Flora of Pakistan: An ethnopharmacological perspective

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ABSTRACT

Ethnopharmacology relies on the knowledge and use of traditional medicinal plants in various human diseases. These plants are a source of nutritional, medicinal and financial support to a greater part of Pakistani population, both in rural and urban setting. Either in the crude form or prepared pharmaceutical formulations, these plants are considered an essential part of the health-care and support system. Being regulated mainly as a part of the Complementary and Alternate Medicine, the plants and their products are used for the treatment of ailments of different organ systems. Their applications vary from being used as tonics, protectants and aids to being used as cytotoxic and antibacterial agents. Pakistan has a variety of biogeographical components which serves as a rich source of medicinal plants. With a deep-rooted history of Unani and Ayurvedic systems in Pakistan, the empirical knowledge about these plants has passed from one generation to the next. Some of these have also been recorded in the historical books of medicine and the components derived from them, now form an essential part of the modern-day pharmaceutical industry. This review provides the information of the flora of medicinal importance acquired from the various parts of Pakistan. The detailed information will help the researchers to develop an understanding about the biological activity and efficacy of phytochemical present in these plants.

Keywords: Ethnopharmacology, therapy, phytochemical, complementary and alternate medicine.

Introduction

The Islamic Republic of Pakistan is located in the western part of South Asia. It comprises of five main administrative regions stretching from the north to the south as Gilgit-Baltistan and Kashmir, Khyber Pakhtunkhwa, Punjab, Baluchistan and Sindh. There is a diverse climatic variation in these regions.¹ The country enjoys all the four seasons. However, there is a considerable variation in the temperature range and duration of each season.

Pakistan has an agriculture-based economy. Moreover, due to a variety of climatic and biogeographical conditions, the country enjoys a wide floral diversity. A greater part of the population is dependent on plants to derive their nutritional, medicinal and financial sustenance. Due to the un-availability of basic medical facilities in the far-flung areas, these medicinal plants are used in a variety of formulations including extracts, decoctions, syrups, poultices, lozenges and elixirs. These plants, hence, form an essential component of the health-care system of the country. Due to an ever-changing climatic conditions, there is a constant threat of various biotic and abiotic stress factors to the food crops, cash crops and medicinal plants.² ³ ⁴ Efforts should be made to ensure that such threats are addressed appropriately to continue and develop the health care system based on indigenous plants. The current manuscript reviews the flora of medicinal importance belonging to the various regions of Pakistan.

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Gilgit Baltistan and Kashmir:

Gilgit Baltistan is the northern most part of Pakistan. The average altitude is 1500m and is a tourist destination in almost all seasons. Health care facilities are scarce especially in far flung areas and doctor to population ratio is alarmingly disproportionate. Due to lack of advance healthcare facilities the use of plants for treatment of various ailments is practiced since ages in the region.

Researchers have reported a number of local plants for medicinal use. The whole plant of Equisetum arvense L. (chihly) is used for kidney stones. Allium carolinianum DC. (khush) is used for swellings, dysentery and joints pain. The leaves and bulbs of Allium cepa L. (kashuh) are used as salads and in cooking. Bulbs are chief source of income. Medicinally bulbs are used as aphrodisiac and extract is used in ear pain, flatulence, bacterial infections and skin diseases. The whole plant of Allium humile Kunth (cherum) is used in blood purification and swellings. Similarly, Allium victoriae L. (faloon) is used for abdominal problems, swellings, asthma, respiratory problems and dysentery. The roots of Asparagus filicinus are internally used for uterine tumors, leucorrhoea, disturbed menstruation and nervous disorders. The roots of Polygonatum ginnemiforum (saat Ashee) are used for dysmenorrhea, uterine tumor and swellings. Some people use its roots as general tonic with milk and ghee. Zea mays L. (makayi) belongs to family Poaceae and is the second chief source of food and straw. Its grain is also used medicinally for dysentery and cough. Lepidium sativum L. (zachik) seeds are used in constipation, reproductive problems, uterine tumors and eye problems. Similarly, the neighboring Jammu and Kashmir region, is rich in the local flora that can be exploited for medicinal purposes.

Researchers reported the use of various plants for their medicinal purposes. Berberis lyceum royle (kalam), belonging to family Berberidaceae, the roots and stem of which are used to treat dyspepsia, jaundice and sore throat. Cassia occidentalis (talwar phali or kaswandii) is applied on skin externally for treatment of fungal infections. The leaves of Erenthemum pulchellum (neeli booti) are boiled with mustard oil and used for cure of blisters and skin cracks. Jasminum humile (peeli chambeli) is used for treatment of skin inflammation and ring worm infection. Myrsine africana (guglu) is used for detoxification and its fruit is used as laxative. The leaves of Lonicera quinquelocularis (phut) are ground into powder form then used for healing of wounds.

Khyber Pakhtunkhwa:

Khyber Pakhtunkhwa incorporates the northern mountainous regions and the plain regions of northwestern part of country bordering Afghanistan. Much similar to the Gilgit Baltistan, KP is scarcely resourced in terms of medical and healthcare facilities. The population is mainly dependent on natural remedies of flora of Khyber Pakhtunkhwa.

Accacia arabica (kekar) belonging to the family Mimosaceae, is widely used as wound dressing material. Accacia modesta (Palosa) is used as a tonic and stimulant. It is taken with milk and provides instant energy. Allium sativum (Ezzah has anti-hyperlipidemic effect. The underground part of Arundo donax (kalam) is burned and the resultant ash is used after boiling with water and filtration for diuretic effect. Cyanon dactylon (owshoo) is a simple herb, which is used to treat small pox by grinding it with rice and Curcuma longa and also used for the treatment of piles. Dalbergia sissoo (sheesham) is used as medicine for mental disorders. The fruit of Eugenia jambolana (jaman) has got the medicinal property of lowering the blood glucose level thus used as an anti-diabetic agent. Non-edible part of this fruit (seeds) are used in powdered form for gastric problems. Echinops echinatus (ont katara) is a member of family Asteraceae and is used for the treatment of liver problems. Roots and rhizome of Glycyrrhiza glabra (mulathi) are used for cold and flu. Acacia catechu (katha safai) aqeous extract is used for treatment of diarrhea. Delphinium denudatum (jadwar) is used as analgesic and anti-rheumatic agent.
Podophyllum hexandrum (kakora) is a member of family Berberidaceae and is used in the treatment of liver diseases. Sarcococca saligna (Landann) is used to relieve the muscular pain. Nasturtium officinale (Talmera) is very famous due to its use against constipation and stomachache. Chenopodium album (sarmay) is used as carminative and diuretic agent. Hypericum perforatum (Shin chai), belongs to Clusiaceae and acts as a diuretic agent. Its tea is used as stimulant and also taken as an analgesic. One of the medicinal plant of the family Cuscutaceae, Cuscuta reflexa (Zelai), is used for urinary incontinence and taken as antiidiabetic and for blood purification. Dioscorea spp. (kanis) belongs to Dioscoreaceae and is used for the treatment of jaundice and ulcers. Rumex dentatus (shalkhay) is a member of Polygonaceae and is used for wound healing. Debregaeesa saeneb (Ajali) belongs to Urticaceae family. The leaves of this plant are ground into a paste which is applied on the blistered feet and is also used for eczema.

**Punjab Region:**

Punjab is the most populous province of the country. It stretches the lad between KP and Sindh and Indian Punjab and Baluchistan. Basic health facilities are mostly present but a number of people still follow complementary and alternative medicine specialists. They use their ethno-botanical knowledge to treat common ailments.

Most of these drugs are derived from plants. Achyranthes aspera (puth kanda) belongs to family Amaranthaceae. Asthma is treated with the help of plant ash. It is also used for the treatment of skin diseases. Datura muricata (tanda), is used in treatment of constipation. Agave americamum (kanwar phara) belongs to Amaryllidaceae, Jaundice is treated with the help of plant pulp. The seeds of Anethum graveolens (soy) are given to females for increased lactation. Cannabis sativa (bhang) is a member of Cannabinaceae family, it is used as an anti-lice agent. Calotropis procera (Aak) is used for the treatment of asthma. It is also used against snakebite and treatment of jaundice. Bombax malabaricum (sumbul) belongs to Bombacaceae family. Its decoction prepared from roots has killing effects on abdominal worms. Eruca sativa (taara mira / jamahoon). It is used to treat constipation and to kill the abdominal worms. Plant oil is widely used as anti-lice agent. Jaundice is also treated with the help of taara mira. Capparis deci belongs to family Capparidaceae, is used as blood purifier and the twig is used as a tooth stick (Miswak) to relieve toothache and pyorrhea.
Baluchistan:

Baluchistan forms the western most province of Pakistan and is the largest province in terms of land area. Due to the harsh climate and unfertile land, flora of the province is not as diverse in comparison to other areas but the locals utilize available plants and use their ethnobotanical knowledge to treat minor ailments.

Among the various medicinal plants of Baluchistan, Pimpinella ranunculifoli (washbo), belonging to family Apiaceae, is used for digestion and is also used to treat heart burn or stomachache. Stewartiella baluchistanica (mashlakh) is used as carminative. Heliotropium baluchistanicum (daroo) and Heliotropium ulophyllum (sag daroo) is used to treat the eye diseases. The fruit of Berberis spp. (karwasakai) is used to treat Snake bite and gynecological problems. One of the medicinal plant of family Chenopodiaceae is Atriplex which is used to treat the skin diseases, as a thirst quencher and for joints pain. Astragalus khalifatensis (jib) and Astragalus lowarensis are used in colic pain, leprosy treatment and also as an anti-cancer agent. Berchemia pakistanica (spera butae) is used in treatment of fever, headache and muscleache.

Sindh:

The southern-most province of the country is Sindh which has a variety of sociological aspects. From extremely under developed regions like the desert of Thar to the cosmopolitan like Karachi, the province’s medical and healthcare facilities vary widely.

Abutilon indicum (khangi) is used to relieve the menstrual pain, painful urination and gynecological problems. Acacia nilotica (Babool/Desi Keekar) belonging to family Mimosaceae, is used to treat dysentery, diarrhea and vomiting. Acacia Senegal (kumbat) is used to treat the burns and inflammation and applied on the skin in the form of a paste. Achyranthes aspera (kandii) is used for treatment of abdominal cramps, ulcers and also in vomiting and dysentery. Aeluropus lagopoides (pooji) is used for wound healing and as an analgesic. Aerva javanica (boo) is used to treat asthma, headache and as a diuretic. Aizoon canariense (Welaiti battar/Dotak) belongs to family Aizoaceae and is used in the treatment of hepatitis and jaundice. Caesalpinia bonduc (karbat) belongs to family Caesalpiniacea and is used in treatment of joints pain associated with trauma and arthritis. Launaea resedifolia (badtar) belongs to family Asteraceae and is used in the treatment of leucorrhoea and jaundice.

Future Perspectives and Conclusion:

The rich diversity of flora in Pakistan and the use of these plants for pharmaceutical purposes calls for the incorporation of modern scientific techniques and procedures to establish the safety and efficacy of these phytochemicals. These plants form the basis of a number of Complementary and Alternative Medicine (CAM) systems. Integration of advanced biological and pharmacological sciences like bioinformatics and pharmacogenomics can help in deciphering the molecular mechanisms involved in the activity of these phytochemicals. Efforts shall be made to develop the phytochemical based pharmaceutical industry in order to ensure the availability of safe and therapeutically effective medicinal options to a larger population base.
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