

Ethnomedicinal Plants used for Gastrointestinal Ailments by the Rural Communities of Kaghan Valley, Mansehra, Pakistan

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ABSTRACT

The research was conducted in the area of Kaghan Valley which is located in Northern areas of Pakistan. In this area the population is mainly based on the rural communities and seasonal nomads. Current study was aimed to collect the primary data by questionnaire survey, interviews and expert opinions about different plant species used for the cure of different gastrointestinal diseases. In this study about 56 plants were targeted that were used by local practitioners, having the potential of the cure of gastrointestinal disorders i.e. heartburn, diarrhoea, constipation, nausea, gas trouble, indigestion, haemorrhoids and ulcer. Among them 35 angiosperms and 2 gymnosperms were reported. The major plant species are *Achillea millefolium*, *Thymus serpyllum*, *Carthamus oxycantha*, *Paeonia emodi*, *Aconitum heterophyllum*, *Dioscorea bulbifera*, *Hyoscyamus niger*, *Viola odorata*, *Fraxinus excelsior*, *Artemisia absinthium*, *Plantago ovata*, *Punica granatum* and *Berberis lycium*.

KEY WORDS: Medicinal plants, gastrointestinal diseases, rural communities, Kaghan Valley, KP, Pakistan

INTRODUCTION

Kaghan Valley is located in the Northern areas of Pakistan and geographically is an alpine climatic region. It is in District Mansehra of the Khyber Pakhtunkhwa (KPK) Province of Pakistan. It is also a catchment area for the famous Kunhar river. The total area of the valley is about 1627 km and it ranges about 161 km long wonderland in which there are numerous wild plant and animal species, lush green forests, minerals, beautiful lakes, gigantic glaciers and water falls. The geographical latitude and longitude of the Kaghan valley is between 34°-17' to 35°-10' and 73°-28' to 74°-7' as North and East respectively. The mode life style and livelihood of the local communities is traditional nomadic and constant since ancient times. According to the reports of Kosambi (1962-1967); the prevailing mode of life is mostly dependent upon wild food and medicinal plants [1]. During past thousands of years people gathered food from dense forest by hunting of wild animals and collecting wild plants. Since time immemorial the nature is providing all kinds of living not only to them but also their animals. By the trial and error method the people of tribal areas have revealed a variety of uses of plants which include fruits, tubers, berries, mushrooms, leafy vegetables and nuts. These were also used for fabrics, shelter, medicines and for the fulfilment of other demands for survival in unfavourable weather condition [2]. These practises to use wild plants were started since ancient civilizations. Plants play an important role as a maintenance of sustainable ecosystem and also play an important role for human welfare. It is correct that humans have obtained the highest benefits from plants through his knowledge of medicinal plants, but unfortunately the worth of these plants is considered very less at international level. From last few decades a systematic approach for the explorations of the medicinal plants were carried out for human welfare. It is of greatest importance that majority of the phytogeographical areas must possibly be discovered intensively so that much more information could be gathered in order to explore flora and its ethnic associations with human beings to supplement the existing understanding, knowledge, and gratitude of the flora. Ethnobotany is the scientific study of the traditional knowledge of indigenous plants and their cultural and religious implications in the society [3]. Most of the traditional knowledge of ethnomedicinal plants was transferred from generations to generations through oral communications in tribal communities. Due to the interference of modern civilization the life style of tribal communities has changed the ancient tribal traditions, cultural life of nomadic societies looks on the verge of extinction. The tribal communities now have started neglecting their traditional habits and getting themselves employed as labourers on daily wages in various development projects, like road construction and stone crushing sites etc. The expansion of new roads through forests, overexploitation of forest wood, converting forest land areas into agriculture lands and the population explosion of the neighbouring rural and affluent urban areas are some of the serious issues of the study area.

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There is an interim need and desire of taking intensive measures to collect the baseline data of nomadic life style and to monitor the extinction of the use of medicinal use of plants by the tribal communities and as affected by the advents of modern civilization. There is a possibility that in near future valuable data on Ethno-botany will be lost due to lack of interest of young generation. Keeping in view of these findings there is a great need to secure this valuable data [4]. It is well known that medicinal plants have global importance. World is gifted with an amusing treasure of medicinal plants. Herbs have continuously remained the major form of medicines in Pakistan and currently they have become popular throughout the world, as people want to remain healthy in the present scenario of environmental pollution and face of chronic stress and to cure different diseases with medicinal plants as they have little or no side effects on human body [5]. People in Australia, North America and Europe are referring qualified herbal specialists and the use of plant medicines. Predominantly in the remote parts of developing countries medicinal plants also play a significant role in saving the lives of many people provided by meagre health facilities. There are following gastrointestinal problems [6]:

- Constipation: Infrequent or difficult bowel movements.
- Diarrhoea: Frequent evacuation of loose, watery bowel movements.
- Digestion (Weak and Painful): The inability to completely digest food, affecting assimilation of nutrients and elimination of wastes.
- Gas Trouble: The presence of air or gas in the intestine that can lead to a feeling of fullness and pain.
- Heartburn: Behind the breastbone a burning pain, associated with a contraction and irritation of the lower part of the oesophagus or upper pyloric stomach.
- Haemorrhoids: Enlarged veins in the wall of anus, sometimes with pain and bleeding.
- Indigestion: Pain or discomfort in the abdomen after eating.
- Nausea: The feeling of being on the verge of vomiting.
- Ulcer: An inflammatory lesion which forms in different areas of gastrointestinal tract.

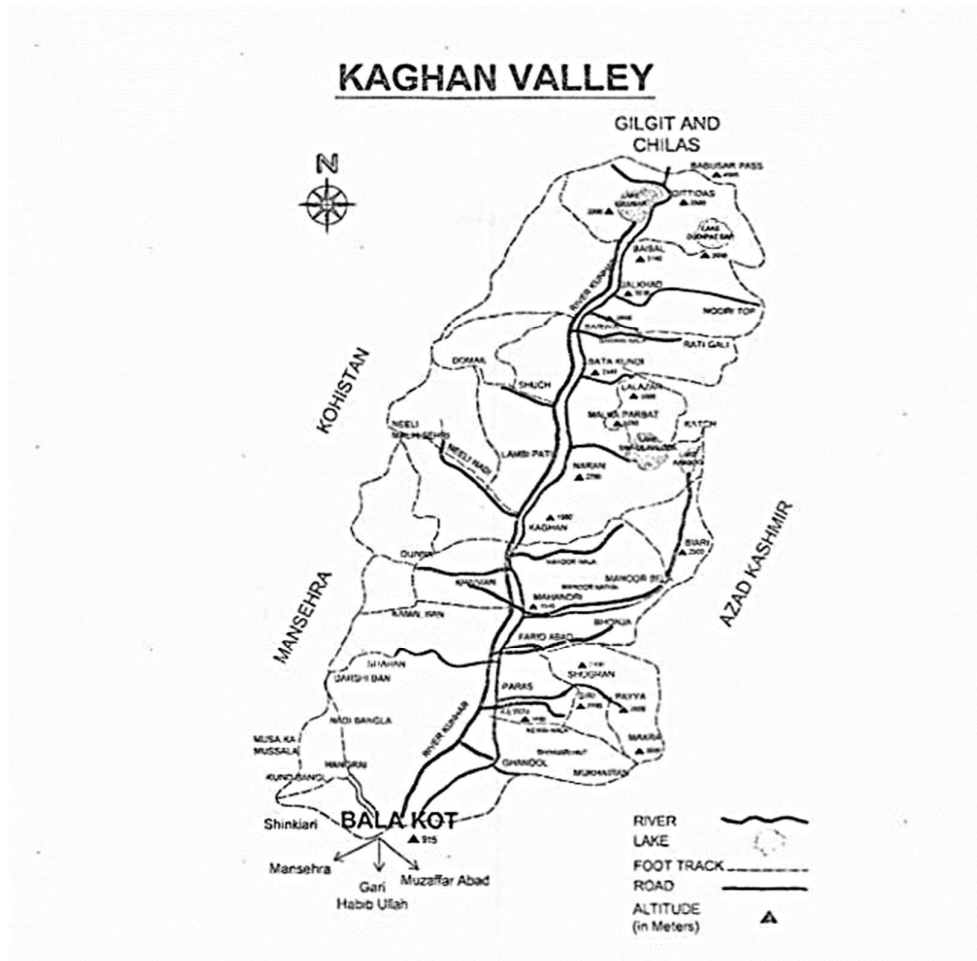


Fig. 1. Map of the research area.

MATERIALS AND METHODS

The present investigations were carried out from August 2015 to August 2016. During this period for the collection of data the research area was regularly visited. Before trip a proper planning was made to make it effective. Frequent field visits were carried out to investigate and collect the ethnomedicinal knowledge for gastrointestinal disorders from the local communities of Kaghan valley. This field work included mainly, observation, interviews, data collection. The general observations were mainly related to culture, life style and behaviour of nomads, climatic conditions, socio-economic conditions faced by the people and above all association of people with plants. During study 26 villages were visited and data collection was done by observations and interviews with the people of different villages [7].

It was noted that how the local inhabitants collect the medicinal plants, harvest, store, dry, process and utilize them. In the meanwhile, the flowering, fruiting, collection and processing and preservation time was also noted. During the field inventory, interviews were conducted individually and in groups for the collection of selected information. Questionnaire method was adopted during the study in order to maintain qualitative and quantitative approaches about the utilization of medicinal plants in Kaghan valley used for gastrointestinal disorders. Local names of plants and their recipes were asked. The plants which were used for gastrointestinal diseases were collected, pressed, dried, poisoned and mounted on herbarium sheets for preservation and references for further studies [8-9]. All the plants were identified with other available literature and with the help of Flora of Pakistan. The plants specimens were deposited in the herbarium of Botany Department Govt. Post Graduate College No. 1 Abbottabad (KP) Pakistan for future references.

RESULTS AND DISCUSSION

During present investigation 56 medicinal plant species belonging to 35 angiospermic and 2 gymperms were reported (total 37 families). These plants were used different digestive problems like constipation, diarrhoea, indigestion, gas trouble, nausea, haemorrhoids, heartburn and ulcer. The results of present finding are presented in Fig. 2 and Table 1. The results indicated that family Asteraceae was the most prominent with 7 plant species, followed by Euphorbiaceae 3, Solanaceae 3, Labiatae 3, Polygonaceae 2, Amaranthaceae 2, Ulmaceae 2, Pinaceae 2, Rosaceae 2, Moraceae 2, Caprifoliaceae 2 and all the remaining having 1 plant species each.

Plants provide the nourishment and curing compounds essential for the good health maintenance of human beings. On human life the influence of medicinal plants and their extracts have great value. In numerous ways they deliver a variety of products and resources for the use of gastrointestinal disease. Kaghan Valley is enriched with natural flora particularly having the vital significance in terms of medicinal aspects.

There are many important medicinal plants having the great worth to be used for gastrointestinal diseases are widely present as natural vegetation in Kaghan Valley. Among them the most important maintained medical plants by the local inhabitants in the moist temperate forests of the transition zone of Himalayan areas are; *Paeonia emodi* and *Dioscorea* sp. in moist temperate forests, *Geranium* spp. in transitional zone between dry temperate and moist temperate, *Thymus limnaris* in alpine zone and *Litsea chinensis* of the Kaghan Valley. To accomplish their indigenous requirements the people of Kaghan Valley greatly depend on plants. Because of the poverty factor, the inhabitants live a very simple and moderate life. From these indigenous resources they have to accomplish all their basic needs. Winter season is very harsh and most of the life activities are halted so that only spring season is favourable for local inhabitant, nomads and tourists. In the Valley the basic health care facilities are just nominal. There is only one hospital in the entire valley which was severely damaged in 2005 earth quake. Although it was reconstructed, but still it is devoid of basic facilities.

To overcome the basic health needs the local inhabitant have to rely on medicinal plants. Then fortunately Kaghan Valley is enriched with a wide range of wild medicinal plants. That's the reason people select and find the solution of health care by themselves. For many gastrointestinal disorders they commonly use different medicinal plants. For these disorders several local remedies are being used which were reported during the present study.

Hoking (1958, 1962) approached for medicinal plants and their uses against diseases in Pakistan [10]. According to their findings about 114 plant species were used by the local inhabitants for utilitarian, nutritional and therapeutic purposes. Zaman and Khan (1970) reported hundred drug plants of West Pakistan each with their botanical names, local names, family, constituents, mode of action, description and their targeted uses [11]. Collected primary data on medicinal plants from several areas of Pakistan have made a baseline for future monitoring and research activities while regarding conservation, pharmacological and additional characteristics of medicinal plants. Similar reports were also published by Goodman and Ghafoor (1992) in Baluchistan province of South Western Pakistan [12].

In the areas of Makran and South Waziristan, Leopritti and Lattanzi (1994) investigated 27 medicinal plants of ethnobotanical value [13]. Shinwari and Khan (1999) carried out an ethnobotanical conservation study of Margalla Hills area in National Park, Islamabad Pakistan and found that the local people regularly used medicinal plants for different diseases and depends on local plant resources for their food, fodder, health care

shelter and **other cultural aspects** [14]. Shinwar in 2000 carried out ethnobotanical studies in Margalla Hills, National Park Islamabad Pakistan and recorded the local uses of medicinal plants [15].

To highlight the medicinally significant plants around the motorway (M-2) in Pakistan, Ahmad in 2007 conducted an ethnobotanical study [16]. In 2002 Sheikh and his coworkers have documented 153 plant species belonging to 113 genera and 38 families from Naltar Valley, Northwestern Karakorums, Pakistan [17]. Although in different parts of Pakistan infrequent information on therapeutic plants exists, but still there is a dire need for a comprehensive gathering of data on ethnobotany of far flung area such as Kaghan Valley in Northern Areas of Pakistan. Especially in the ranges of Karakoram and Himalayan regions of Pakistan.

Abbasi *et al.* (2009) reported medicinal plants used for hepatitis and jaundice which is based on socio-economic documentation. Among them a total of 30 plant species of 24 families were reported by local inhabitants for the treatment of hepatitis and jaundice [18]. Dastgir and Abbasi (2004) reported various folk medicines used for the treatment of jaundice in District Haripur, Pakistan after phytochemical screening [19]. However, due to urbanization, rapid industrialization and the supplementary changes in their life style are responsible for the decrease of practices in the local use of plants for medicine. Similarly studies were conducted by Scherrer, *et al.* (2005) for traditional plant use in the areas of Monte Vesole and Ascea, Cilento National Park, Italy and reported 22 as craft plants, 49 as food and 63 plant species used as medicinal aspects [20]. In present research 56 plant species of medicinal plants belonging to 35 angiospermic and 2 gymperms were reported (total 37 families). In Fig. 2 family wise detail of plant species is provided where as in Fig. 3 some selected medicinal plants used for gastrointestinal diseases are photographed.

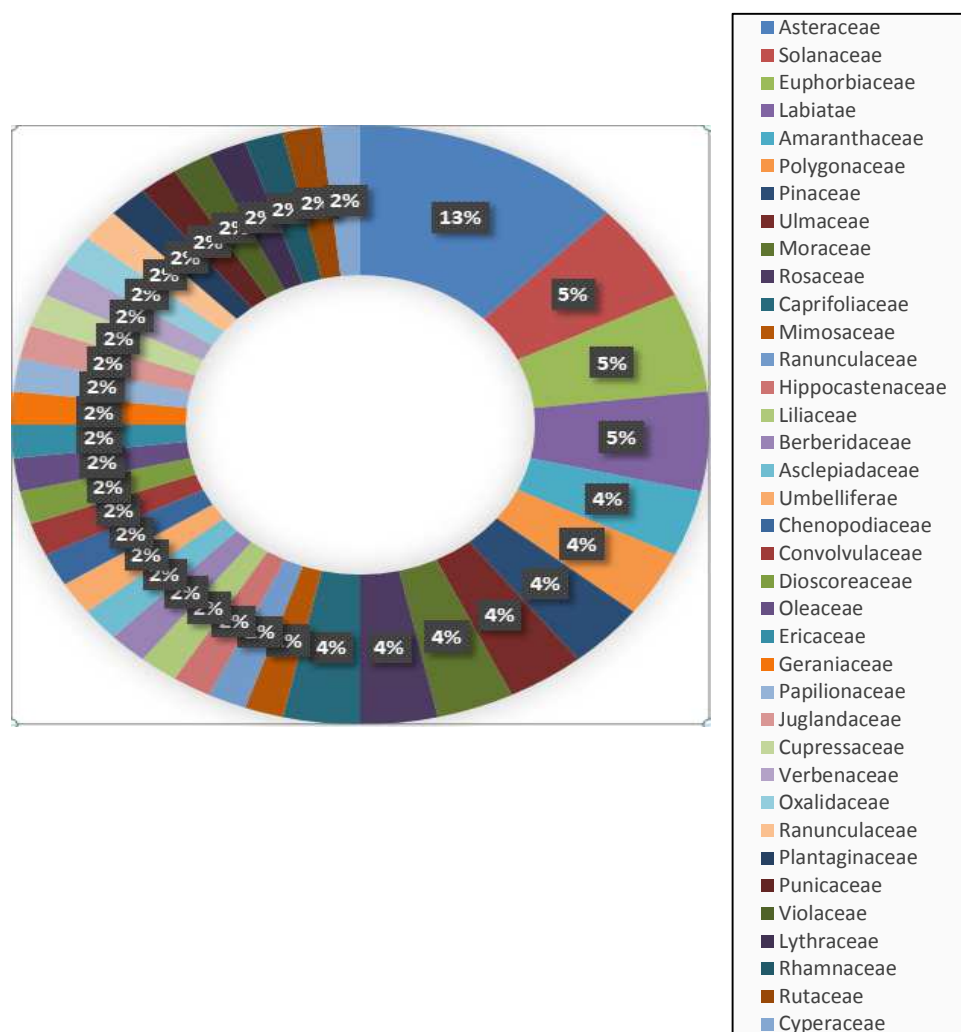


Fig. 2. Family wise detail of Plant species

Table1. Medicinal plants administered for gastrointestinal disorders in local people in Kaghan valley.

Sr. No.	Botanical Name	Local Name	Family	Part Used	Recipe / Uses
1	<i>Acacia nilotica</i> Delile ssp, indica (Benth.) Brenan.	Kikar, Babul	Mimosaceae	Bark, Leaves	In case of ulcer the bark is grind and used for its cure. Similarly the leaves are considered best for dysentery.
2	<i>Achillea millefolium</i> Linn.	Gandana	Asteraceae	Leaves, Flowers.	The decoction of leaves and flower heads is employed as carminative.
3	<i>Achyranthes aspera</i> Linn.	Lathjira	Amaranthaceae	Whole plant, Roots.	The decoction of plant is used in haemorrhoids. In case of haemorrhoids the roots are grind and mixed with honey and used on daily basis.
4	<i>Aconitum heterophyllum</i> Wall. Ex Royle.	Atis	Ranunculaceae	Roots.	The roots are crushed mixed with ghee and honey and orally administered against diarrhoea, dysentery and haemorrhoids.
5	<i>Aesculus indica</i> Hook.	Bankhor	Hippocastanaceae	Seeds.	Seeds are used for the complaints of ulcers and haemorrhoids.
6	<i>Aloe barbadensis</i> Mill.	Kanwar Ghandal	Liliaceae	Pulp. Leaf and Root extract.	The dried juice is given in constipation. The pulp is given in chronic ulcers to stimulate healing.
7	<i>Artemisia absinthium</i> Linn.	Vilayathi ajsanthin	Asteraceae	Whole plant	The drug is used as stomachic. Tincture of plant is considered good for digestion.
8	<i>Berberis lycium</i> Royle	Sumbul	Berberidaceae	Bark of Root	The dried bark is considered best for proper defecation.
9	<i>Bistorta amplexicaulis</i> (D.Don)	Anjabar	Polygonaceae	Stem and Leaves.	This herbal drug is used for curing ulcer.
10	<i>Calotropis procera</i> Ait. F.	Aak	Asclepiadaceae	Latex, Root bark	The latex is extracted and dried to be orally administered for the effective treatment of dysentery and diarrhoea.
11	<i>Carthamus oxyantha</i> M. Bieb.	Pohli	Asteraceae	Seed Oil	Oil extracted from seeds is used for ulcers.
12	<i>Carum carvi</i> Linn.	Kali Zeeri	Umbelliferae	Fruit	The seeds are given to relieve colic indigestion and stomach spasm.
13	<i>Cedrus deodara</i> D.Don	Diar	Pinaceae	Heartwood, Oil	The heartwood and oil are used for various ailments. They are digestive, carminative and laxative. The oil is also used in ulcers.
14	<i>Celosia argentia</i> Linn.	Kokan	Amaranthaceae	Flowers and Seeds.	The flowers and seeds are used in diarrhoea and dysentery.
15	<i>Celtis australis</i> Linn.	Batkald	Ulmaceae	Leaves and Fruit	They are used in peptic ulcers, diarrhoea and dysentery.
16	<i>Chenopodium album</i> Linn.	Bathu	Chenopodiaceae	Whole plant	The leaves are boiled in mustered and soya been oil for anthelmintic and laxative.
17	<i>Cuscuta reflexa</i> Roxb.	Akashbel	Convolvulaceae	Whole plant	Its roots and leaves are dried, crushed and boiled in mustered oil. Then filtered and dried again. Filled in capsules and administered orally on daily basis for 7 days as carminative.
18	<i>Cyperus rotundus</i> Linn.	Motha	Cyperaceae	Tubers	They are used in disorders of stomach and irritation of the bowel.
19	<i>Datura stramonium</i> Linn.	Dhatuira	Solanaceae	Flowers, Leaves	The petals and leaves are mixed and crushed and obtained juice is administered for ulcer.
20	<i>Dioscorea bulbifera</i> Linn.	Ratalu	Dioscoreaceae	Tubers	Tubers are cut into small pieces, dried and made powdered taken with water on daily basis twice for piles and dysentery.
21	<i>Eclipta prostrata</i> Linn	Bhangra	Asteraceae	Whole plant	The roots are purgative.
22	<i>Euphorbia indica</i> Lamk	Dodal	Euphorbiaceae	Leaves	An infusion of dried leaves is given in diarrhoea and dysentery.
23	<i>Ficus carica</i> Linn.	Anjir	Moraceae	Fruit	The persons suffering from body weakness, piles and ulcer take the dried fruits soaked in water for overnight.
24	<i>Fragaria nubicola</i> Lind.	Budimeva	Rosaceae	Leaves and Fruit	Leaves and fruit are eaten in diarrhoea and dysentery.
25	<i>Fraxinus excelsior</i> Linn.	Sumb	Oleaceae	Bark and Leaves	The leaves are considered to have laxative and diuretic properties.
26	<i>Gaultheria trichophylla</i> Royle.	Neeli Buti	Ericaceae	Leaves and Berries	The leaves and berries are administered in acute gastritis and prolonged vomiting.
27	<i>Geranium pusillum</i> Burm.	Ratanjot	Geraniaceae	Roots	In case of haemorrhoids and irritable bowel syndrome the roots powder are considered best and taken daily.

28	<i>Hyoscyamus niger</i> Linn	Khurasani Ajwain	Solanaceae	Seeds	The seeds are used in gastric and intestinal cramps and diarrhoea.
29	<i>Indigofera heterantha</i> Wall ex Brand.	Jand	Papilionaceae	Whole plant, Flowers	The root, stem and leaves are considered to be laxative and anthelmintic.
30	<i>Juglans regia</i> Linn.	Khor	Juglandaceae	Leaves, Bark and Fruit	Leaves are considered anthelmintic and fruit carminative.
31	<i>Juniperus communis</i> Linn.	Panthree	Cupressaceae	Ripe Berries	The oil obtained from fruit is carminative.
32	<i>Lantana camara</i> Linn.	Gendi	Verbenaceae	Aerial parts of plant	The plant is considered as carminative.
33	<i>Lonicera hispida</i> Pall.	Loony	Caprifoliaceae	Leaves	The whole plant infusion is considered best for the treatment of dysentery and diarrhoea.
34	<i>Mentha longifolia</i> Linn.	Jungli Poodna	Labiatae	Whole plant	The leaves and flowers are used as carminative and stimulant. The flowers are used as appetizer.
35	<i>Morus alba</i> Linn.	Shatut	Moraceae	Root, Fruit, Bark and Leaves	Leaves when dried and fruits are eaten as refrigerant, bark is used as purgative. Similarly the dried roots powder is taken with in night before sleep for anthelmintic.
36	<i>Oxalis corniculata</i> Linn.	Khat Kurla	Oxalidaceae	Leaves and root	Leaves and roots are dried and taken as refrigerant; bark of the plant is used as purgative. Similarly the dried roots powder is taken with in night before sleep for anthelmintic.
37	<i>Paeonia emodi</i> Wall.	Mamakh	Ranunculaceae	Roots	The roots and tubers are used as purgative.
38	<i>Phyllanthus niruri</i> Hook.	Bhuiyan anvala	Euphorbiaceae	Whole plant	The plant is useful in gastrointestinal problems like colic, diarrhoea and dysentery.
39	<i>Pinus roxburghii</i> Sarg.	Chir	Pinaceae	Wood, Resin, Oil	Wood resin and oil is used against loss of appetite and intestinal worms.
40	<i>Plantago ovata</i> Forsk.	Isabgol	Plantaginaceae	Seeds	The seed husk is regarded as best for constipation and dysentery.
41	<i>Polygonum barbatum</i> Linn.	Jal bahar	Polygonaceae	Seeds	The seeds are used as laxative and also applied for relieve in spasm.
42	<i>Punica granatum</i> Linn.	Daruna	Punicaceae	Leaves, Fruit and Flowers	In case of dysentery the leaves are chewed. The fruit is eaten as refrigerant. The pulp of fruit and seed is used for stomachic and carminative.
43	<i>Ricinus communis</i> Linn.	Arund	Euphorbiaceae	Seeds, Oil	Seeds are used as purgative. Oil obtained from seeds is used for constipation.
44	<i>Rubus niveus</i> Thunb.	Guraccha	Rosaceae	Roots and Leaves	In case of bowel complaints the infusion made from leaves is administered. As well as the roots are applied for spasm and colic pains.
45	<i>Salvia officinalis</i> Linn	Phulgari	Labiatae	Leaves and rot	The leaves are used as carminative.
46	<i>Saussurea lappa</i> Clark.	Kuth	Asteraceae	Roots and bark	The roots are used in chronic ulcers, colic and dysentery.
47	<i>Solanum surattense</i> Burm.	Mohri	Solanaceae	Leaves, stem and roots	Whole plant is used in constipation. The fruit, flowers and stem are used as carminative.
48	<i>Tagetes erecta</i> Linn.	Genda	Asteraceae	Flowers	The flowers are used in sores of stomach treatment.
49	<i>Taraxacum officinale</i> Weber.	Hundh	Asteraceae	Whole plant	The plant is used in chronic ulcers, colic and constipation.
50	<i>Thymus serpyllum</i> Linn.	Cheeken	Labiatae	Whole plant	The herb is considered anthelmintic, carminative and also used as stimulant.
51	<i>Ulmus wallichiana</i> Planch	Kain	Ulmaceae	Bark	The bark is used in chronic diarrhoea.
52	<i>Viburnum cotinifolium</i> D.Don.	Guch	Caprifoliaceae	Fruit, Stem Bark	The fruit is edible and the stem bark is used for complaints of colic.
53	<i>Viola odorata</i> Linn.	Banafsha	Violaceae	Flowers	An infusion of the leaves is used as mild purgative.
54	<i>Woodfordia fruticosa</i> Linn.	Dhai	Lythraceae	Flowers	Dried flowers are administered for astringent and also used for piles and dysentery.
55	<i>Ziziphus jujuba</i> Linn	Ber	Rhamnaceae	Leaves, Root Bark, Fruit and Seeds	The powder or decoction of stem bark is given in diarrhoea. The root extract is given as purgative. The decoction of root is also given to aid digestion.
56	<i>Zanthoxylum armatum</i> Dc.Prodr.	Timber	Rutaceae	Whole plant	Fruit and branches are used for gas trouble and indigestion.



Berberis lycium Royle



Datura stramonium Linn.



Ficus carica Linn.



Indigofera heterantha Wall ex Brand



Punica granatum Linn



Solanum surattense Burm

Fig. 3. Selected medicinal plants used for gastrointestinal diseases

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