributes to the earth's plant diversity. These primitive vascular plants form an important and dominant component of many plant communities. The India has a rich and varied pteridophytic flora due to its diversified topography, variable climatic conditions and soil types. About 191 genera and more than 1000 species of pteridophytes have been reported from different regions of India (Dixit, 1984; Dixit and Vohra, 1984; Bir, 1977, 1992; Chandra, 2000). Majority of the members prefers shady and hygroscopic conditions for prolific growth (Bir, 1993), but also occur throughout in an extra ordinary range of habitats (Shankar and Khare, 1994; Vasudeva, 1999; Srivastava, 2007; Kumar and Kaushik, 1999). Like the other group of plants, pteridophytes are also show medicinal value. People throughout the world have been utilizing many ferns as medicine for the treatment of different diseases and conditions since ancient times. Caius (1935) has described the medicinal and poisonous ferns of India. Besides, Das (2003), Kaushik and Dhiman (1995), Manickam (1999), Nayar (1959), Singh (1999), Watt (1959) have also described medicinal uses of some pteridophytes of India. Furthermore, Dhiman (1998), Dixit and Singh (2004), Kumari *et al.,* (2011), Padala (1998), Puri (1970), Srivastava, (2007a), Trivedi (2002), Vyas and Sharma (1998), have much

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contributed to the knowledge of ethnobotany and medicinal uses of pteridophytes. A number of authors have also reported many medicinal ferns used by the rural and tribal communities in different parts of northern India (Gaur and Bhatt, 1994; Joshi, 1997; Kholia and Punetha, 2005; Sharma, 1985; Siddiqui and Husain, 1991; Singh *et al*., 1989; Singh and Roy, 1986; Srivastava, 2007b; Srivastava et al., 2013; Upreti *et al*., 2009; etc.). In the present paper we have reviewed and analysed some useful information on 11 species of pteridophytes that are used in folk medicine and very well known to indigenous communities of various forests of this region of the country. This contribution is an addition to the above reports.

Material and Methods

Plant materials for the present study were obtained from the data recorded during ethnobotanical explorations of various forest divisions like Kashi, Moradabad, Pilibhit, Shivalik of Uttar Pradesh and Haldwani, Kalsi, Nainital, Pithoragarh, Ramagar of Uttarakhand. Fieldwork was carried out in different seasons from 1998 to 2005. The data were collected according to the methodology of Singh and Ali (1992). The identification of some specimens was finally confirmed by matching with the specimens at the herbarium of Forest Research Institute, Dehradun (DD). For compilation of data, all medicinally important pteridophytic species are arranged in alphabetic order by their botanical names with respective family in parenthesis, local name, locality and voucher specimen number, habit and habitat, ethnomedicinal use (s). This is followed by a remark on presence of major chemical constituents. All the specimens were preserved in the herbarium of Survey of Medicinal Plants Unit, Regional Research Institute of Unani Medicine, Aligarh (U.P.), India.

Observations

1. *Adiantum capillus-veneris L.* (Adiantaceae)

Local name:	*Hansraj*
Locality and F. B. No.:	Shivalik (9171), Moradabad (5225)
Habit and habitat:	A small fern with short-creeping, dark brown, densely scaly rhizome. Plants grow in crevices of shady rocks and forms dense clusters.
Ethnomedicinal use (s):	About 20g of dried fronds are boiled in 100ml of water. This decoction with powder of few black peppers and little honey is given two times a day for 30-45 days in asthma.

Chemical constituents: Tannin, kaempferol, quercetol, astragalin, lutelol, rutin, triterpinoid, isoquercitrin, nicotiflorin, querciturone and flavonoids naringenin, hesperidin sulphuretin and genistein.

2. *Adiantum incisum* Forsk. (Adiantaceae)

Local name: *Hansraj, Hansavati*

Locality and F. B. No.: Pilibhit (5942)

Habit and habitat: A small terrestrial herb. Found in shaded localities in crevices of rocks in the forest.

Ethnomedicinal use (s): Frequent chewing of fresh fronds is recommended in stomatitis.

Chemical constituents: Adiantone, isoadiantone, triterpenes-fernene, hentriacontane, hentriacontanone, â-sitosterol.

3. *Adiantum philippense* L. (Adiantaceae)

Local name: *Chandni Buti*

Locality and F. B. No.: Haldwani (6336)

Habit and habitat: A tufted fern, 8-22mm in size, densely covered with fibrous root, scales and leaf bases. Commonly grows along the roadsides in the forest under moist situation in low mountainous region.

Ethnomedicinal use (s): Fresh fronds with leaves of 'kasni' *(Cichorium intybus* L.) in equal quantities are boiled in water and liquid strained. One cup of the resulting decoction is taken twice daily for irregular menses.

Chemical constituents: Flavanoids, hesperidin and sulfuretin.

4. *Ampelopteres prolifera* Copeland (Thelypteridaceae)

Local name: *Lukra*

Locality and F. B. No.: Pilibhit (5939)

Habit and habitat: A terrestrial fern. Fronds erect and tufted. Commonly found in moist and shady places.

Ethnomedicinal use (s): Frond paste is used as antipyretic.

Chemical constituents: Protein, steroids, triterpinoids, flavones, flavonoides, sugars.

5. *Cheilanthes farinosa* (Forsk.) Kaulf. (Cheilanthaceae)

Local name:	*Chhapa Ghans*
Locality and F. B. No.:	Kalsi (9648)
Habit and habitat:	Erect herb, about 8cm high. Fronds white beneath. Abundantly grows in dry situations and exposed places.
Ethnomedicinal use (s):	Brown stipe is used by females as nose and ear studs. In cases of cows, dried powder of the frond is sprinkled externally on prolapsed uterus and then the uterus is pushed inside.
Chemical constituents:	Cheilanthatriol, cheilarinosin, kaempferol, quercetin, flavonoides, naringenin and dihydroquercetin and phenols.

6. *Diplazium esculentum* (Retz.) Sw. (Athyriaceae)

Local name:	*Leungra*
Locality and F. B. No.:	Nainital (7197)
Habit and habitat:	A large fern with an erect stout caudexes. Commonly found on damp and marshy places.
Ethnomedicinal use (s):	Young shoots are cooked and taken for indigestion.
Chemical constituents:	Protein, vitamin B, iron, calcium phosphorus, steroids, triterpenoids, flavonoides, flavones, sugar.

7. *Equisetum arvense* L. (Equisetaceae)

Local name:	*Hadjoran*
Locality and F. B. No.:	Pithoragarh (8097)
Habit and habitat:	Herb with jointed and hollow stems. Found along ditches.
Ethnomedicinal use (s):	Stem paste mixed with powdered alum is plastered around the fractured limb. Splints and bandages are used to hold the bones and plaster in position.
Chemical constituents:	3-methoxy pyridine, nicotine, palustine, thymine, dimethyl sulphone iso-quercitrin, galiteolin, equisetrin, equisetonin, aconitic acid, kaempferol, quercetin, epigenin, vitamin c, lipids, sterols.

8. *Equisetum ramosissimum* Desf. (Equisetaceae)

Local name:	*Joratora, Hadjor, Sarset*
Locality and F. B. No.:	Moradabad (5246), Pilibhit (5933), Shivalik (9161); Nainital (7150), Haldwani (6150).
Habit and habitat:	A plant with creeping rhizome and ribbed as well as jointed stems. Found in shady or gravely soil along stream and riverbanks in moist or exposed situations.
Ethnomedicinal use (s):	A paste of the plant is mixed with little slaked lime and plastered around the fractured limb after setting the bones right. The paste of the aerial parts is given orally to expel small kidney stones. Fresh juice of aerial parts is applied on burns for healing and to prevent scar. Plant juice is used as ear drops for earache.
Chemical constituents:	Phenols.

9. *Helminthostachys zeylanica* (L.) Hook. f. (Helminthostachyaceae)

Local name:	*Kamraj, Kamrajvati*
Locality and F. B. No.:	Pilibhit (5939), Haldwani (6431), Ramnagar (6602)
Habit and habitat:	A terrestrial and perennial fern with creeping rhizomes. It flourishes well as undergrowth, chiefly in the forest of Sal. It is restricted to Tarai region of Uttar Pradesh and Uttarakhand. This is an endangered species.
Ethnomedicinal use (s):	Rhizomes with few grains of black peppers are ground to make a fine paste. About 10g of this paste are given with milk two times a day, for 15 days in leucorrhoea. It is also used as nutritive tonic for impotency.
Chemical constituents:	Ugonins, Stigmasterol, fucosterol and dulcitol.

10. *Lygodium flexuosum* (L.) Sw. (Lygodiaceae)

Local name:	*Kalijar*
Locality and F. B. No.:	Pilibhit (5979)
Habit and habitat:	A terrestrial climbing fern. Commonly grows on bushes and trees or trailing on the ground along the edges of forest in gravelly and sandy soil.

Ethnomedicinal use (s): Fresh root is rubbed on a stone and the paste thus obtained is given with mother's milk to the infants as an anti diarrhoeal agent. Root paste is mixed with powder of black peppers and given for cough.

Chemical constituents: Tryptophan, tryptamine, indole-3-acetic acid, -3-propionic acid, -3-butyric acid and 3-acetonitrile.

11. *Selaginella bryopteris* (L.) Bak. (Selaginellaceae)

Local name: *Pattharchati*

Locality and F. B. No.: Kashi (7809)

Habit and habitat: Lithophytic herb up to 15cm high that occurs on rock boulders and forming thick, green carpet during rainy season. Leaves curled up in dry weather but retain original colour and shape if dipped upside down in water for some time.

Ethnomedicinal use (s): About 12-15g of the leaf paste are given orally twice daily for one month to treat spermatorrhoea.

Chemical constituents: Hexoses and proteins.

Fig.1 *Helminthostachys zeylanica* (L.) Hook. f.

Fig.2 *Cheilanthes farinosa* (Forsk.) Kaulf.

Discussion

This communication provides a report on ethnomedicinal uses of some important species of pteridophytes revealed by the indigenous people belonging to different forest divisions of Uttar Pradesh and Uttarakhand in northern India. The uses were mostly related to the disorders of digestive, integumentary, musculoskeletal, respiratory and urino-genital systems. The data are authentic and obtained from the knowledgeable village elders and local healers. Leaves are the most commonly utilized plant part in herbal preparations which are used internally in the form of decoction and paste. Data on medicinal uses were analyzed and compared with relevant literature (Anonymous, 1948-1976; Benjamin and Manickam, 2007; Benniamin, 2011; Bharti, 2011; Chopra *et al*., 1956; Jain, 1991; Kirtikar and Basu, 1935; Kumari *et al*., 2011; Nadkarni, 1954; Sharma, 2002; Parihar, and Parihar, 2006; Rout, et al., 2009; Singh and Singh, 2012; Upreti *et al*., 2009; Watt, 1889-1892) and it was found that uses of some species were similar to information already published in the literature. However, majority of these claims are new and imperfectly known and enrich our existing traditional knowledge on medicinal ferns.

Reported species deserve accurate scientific screening and evaluation to demonstrate the effectiveness, safety and establishment of proper dosages. As, these claims are based on ancestral knowledge and empiric experience. Moreover, many pteridophytes contain poisonous substances and carcinogenic factors. A well-known true Maidenhair fern *(Adiantum capillus-veneris*) is not suitable for pregnant women as it is known to be a contraceptive. An excessive dose of the fern can lead to muscular weakness, coma and even injury to the eyes. Such studies on toxicity, pharmacological actions and chemical constituents are very essential to analyse the chemicals of these plants and the implication on health.

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