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ETHNOMEDICINAL PLANTS USED AGAINST COMMON DIGESTIVE PROBLEMS

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Abstract

Background: Ethnomedicinal knowledge is highly significant for persistence of human health care. Different studies have shown that medicinal plants are considered as curing agent for digestive disorders in Pakistan. The aim of present review is to explore this ethnomedicinal information all over the Pakistan and to investigate the ecological status of these species in the country.
Methodology: Online literatures on ethnomedicinal plants used to treat digestive complaints in Pakistan were searched and gathered using online bibliographic databases including PubMed, Scopus, Google Scholar, Web of Science and Flora of Pakistan**.**
Results: The review documented 178 medicinal plant species, belonging to 59 families, used for different digestive ailments. The majority of species were herbs (60%), used in drug preparation. The most frequent part used in preparation of these remedies is leaves (23%), followed by roots (19%).
Conclusion: In conclusion, the study provides enormous ethno-medicinal knowledge and due to the unsustainable activities of the people of Pakistan, some medicinal plants need to be conserved for the future.
Key words: Ethno-medicine, medicinal plants, gastrointestinal diseases, ecological status.

Introduction

Plants are a vital source of traditional medicines that are used for the treatment of various ailments. Approximately 4, 22,000 flowering plants reported from the world, more than 50,000 have been used worldwide for medicinal purposes (Walter & Hamilton, 1993). Man has cultivated the habit of observing plants for thousands of years and had used them for different purposes (Bako et al., 2005). The local uses of medicinal plants are common particularly in those areas of developing countries, which have little or no access to modern health services (Sandhya et al., 2006). Mostly local people keeping the centuries-old trend alive, rely hugely on the wild plants for their daily needs such as food, fodder and medicines. Treatment through traditional medicine system is progressing all over the world particularly in the Indo-Pak sub-contentment where this system is known by Unani or Ayurvedic (Haq, 1993).

Pakistan has a unique biodiversity that is stretched along nine major ecological zones. A major part of the country is quite rich in medicinal herbs due to its salubrious climate (Abbasi et al., 2010). Numerous medicinal plants are being used by local communities of different geographical regions of the country, having old traditional knowledge on such plants. Medicinal plants have been used as a source of curing various digestive disorders in the country. Digestive disorders generally occur due to the nature of food that we consume and it's incompatibility with our constitution or due to some viruses and bacteria *like rotavirus, Helicobacter pylori, Salmonella, Shigella* and *Escherichia coli* etc. Some of the most common digestive problems that people of Pakistan faces in their day to day life are stomach-aches, cramps, vomiting, dyspepsia, diarrhea and indigestion to the complicated conditions such as cancer and gastric ulcer etc (Zaidi et al., 2009, Khan et al., 2013). In early 1950, more than 80% of Pakistani population was totally dependent on ethnomedicines for traditional health practices (Hocking, 1958), but now, it is experienced only in the rural areas (Ibrar et al., 2007), because the indigenous knowledge changes with the passage of time, with change of natural resources and culture. Indigenous knowledge on ethnomedicines is under threat due to the current modernizing trends. In Pakistan, about 6000 plant species have been reported so far. However, only 600 plant species have been documented recently (Shinwari et al., 2003). Therefore, there is a dire need to preserve this valuable traditional knowledge (Khan et al., 2011) by conserving plants and educating people about ethnomedicinal knowledge. Conservation of medicinal plants is a serious issue of present times. Because studies have shown that plant biodiversity of Pakistan is under wonderful pressure due to the population explosion and unsustainable activities of people in the country (Abbas et al., 2010, Sheikh et al., 2002).Unfortunately, very little work has been done on threatened plants of the country and extremely limited information is available on this subject (Alam & ali., 2009). Thus the present review aims to collect and elaborate the ethnomedicinal data available for digestive problems in Pakistan. This could help in creating mass awareness regarding the need for conservation of endangered, threatened and vulnerable medicinal plant species used ethnobotanically in the country. The review also helps in the promotion of ethno-medico-botany knowledge all over the world. Hence people belonging to the countries having these species may also use the remedies mentioned in this paper for the treatment of their digestive problems. Above all, this review will provide baseline information for ecologists, pharmacists and researchers for further studies.

Methodology

This review paper was designed by consulting and compiling large number of mostly published literature on gastrointestinal

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problems of Pakistan. Literature on ethnobotanical information of medicinal plants against gastrointestinal diseases in the country has been searched using online bibliographic databases including PubMed, Scopus, Google Scholar, Web of Science and Flora of Pakistan. An extensive number of articles were found out of which approximately 105 articles were selected as the data was focused to only those medicinal plants whose recipes were mentioned for the gastrointestinal ailments. The material was thoroughly checked for the exclusion of duplicate material collected from different search engines. A detailed ethnomedicinal table was formulated on all the plants used for gastrointestinal complications in a systematic manner. In ethnomedicinal table, plant scientific names, local names, habit, reproductive status, part used, recipes and types of problems were included. Efforts were also made, to collect data regarding ecological status of these species in the country. However, this data was found limited and was compiled in table form.

General Overview

Traditionally, different medicinal plants are used for various gastrointestinal problems such as diarrhea, dyspepsia, peptic ulcer vomiting and nausea etc. in the developing countries like Pakistan. In present review, a total of 178 plants belonging to 122 genera and 59 families are documented to be used in different regions of the country. These plants include *Achillea millefolium*, *Achillea wilhelmsii*, *Achyranthes aspera*, *Adhatoda vasica*, *Allium sativum* and many others (Table 1). Literature proved that herbs were mostly used (60%) in various gastrointestinal related ethnomedicinal recepies followed by shrub (21%) (Figure 1.) It might be due to the fact that herbs can be easily uprooted and extracted from the wild or due to their strong therapeutic activity (Murad et al., 2013). Most of the plants (50%) are annuals followed by perennials plants (44%) and 6% biennials. Different plant parts are used for remedy preparation in order to treat digestive disorders but leaves are mostly preferred (23%) followed by roots (19%), pulp (15%), whole plant (12%), fruits (11%), stem (9%) and 5% bark. However, other parts of the plants such as latex, rhizome and resin etc., are also used in some of herbal preparation. The use of specific plant parts for specific disease treatment suggests that these parts have strongest certain active phyto-constituents against digestive complaints with no or less side effects (Mitscher et al., 1980). Moreover, the maximum use of leaves for remedy preparation might be due to the reason that it is main site of most of the physiological process that result in production of variety of active compounds as well as the collection of leaves poses no significant threat to the survival of individual plants (Poffenberger et al., 1992). This article critically reviews only some common digestive disorders and their phytotherapy with locally used medicinal plants; furthermore, the ecological status of these species in the country is also discussed. Out of 178 species, the ecological status of only 34 plants was discussed in literature (Table 2). It was noticed that 14 plants were endangered and needs to be conserved otherwise they will be extinct in future. Similarly, 6 medicinal plants were found threatened and are at risk of becoming endangered in future if not protected (Figure 2).

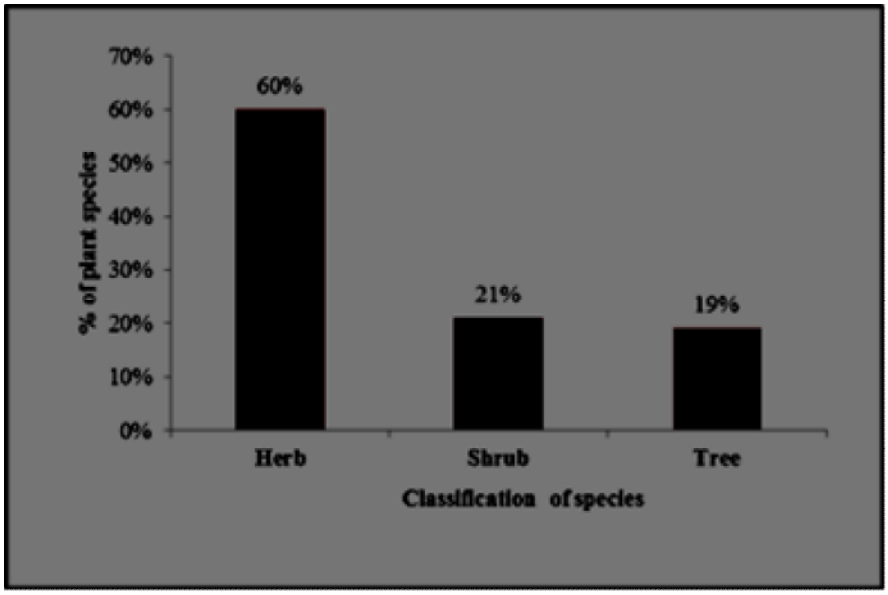

Figure 1: Classification of plants on the basis of their habits.

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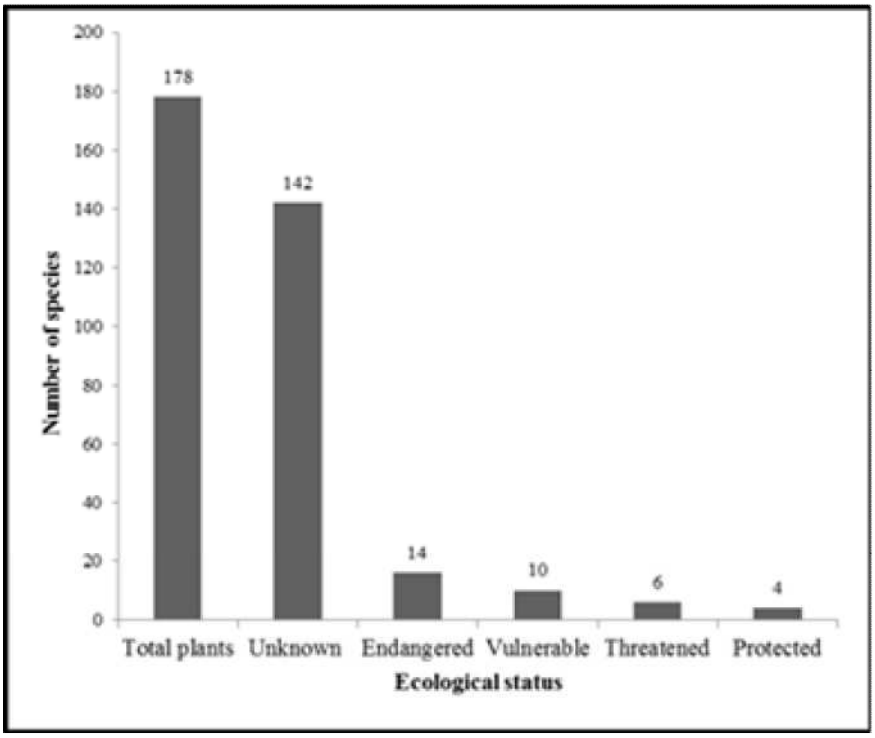

Figure 2: Ecological status of plants used for digestive problems in Pakistan

Diarrhea and Dysentery

Diarrhea and dysentery are most commonly occurring digestive disorders. Dysentery is the severe form of diarrhea which contains blood. Diarrhea is caused by *rotavirus*, *adenovirus* and or various bacterial species belonging to the *Aeromonas*, *Cryptosporidium*, *Campylobacte*, *Salmonella*, *Shigella*, *Escherichia coli* etc. (Shinwari et al., 2013, O'Ryan et al., 2005). In the developing countries like Pakistan, diarrhea is the third leading cause of death (Thapar & Sanderson, 2004). People with poor hygiene, children and adults are at high risk. More than 3.2 million children of developing countries died annually because of diarrhea (Rebiero, 2000). In Pakistan, different medicinal plants such as *Acorus calamus*, *Albizia lebbeck*, *Allium sativum*, *Amaranthus viridis*, *Foeniculum vulgare*, *Mentha spicata* and *Adhatoda vesica* etc., are used in order to cure the ailments. The decoction method is mostly preferred ethnobotanically for remedy preparation in the country. Traditionally, the bark of *Albizia lebbeck* in addition to *Trchyspermum ammi* and *Commelina bengalensis* are boiled in water to prepare a decoction for the diseases of diarrhea and dysentery. Moreover, people of Pakistan boil leaves, fruit and stem of *Salvadora oleoides* in water and locally the decoction is given to patients suffering from diarrhea (Table 1). However, due to human unsustainable activities, these plants are endangered in Pakistan (Table 2). If these are used with maximum ratio, they might become extinct in future. Similarly, some other anti-diarrheal and anti-dysenteric plants of Pakistan are traditionally administered in different ways, such as roots and leaves of *Barberis lyceum* are boiled and decoction is used against the diseases, in addition the roots of *Bergenia ciliate* are used as a tonic in the treatment of diarrhea (Table 1). However, these are considered as threatened species of the country and might be endangered in future, if not protected. In addition, researchers scientifically proved some medicinal plants of Pakistan as vulnerable species which are used against diarrhea. Examples are *Achillea millefolium*, *Elaeagnus angustifolia* and *Ocimum bacilum* (Table 2). These vulnerable plants are administered for the disease treatment. Literally, there is need to conserve all the above species and instead of them being protected or conserved medicinal plants should be preferred against diarrhea and dysentery. For example *Allium sativum* is protected plant species of Pakistan (Table 2) and should be preferred for the disease curing. This review calls for an urgent complementary conservation action to save these anti-diarrheal and anti-dysenteric medicinal plant species in Pakistan and clinical studies are also required to justify the ethnomedicinal knowledge.

Peptic Ulcer

Peptic ulcer, being an inflamed break in the mucosa skin, can be divided into two broad categories that include ulcer in the stomach (gastric) and the duodenum (Tarnawski, 2005, Gadekar et al., 2010). The prevalence of gastrointestinal ulcers differs around the world: in Asia gastric ulcer is dominant while duodenal ulcer is more frequent in Western populations of the world (Yuan et al., 2006). The etiological factors of this disorder include: exogenous aggressive factors such as stress, smoking, nutritional deficiencies, infections due to *Helicobacter pylori*, frequent and indiscriminate use of non-steroidal anti-inflammatory drugs (Khazaei et al., 2006, Bandyopadhyay et al., 2001). During the past few decades, researchers were searching to identify new anti-ulcer therapies from natural sources. Thus herbs, spices, vegetables and crude drug substances are considered to be a potential source to treat these ailments and

scientific literature, also reported a large number of medicinal plants with anti-ulcer potential (Al-Mofleh et al., 2006, Raffatullah et al., 1990, Al-Mofleh et al., 2008). In Pakistan different medicinal plants are used traditionally for the treatment of peptic ulceration. For example *Achyranthes aspera* is a perennial wild endemic herb of Pakistan (Table 2). It is boiled in water and the decoction is used for the treatment of ulcer. Similarly, decoctions of other medicinal plants are also recommended for the disease treatment such as seeds of *Cordia oblique* and Fruit, bark of *Capparis deciduas* are boiled, in order to make decoctions for the phytotherapy. The decoction of *C. oblique* is administered orally for 10–15 days to the patients. Similarly, the decoction and infusion are prepared from the leaves of *Oxystelma esculentum* and recommended as mouth wash for the treatment of ulceration in Pakistan. Leaves of *Alstonia scholaris* are pulverised to make poultice for peptic ulcer. Furthermore, the powdered flowers of *Rosa damascena* are mixed with with *Quercus* fruits and an infusion is prepared to be used against stomach ulcer (Table 1). From literature, it is noticed that there is no available data regarding the ecological status of the above anti-ulcer plants. Thus, further studies are required to gather ecological information in order to conserve these species if they are endangered or threatened.

Oropharyngeal and Gastric Cancer

According to World Gastrointestinal Organization, it is noticed that sometimes the malignant lesions occur in the oropharyngeal wall and overall, 15 to 20% of these lesions progress to carcinoma (Lambert, 2010). However, cancer is not only limited to the pharyngeal region, it also affects other parts of digestive system like stomach and known as gastric cancer. This disease is mostly found in young population. According to a study it was noticed that the existence of malignant gastrointestinal tumors is found in higher frequency in the young population of Pakistan (Butt et al., 2012). The causal factors of cancer include tobacco smoking or chewing, alcohol drinking, socioeconomic status and nutritional deficiencies, Human Papilloma Virus and *Helicobacter pylori* (Lambert, 2010).

This review notifies that there must be some anti-cancerous medicinal plants in the country but they have no ethnobotanical and pharmacological proves. Therefore, they should be checked for gastrointestinal cancer in Pakistan.

Dyspepsia

Dyspepsia is defined as epigastric fullness after meals, often described by the patients as indigestion. It affects 14 to 40% population of world annually. The symptoms of dyspepsia usually contain upper abdominal fullness, eructation, heartburn, nausea and vomiting (Zaidi et al., 2009; Tally et al., 1999). In Pakistan, different medicinal plants are recommended for the treatment of dyspepsia. Mostly decoction and powdered form of the plants are used for remedy preparation in the country. *Foeniculum vulgare* is a perennial herb in Pakistan; its fruits are directed for the treatment of dyspepsia. Traditionally, 250gm of dried fruits is grinded to obtain powder. This powder is mixed with 250gm seeds of pomegranate and 375gm of sugar candy, 4-6 seeds of Green cardamom in powder form are added. One teaspoon of this powder is used thrice a day before and after meal, in order to cure the dyspepsia (Table 1). According to Zaidi et al., green cardamom is employed traditionally more for dyspeptic symptoms than black cardamom. As *Helicobacter pylori* is considered to be one of the causative factors for dyspepsia, the comparatively strong bactericidal activity of green cardamom might explain its traditional use (Zaidi et al., 2009). In addition, some other plant species such as *Zanthoxylum armatum*, *Elaeagnus angustifolia* and *Echinops echinatus* are also used for the dyspepsia treatment. However, due to unsustainable activities of people, some species are at risk of becoming extinct in future, if not protected. For example *Z. armatum* wild endemic shrub of Pakistan is critically endangered (Table 2) and needs to be conserved. This species is traditionally recommended in the treatment of dyspepsia or its symptoms and 50gm seeds or fruits of the plant are mixed with flour and is orally given to patients. Similarly, *E. angustifolia* is vulnerable perennial tree in the country. Its fruit Juice, seeds and roots is recommended traditionally against gastrointestinal ailment (Table 1). Being the vulnerable species it also needs to be conserved for the future. The fruit extract of *Olea ferrugini* is given orally for 5–6 days to dyspepsia patients. This medicinal plant is also endangered in Pakistan (Table 2). Therefore, it is necessary that people of the country should use protected plant species in place of endangered, threatened and/or vulnerable species. Additionally, further studies are required to find out the ecological status of species in the country because limited literature is available.

Conclusions

The study provides enormous ethno-medicinal knowledge all over the world administered via different recipes for digestive problems. However, the phytoterapy should be checked for gastrointestinal cancer in Pakistan. Further, due to unsustainable activities of people of Pakistan, some medicinal plants like *Acacia nilotica, Acorus calamus, Aesculus indica, Albizia lebbeck,* and *Zanthoxylum armatum* etc. are at risk of becoming extinct in future, so it is a dire need to conserve these species. Additionally, the ecological status of most species is unknown, so these findings are research provoking for future. Furthermore, clinical studies are required to scientifically justify the rationale of traditional uses of medicinal plants of Pakistan.

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Table 1: Ethnobotanical uses of medicinal plants of Pakistan against gastrointestinal problems

Plant species/ Families	Local name	Plant status	Habit	Part used	Recipe	Diseases	Place	Refrences
Abrus precatorius L. Papilionaceae	Rati	P	T	L	Decoction having little common salt is given twice a day for 2 days	Stomach pain	Lahore-Islamabad motorway	Rashid., 2012
Abutilon indicum L. Malvaceae	Sumbal Kakpai	P	H	WP	Juice of plant and decoction is used orally	Dysentery	Bannu, Dara Adam khel	Marwat et al.,2012; Mahmood et al.,2013
Acacia catechu L.Mimosaceae	Kikar	A	T	W Sp	Decoction of wood. 150g of dried sap is mixed with 300 ml water and given 1h intervals for 24h.	Intestinal pain Blood dysentery	Northern Areas of Pak	Singh et al.,2012; Rahmattullah et al.,2010
Acacia modesta Wall. Mimosaceae	Palosa	P	H	B	Bark powder of bark mixed with little quantity of salt and sugar and used	Stomachache Dysentry	Northern Areas of Pak	Sher et al.,2011; Hayat et al.,2007
Acacia nilotica L. Mimosaceae	Kikar	A	T	B S	Decoction of ½kg bark is given orally twice a day for 5–6 days. Shoots powder along with zeera and pomegranate flowers use orally as carminative.	Stomach disorder Carminative	Southern Punjab	Singh et al.,2012; Khan et al.,2013; Abbas et al.,2013
Acacia Senegal L. Mimosaceae	Kikar	A	T	G	Fresh gum is eaten	Constipation, Stomachache	Southern Punjab	Khan et al.,2013; Belayneh et al.,2012
Achillea millefolium L. Asteraceae	Sultani Booti	A	H	WP	Decoction of flower in milk is laxative.Tea made from the plant is used for dirrhoea. Whole plant extract is used in constipation. Fresh or dried ground leaves for relieving anorexia, constipation andstomachache.	Laxative,Anorexia Constipation, Dirrhoea Constipation Stomachache	Khirthar National Park	Awan et al.,2013; Ballabh & Chaurasia., 2009
Achillea wilhelmsii C.Koch. Asteraceae	Boi baro, Gozh madar	P	H	WP	Decoction is used	Dirrhoea Constipation Stoachache	Khirthar National Park	Ali & Qaiser., 2009; Tareen et al.,2010
Achyranthes aspera L. Amaranthaceae	Kandri, Puth Kanda	P	H	WP	Extract is used for different gastro complaints. Seeds powder mixed with sugar and given in colic.Root paste mixed with black pepper is taken during cholera, indigestion	Dysentery, Ulcer Abdominal pain, Colic,Cholera, Indigestion	Nwazstan ANP	Arshad et al.,2014; Qureshi et al.,2011; Shadangi et al.,2012
Acorus calamus L. *Acoraceae*	Kini kathi	B	H	Rh	Powder is given	Dysentery, Diarrhea	Cholistan	Hamayun et al.,2006
Acroptilon repens L. Asteraceae	Talkha	P	S	WP	Grinded leaves are mixed with flour and water to make paste and applied externally on belly	Stomachache Dysentery	Lahore-islamabad motoway	Ali & Qaiser., 2009
Adhatoda vasica Nees. Acanthaceae	Bahker,	P	H	L	1kg fresh leaves each of *A. vasica* and *Rhazya stricta* are soaked in water over night and administered for 3–4 days.	Stomach disorder	Cholistan	Abbas et al.,2013
Adhatoda zeylanica Medic.Acanthaceae	Bhaikar,	P	H	WP	Root and leaves decoction is given	Anthelmentic	Cholistan	Rauf et al.,2012; Khan & Hanif., 2006
Aesculus indica Coleb. Hippocastanaceae	Jawaz	A	T	F	Powder is mixed with husk and taken	Abdominal pain, Colic	Jalalpur Jattan, Gujrat	Abbas et al.,2013; Ali & Qaiser., 2009
Agave americana L. Agavaceae	Kanwar Phara	A	T	P	Make *Halwa* and used	Constipation, Acidity	Buner	Qureshi et al.,2011
Agave sisalana Perr. Agavaceae	Kanwar Phara	P	T	P	Make *Halwa* and used for constipation and acidity	Constipation, Piles, Acidity	Cholistan	Manan et al.,2007
Ajuga bracteosa Wall.	Spina	A	H	WP	125g pwder is mixed with flour and orally administered for	Abdominal pain	Mandi Bahaudin	Abbas et al.,2013; Hazrat et

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Labiatae	bootei				2–3 days.			al.,2011
Luffa cylindrica L. Labiatae	Torai	A	H	Fr	Fruits are used as vegetable	Stomach pain	Malakand	Alamgeer et al.,2013
Albizia lebbeck L. Mimosaceae	Sirsirin	A	T	B	Decoction is prepared with *T. ammi* and *C. bengalensis* and given	Diarrhea,Dysentery	Southern Punjab	Khan & Hanif., 2006
Allium barszczewski L. Alliaceae	Kach	B	S	L	Eaten raw or cooked as vegetable.	Stomachache	Cholistan	Abbas et al.,2013
Allium sativum L. Alliaceae	Lehsan	A	H	B, L	Bulb and leaves are boiled and the cooled extract administered against diarrhea, dysentery and vomiting. Bulbs are fried in mustard oil and can be used for dysentery.	Diarrhoea, Dysentery, Vomiting	Cholistan, D.I. Khan	Ballabh & Chaurasia., 2009; Rahmatullah et al.,2011; Mussarat et al.,2014
Aloe vera L. Asphodelaceae	Masloon, Bistorta	A	H	P	Fresh leaf pulp, ghee, sugar and wheat flour cooked together, make halwa and taken once a day at bedtime for treatment of constipation. ½ kg of leaf pulp, salt and *T.ammi* are mixed and take orally up to 1 week for digestive problems	Constipation Digestion	Bannu	Awan et al.,2013; Abbasi et al.,2010
Althea rosea L. Malvaceae	Gul e khaira	P	H	R	Roots are dip in earthen pot for whole night. In morning the water juice is drunk	Gastro-intestinal diseases	Leepa Valley, Muzaffarabad	Begum et al.,2014
Amaranthus hybridus L. Amaranthaceae	Tagalog Ranjaka	A	H	S	Seeds are semi cooked on iron pan, grindered and used as tea for acidity and stomach disorder	Acidity, Stomach disorder Indigestion	Cholistan Nwazstan	Marwat et al.,2012; Humayun et al.,2006; Noor et al.,2012
Amaranthus viridis L.Amaranthaceae	Putkanda, Ranzaka	A	H	L	Leaves are boiled in water with 'gur'and filter through a cloth, extract use for Expulsion of worms, abdominal pain and diarrhea.	Worms, Abdominal pain, Diarrhea	Cholistan Nwazstan	Farooq et al.,2012
Anthemis cotula L. Asteraceae	Sherisht	P	H	F	Flowers are boiled in water and used	Stomachache, Gas trouble	Khirthar National Park	Ali & Qaiser., 2009
Arisaema flavum Forsk. Araceae	Marjara	P	H	Rh	Rhizome used to kill worm	Worms	Chapursan Valley gilgit	Hazrat et al.,2011
Artemasia martima L. Asteraceae	Gadadhar	A	S	F,R	Flower powder and fresh roots Juice is used to expel worms and stomach pain.	Worms	Kohistan	Singh et al.,2012
Artemisia santolinifolia Turez. Asteraceae	Dron	A	H	WP	Plant extract is used	Worms	Khirthar National Park	Ahmad et al.,2007; Hayat et al.,2009
Artemisia absinthium L. Asteraceae	Sheeh	A	H	F	Powder is used	Indigestion	Dir Kohistan Valley	Afzal et al.,2009
Artemisia parviflora Roxb. Asteraceae	Kharkhalie ch	A	S	S	One teaspoon powder with one glass water for abdominal pain.	Abdominal pain	Khirthar National Park	Ahmad et al.,2007; Khan, 2011
Artemisia roxburghiana Wall. Asteraceae	Jangli ajwain	P	H	WP	Plant powder is used	Worms	Rawalpindi	Hayat et al.,2008; Khan et al.,2012
Asparagus adscendens Roxb. Asparagaceae	Safid muesli	A	H	R	Tuberous roots paste is very effective in dysentery problems	Dysentry	Karak	Mukergee, 2013
Asparagus racemosus Wild. Asparagaceae	Shahghand al/nanoor	A	S	R	Corm is used as carminative. Root paste and Extract mixed with sugar is taken for constipation and dysentery	Carminative, Constipation Dysentry	Leepa Valley, Muzaffarabad	Rahmatullah et al.,2010; Shah & Khan., 2006; Shadangi et al.,2012
Astragalus macropterus		P	H	L	Leaves are use to cure stomachic	Stomachic	Lahore_ Islamabad	Wazir et al.,2004

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DS. Papilionaceae							motorway	
Averrhoa carambola L. Oxalidaceae	Kamrnga	A	S	F	Fruit is taken orally.	Dirrhoea Vomiting	Rawalpindi	Rahmattullah et al.,2009
Azadirachta indica L. Meliaceae	Neem	P	T	B	Mixture of bark, lime and salt taken on empty stomach in the morning for 7 days	Worms	Lakki Marwat	Qureshi et al.,2011
Barberis lycium Royle. Berberidaceae	Sumbal , Toor Kwaray	P	S	R, L, F	Two to three teaspoonful of fresh fruit extract is recommended for stomachache, intestinal problem and diarrhea.	Stomachache Intestinal problem Diarrhea	Rawalpindi Kaghan valley	Ballabh & Chaurasia., 2009; Hazrat et al.,2011; Abbasi et al.,2013
Barleria acanthoides Vahl. Acanthaceae	Thath	P	S	R	Decoction of roots used	Gastrointestinal upset	Orakzai, Gujar Khan	Ahmad et al.,2007
Basella alba Basellaceae	Saag	A	H	R, S	Decoction of roots and shoot is given	Intestinal disorder		Singh et al.,2012
Bergenia ciliata Sternb. Saxifragaceae	Batpia,Gatpanra Zakhm-e-Hayat	P,A	S	R, Rh	The root is used in the treatment of diarrhea and digestive disorder. Rhizome is crushed and used in all kinds of stomach and duodenal ulcer.	Diarrhea,Indigestion,StomachUlcer, Internal infections	Jalalpur Jattan, Gujrat	Arshad et al.,2014; Begum et al.,2014; Humayun et al.,2006; Chaudary et al.,2013
Bergenia ligulata Wall. Saxifragaceae	Gatpanra	P	H	Rh,R	10 g of rhizome juice is taken orally with molasses, twice a day for 3-4 days as anthelmentic. Roots infusion for dysentery and stomach disorders.	Worms, Dysentry Stomach disorder	Jalalpur Jattan, Gujrat	Gurav & Gurav., 2014
Boerhaavia diffusa L. Nyctaginaceae	Punara	P	H	WP	Extract with raw sugar is use d	Stomach disorder	Karak	Khan & Hanif., 2006; Kumar & Bhagut., 2012
Boerhavia procumbens Roxb. Nyctaginaceae	Punarnava	P	H	R	Decoction is used.	Dyspepsia, Abdominal pain	Takht-e-Nasrati, Karak	Marwat et al.,2012; Qureshi et al.,2011
Brassica campestris L. Brassicaceae	Tepar, Sarson	A	H	S	100 g seeds are ground, and then powder is mixed with eggs and orally administered for 2–3 days	Stomach infection	Dir, kohistan valley	Abbas et al.,2013; Hassan et al.,2014
Bunium persicum Boiss. Umbelliferae	Kala zera	A	H	Fr, S	Fresh fruits and dried seeds are used	Gastrointestinal disturbance Dysentry	Chitral	Sharma et al.,2011
Callicarpa Macrophylla Vahl. Verbenaceae	Daya	A/P	S	R	Root juice is taken orally	Indigestion	Valley Alladand Dehri, Malakand	Jones & Kinghorne., 2008
Calotropis procera Willd. Asclepiadaceae	Spulmaey, Ak	A	S	F, L	50gm flower powder along with *P. somniferum*, *Eletteria cardomomum* (20 g each) used. Warmed leaves are tied on abdomen for colic	Cholera, Dysentery, Colic	Kaghan valleyBugrote	Khan et al.,2012; Punjani, 2002
Cannabis sativa L. Cannabaceae	Bhang.	A	H	WP	1 kg of dried leaves, floral buds and seeds are ground and mixed with wheat flour, salt and water use for 10–15 days	Abdominal swelling Indigestion	Upper Dir	Manan et al.,2007; Abbasi et al.,2013; Iqbal et al.,2011
Capparis decidua (Forsk) Edgew. Capparidaceae	Karir	P	S	AP F, B	Decoction of ½ kg of fresh aerial parts and fruits is used for 5–6 days	Indigestion Carminative Stomachache	Upper Dir	Abbasi et al.,2013; Marwat et al.,2011
Capsicum annuum L. Solanaceae	Merchiki	A	H	F	Fresh fruit with table salt and gur is used	Stomach disorder	Poonch Valley Azad Kashmir	Khan & Hanif., 2006
Caralluma edulis Benth. Asclepiadaceae	Pamankai	A	H	WP	Fresh plant is used	Parasitic diseases	Bugrote valleys Gilgit	Safa et al.,2012
Caralluma tuberculata	Marmoot,	A	H	WP	Plant powder is used	Dysentery, Stomach	Kaghan valley	Tareen et al.,2010; Ullah et

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Brown. Asclepiadaceae	Pawany					pain, Constipation		al.,2010
Carissa opaca Stapf. Apocynaceae	Granda	A	S	R	Root powder mixed with pericarp of *Mangifera indica* and used as wormicide	Worms	Karak	Khan & Hanif., 2006; Mahmood et al.,2011
Carthamus oxyacantha M.Bieb. Asteraceae	kareeza	A	H	L S	Decoction of leaves is used against dysentery. Seeds are used for stomach pain.	Dysentry Stomachache	lahore-islamabad motoway,Khirthar National Park	Alamgeer et al.,2013
Carum carvi L. Umbelliferae	Hojoj	P	H	F, S	Fruit decoction use to cure colic. Few seeds are taken directly with fresh water before sleeping as carminative and promote digestion.	Colic Carminative Indigestion	Kala Bagh	Ballabh & Chaurasia., 2009; Ahmad et al.,2007; Zid et al. AbouZid & Mohamed,2011
Chenopodium ambrosioides L. Chenopodiaceae	Ranzekka	A	H	F	The dried ripe fruits are crushed into powder, which is taken orally with water	Dyspepsia	Khushab	Khan et al.,2013; Adnan et al.,2014
Chenopodium botrys L. Chenopodiaceae	Skha kharawa	A	H	WP	Aqueous extract of the plant is used	Stomachache	Khushab	Barkattullah et al.,2009
Chenopodium morale L. Chenopodiaceae	Wereaij	A	S	WP	Decoction is used	Helminth and Laxation	Upper Dir	Khan et al.,2013; Hamayun, 2007
Chrozophora tinctoria L. Euphorbiaceae	Neeli Booti	A	S	L	Leaves are boiled in water and given orally	Stomachic	Makerwal & Gulla Khel	Qureshi et al.,2011
Cichorium intybus L. Asteraceae	Hund, Kasni, Gojri	A	H	F, L, R	Decoction of plant is taken	Gas trouble Diarrhoea Constipation Stomachache	Kohistan Khirthar National Park	Abbas et al.,2013; Awan et al.,2013; Fakir et al.,2009
Cistanche tubulosa (Schenk) Wight. Orobanchaceae	Kasi	A	H	WP	Powder of the plant is given in diarrhea.Whole plant decoction used to cure the gastric ulcer, vomiting and diarrhea.	Diarrhea Ulcer, Vomiting, Diarrhea	Malakand Valley Dir (Lower)	Qureshi et al.,2010
Citrullus colocynthis L. Cucurbitaceae	Maraghona e	P	H	F, S	Fruit and root pills use for constipation and piles. Juice of plant and *C. procera* is used up to a week.100 g fruit is crushed, mixed in *Aloe vera* pulp and taken for constipation for 2–3 days.	Stomachache Constipation, Piles Indigestion, Gas trouble and worms	Attock, Kaghan Valley	Hayat et al.,2008; Abbasi et al.,2013
Convolvulus arvensis L. Convolvulaceae	Leli / weli Pirwathia	P	H	WP	Dried roots are grinded and take 1–2 spoons as Purgative.1kg fresh plant is crushed along with sugar and water and given orally for 3–4 days	Purgation Constipation	Dir Kohistan Valley, Punjab	Manan et al.,2007; Arshad et al.,2014; Hussain et al.,2010; Adnan et al.,2014
Cordia myxa L. Boraginaceae	Lasora	A	T	B, L, F	Plant parts are used	Stomachache	Swat	Marwat et al.,2012
Cordia obliqua Willd. Boraginaceae	Lasoora,	A	T	S, St, B	Decoction of seeds stem and bark is administered orally for 10–15 days	Ulcer	Rawalpindi	Abbas et al.,2013; Krishna et al.,2014
Coriandrum sativum L. Umbelliferae	Dhania	P	H	L	Roast their leaves and take with water orally	Carminative	Valley Alladand Malakand	Adnan et al.,2014
*Croton bonplandianus*Bail. Euphorbiaceae	Mirch boti	P	H	R	Crushed roots are taken	Gastric diseases	Lahore_ Islamabad motorway	Ullah et al.,2010; Mahmood et al.,2011
Cucumis melo L.	Chibbar	A	H	F,L	The ripened fruit is cut into pieces and dried, which is used	Laxative, Indigestion	Attock, Kaghan	Hussain et al.,2010; Abbasi et

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Cucurbitaceae					as a condiment in cooking vegetables		Valley, Malakand	al.,2013; Arshad et al.,2011
Cucurbita pepo L. Cucurbitaceae	Gharangy Kadoo	A	H	F	Fruit pieces are boiled in 1.5 liters of water. Add salt and black pepper for taste and decoction used. Seeds are eaten raw as anti-helminthic	Intestinal, Gastric disorder Helminths	Attock, Malakand	Hayat et al.,2008; Mustafa et al.,2012
Cyperus nevieus Retz. Cyperaceae	Deela	A	H	R	Crushed root is taken	Stomachic	Malakand	Ahmad, 2007
Cyperus rotundus L.Cyperaceae	Nagermotha, Dilla, Kabah	P	H	R, Rh	Decoction of root and equal quantity of *M. piperata* given for 4-5 days. 5g of rhizome powder is taken with milk daily 3 times a day for 2-3 days to cure dysentery.	Cholera, Dysentry Indigestion	Malakand, Punjab,Bannu, SouthWaziristan Agency	Hussain et al.,2010; Qureshi et al.,2010; Gulshan et al.,2012; Biswas et al.,2011
Cyperus scariosus R.Br. Cyperaceae	Tarkh	P	H	WP	Powder of plant or fresh plant is used	Worms	Kadhi Areas of khushab	Afzal et al.,2009
Dalbergia sissoo Roxb. Papilionaceae	Shisham, Shawa	P	T	B, L	Crushed bark as remedy for the abdominal pain. Deecocotion of ½ kg fresh leaves, 200 g linseeds taken orally for 8–10 days for constipation.	Abdominal pain Constipation	Northern areas Miandam Valley, Swat,	Abbas et al.,2013; Hassan et al.,2014
Datura stramonium L. Solanaceae	Batura	A	H	L	Leaf juice is used	Stomachache	Karak	Manan et al.,2007
Debregeasia longifolia Rendle. Urticaceae	Sandari.	P	H	L	Tender leaves are taken as vegetable	Dysentry	Valley Alladand Dehri,Malakand	Khan et al.,2012; Majumdar & Datta., 2013
Diospyros lotus L. Ebenaceae	Amlok	A	T	F	Decoction of ripened fruit is used	Dysentry	Tehsil Birmal, SWA	Sher & Hussain., 2009
Dodonaea viscosa Jacq. Sapindaceae	Sanatha	B/P/A	S	L	Grind dried leaves into powder and take orally with water	Stomach acidity	Jalalpur Jattan, Gujrat	Hayat et al.,2008; Hussain et al.,2010
Echinops echinatus Roxb. Asteraceae	Tik.	B	H	WP	Whole plant infusion use orally	Dyspepsia	Rawalpindi	Murad et al.,2012
Eclipta alba L. Asteraceae	Tik.	A	T	R	Root powder or decoction is taken	Nausea and Vomiting	Rawalpindi	Wariss et al.,2014
Elaeagnus angustifolia L. Elaeagnaceae	Sersang	P	T	F, L, Fl	Plant parts are used in powder form	Ulcer, Diarrhea and Dyspepsia	Lakimarwat	Khan, 2011; Mardaninejad et al.,2013
*Ephedra gerardiana*Wall ex Stapf. Ephedraceae	Soane	A	S	L	The leaves and stem extract is used	Stomachache	LakkiMarwat	Hadi et al.,2013
*Eruca sativa*Miller. Brassicaceae	Tarameera	A	H	S	200 ml seed oil is mixed with 200 g of sugar orally used for 4–5 days	Dysentry	Attock, Dir, kohistan valley	Murad et al.,2013; Abbas et al.,2013
Euphorbia hirta L. Euphorbiaceae	Titra	P	H	WP	Extract of milky juice is used orally for infants as carminative	Carminative	Lakki Marwat, Makerwal & Gulla Khel	Adnan et al.,2014
Fagonia bruguieri DC. Zygophyllaceae	Drummahu.	P	S	WP L, Fr	The plant powder is used for gastritis, dyspepsia, flatulenceand vomiting. Leaves and fruit's decoction is used	Gastritis, Dyspepsia, Vomiting Abdominal pain	Malam Jabba valley, Swat	Wariss et al.,2014; Noor et al.,2012
Fagonia cretica L. Zygophyllaceae	Spelaghzii Shin	A	H	WP	The extract of whole plant is used	Inflammation	Galyat	Murad et al.,2013

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Fagonia indica Burm. Zygophyllaceae	Dhaman	A	H	WP	Grind the whole plant and take 2–3 spoons as purgative.	Purgative	Gallyat	Abbas et al.,2013; Adnan et al.,2014
Ferula assafoetida L. Umbelliferae	Sup	P	H	R, La	Latex, root powder use for parasite repellent.	Parasite	Chitral	Safa et al.,2012
Ficus carica L.Moraceae	Inzar	A	T	L, F	Fruit is eaten daily twice a day to cure constipation. Leaves and fruit decoction use orally for dysentery.	Constipation Dysentry	Tunglai Mountain Baffa Mansehra	Barkatullah et al.,2009
Foeniculum vulgare Mill. Umbelliferae	Sonf	P	H	F	250g fruits powder mix with equal quantity of pomegranate powder and one teaspoon thrice in a day before and after meal.decoction of fennel fruit, fresh mint leaves and green used for vomiting	Indigestion,Chronic dyspepsia, Gastritis Dysentry, Diarrhea Vomiting	Chitral Kala Bagh	Mussarat et al.,2014; Afzal et al.,2009; Kumar et al.,2009
Fumaria indica Hausskn. Fumariaceae	Shahtora Pita papara,	A	T	WP	The juices mixed with honey useful in constipation. Whole plant is boiled in water and decoction is used for constipation.	Constipation	Sothern Punjab, Northern Areas	Manan et al.,2007; Noor et al.,2012; Hussain et al.,2008; Jan et al.,2008
Gardenia jasminoides Ellis. Rubiaceae	Chandna	P	S	L, F	Leaves and flower are use in stomach ache.	Stomachache	Balochistan	Hussain et al.,2010
Gentiana decumbens Wall. Gentianaceae	Neeli Booti	A	T	WP	A tincture of this plant has been prepared and used	Stomachache	District Sialkot, Punjab	Qureshi et al.,2007
Gentiana kurro Royle. Gentianaceae	Trayamana	P	H	R	Roots are dried to make powder and taken along desi ghee	Stomachache	Pakistan	Begum et al.,2014
Gentianodes olivier Griseb. Gentianaceae	Nilkant	P	H	R	Decoction of root is used	Stomachache	Pakistan	Tareen et al.,2010
Gisekia pharnaceoides L. Aizoaceae	Aluuka	B	H	WP	Fresh parts are used	Indigestion and parasites	Sialkot	Safa et al.,2012
Grewia tenax (Forssk.) Tiliaceae	Anzirai	A	S	R, B	Decoction of root and bark powder is used	Dysentry	Booni Valley, Chitral	Patel et al.,2013
Haloxylon griffithii Boiss. Chenopodiaceae	Bundi	A	S	WP	The whole plant is boiled in water and the decoction is used	Stomachache	Dir	Tareen et al.,2010
Haloxylon recurvum Bioss. Chenopodiaceae	Khar	A	S	WP	Ash powder is used	Flatulence, Dyspepsia, Constipation Hemorrhoids	Upper Dir	Waris et al.,2014
Heliotropium strigosum L. Boraginaceae	Kharsan Gorakh pan	A	H	WP	Infusion used for cooling purposes. Add sugar to infusion for taste.	Inflammation	Swat,North Waziristan	Hayat et al.,2008; Iqbal et al.,2011
Hertia intermedia Boiss. Asteraceae	Manguli	A	H	L	Leaves are boiled in water and the decoction is used	Stomachache	Nara desert	Tareen et al.,2010
Hippophae rhamnoides L. Elaeagnaceae	Bera, Sarla	A	T	F	Syrup is prepared from sour fruit and used	Diarrhea	Tehsil Birmal, SWA	Afzal et al.,2009
Indigofera gerardiana Wall.exBaker. Papilionaceae	Ghore jey Nili veda	P	T	L	Leaves juice is used	Diarrhea, Dysentry	Lahore_ Islamabad motorway, Southern Punjab	Kumari et al.,2013
Inula grandiflora Willd. Asteraceae	Poshkara	A	H	Rh	Both powdered and fresh rhizome is used	Gastric disorder	Khirthar National Park	Khan et al.,2013

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Inula racemosa H.K. Asteraceae	poshkar	P	H	R	Roots are use to cure stomachic and carminative.	Carmination	Khirthar National Park	Wazir et al.,2004
Jatropha hastate Jacq. Euphorbiaceae	Arind	P	T	L, S	Decoctions of the leaves used for stomachache. Seeds oil is used as purgative.	Stomachache Purgative	Makerwal & Gulla Khel, swat	Ahmad, 2007
Justicia adhatoda L. Acanthaceae	Bhekkar, Vasaka, Baza	B	S	L	The leaves of *J.adhataoda, C.sinensis* and *F. vulgare* (10g each) are boiled in water at night Decoction is filtered and used early in morning	Stomachache, Bleeding dysentery	Orakzai, Gujar Khan, Cholistan	Hayat et al.,2008; Ullah et al.,2010; Jan et al.,2008
Lallemantia royleana Benth. Labiatae	Tukm-e-BalangahVillanays	A	H	S	Seeds are soaked in water overnight make infusion. Eat seeds up to 2–5 gram for carminative.	Stomach troubles Carminative	Mandi Bahaudin	Hayat et al.,2008; Adnan et al.,2014
Lawsonia inermis Lam. Lythraceae	Revandchini`	P	H	L, S	Leaves and Seeds are used	Dysentry	Bannu	Hussain et al.,2008
Lepidium draba L. Brassicaceae	Bashka	A	H	WP	Fresh plant is used	Stomachache	Dir, kohistan valley	Farooq et al.,2012
Leptadenia pyrotechnica Forssk. Asclepiadaceae	Markh	A	S	WP	Powder of whole plant used	Carminative	Bugrote valleys gilgit	Safa et al.,2012
Lycopersicon esculentum Mill. Solanaceae	Tamatar,	A/P	H	Fr	Fresh juice of riped fruit is used to reduce acidity	Stomach acidity	Lodheran, Punjab	Hayat et al.,2008
Malva neglecta Wall. Malvaceae	Panerak	P	H	L, R	Decoction of leaves is used as a laxative and remedy for tape worm.	Laxative, Worms	Lakki Marwat	Farooq et al.,2012; Hassan et al.,2014
Melia azedarach L.Meliaceae	Dharek/ Bakain	P	T	Wp	200 g of fresh leaves, twigs and fruits are crushed for gas troubles and indigestion.	Gas trouble, Indigestion	Lakki Marwat	Manan et al.,2007; Khan et al.,2012
Mentha arvensis L. Labiatae	Podina	P	H	L	Dried leaves are taken with curd to control dysentery, to stop vomiting and nausea, cholera	Dysentry,Vomiting Indigestion,Cholera	Punjab, Balochistan	Shah & Khan., 2006; Begum et al.,2014
Mentha longifolia L. Labiatae	Enaley, Ben	P	H	L, S, R	Fresh leaves and shoots as anti-diarrhoeal. Paste of leaves and tender shoots with garlic and little salt is given trice a day	Dysentery,Diarrhea, Stomachache, Vomiting	Jhelum, Mirpur, AJK	Hassan et al.,2014; Barkattullah et al.,2009; Hussain et al.,2008
Mentha royleana Benth. Labiatae	khwaa bootei	A	H	Wp	Leaves are mixed in green teas and are used in vomiting, as cooling agent. Decoction is used as carminative.	Vomiting, Gas trouble, Carminative	Mandi Bahaudin	Khan et al.,2013; Noor et al.,2012
Mentha Spicata L. *Labiatae*	Poodna	A	H	L	Leaves decoction taken orally	Carminative, Diarrhea	Balochistan, Kurd Sharif	Mahmood et al.,2013
Mentha sylvestris L. Labiatae	Lewanii Vellana	A	H	L	Decoction of the plant is used	Carminative, Nausea,Vomiting	Lakki Marwat, Jhelum	Farooq et al.,2012
Mentha virdis L. Labiatae	Podina	P	H	WP	Decoction is used.Dry leaves powder used as carminative.	Flatulence, Indigestion, Stomachache Carminative	Sialkot	Mussarat et al.,2014; Farooq et al.,2012; Hussain et al.,2012
Momordica balsamica L. Cucurbitaceae	Jangli Kareel	P	T	F	Fruit is used to treat gas trouble and constipation. By using its extract to kill the abdominal worms.	Constipation Abdominal worms	Attock	Manan et al.,2007; Shaheen et al.,2012
Momordica charantia L. Cucurbitaceae	Karela	A	S	F	Fruit is used to treat intestinal worms and dysentry.	Worms, Dysentry	Malakand	Shaheen et al.,2012

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Morus nigra L. Moraceae	Kala Toot	A	T	L	The decoction of young leaves is used	Diarrhea	Mansehra	Hussain et al.,2010
Mukia maderaspatana L. Cucurbitaceae	Khotilal	A	H	R	The decoction of root is useful	Flatulence	Attock	Qureshi et al.,2010
Murraya exotica L. Rutaceae	Marva	A	S	R, L	Roots and leaves extract with sugar or salt is useful	Helminths,DiarrheaCarminative Dysentery	Humzoni, Nwa	Hussain et al.,2010
Nasturtium offficinale R.Br. Brassicaceae	Termera	P	H	L	Fresh leaves are cooked as vegetables and taken orally for constipation. Local hakims use it in tablets, for stomachache.	Constipation Stomachache	Dir, kohistan valley, D.I.Khan	Abbasi et al.,2013; Barkattullah et al., 2009
Ocimum bacilum L. Labiatae	Gusmaly	P	H	S,L	Mucilaginous seeds are used in diarrhea and chronic dysentery. Decoction of leaves is useful in diarrhoea and tonic for stomach. Leaves mixed with mint and little for stomachache and vomiting.	Diarrhea Dysentry Stomachache Vomiting	Chitral	Hayat et al.,2008; Ballabh & Chuarasia., 2009; Shadangi et al.,2012; Hussain et al.,2008
Olea ferruginia Royle.Oleaceae	Kahu/ kohi	P	H	F	Extract of fruits is given orally for 5–6 days	Indigestion	Bumburet Valley Chitral	Rauf et al.,2012; Khan et al.,2012
Opuntia dillenii Haw. Cactaceae	Kunda thur	P	S	F	Decoction of fruits with sugar and kept in a bottle and 2 tablespoon of juice used twice a day for 21 days	Piles Inflammation	D. I. Khan	Rajasab & Isaq., 2007
Opuntia monacantha Haw. Cactaceae	Chnutarthar	P	S	WP	Used in powder form	Laxation, Stomachache Carminative	D.I.Khan	Ahmad., 2007
Origanum vulgare L. Labiatae	Jangli Ajwain	P	H	Wp	Leaves extract and Whole plant Powder mixed with milk is taken	Stomachache Colic, Diarrhea, Ulcers, Vomiting	Kurd Sharif, Karak	Murad et al.,2012; Bhatt & Negi, 2006; Arshad & Ahmad., 2004
Oroxylum indicum Linn. Bignoniaceae	Talwar phalli	P	T	F, St, B	Fruits and stem are dried and powdered make pills and taken thrice daily for 1-2 months	Dysentry Piles	North Waziristan	Punjani., 2002; Hossan et al.,2009
Otostegia limbata Boiss. Labiatae	Chitta jand	A	T	L	Leaves are crushed and used	Acidity	Jhelum	Rauf et al.,2012
Oxalis corniculata L. Oxalidaceae	Marveeza	P	H	WP	Whole plant infusion use orally	Diarrhea,Dysentery Constipation Stomachache	Malakand Valley Dist Dir (Lower)	Murad et al.,2012
Parthenium hysterophorus L. Asteraceae	Thandi boti	A	H	WP	Decoction of plant is used	Dysentry	Lahore-Islamabad Motoway	Mahmood et al.,2011
Peganum harmala L. Zygophyllaceae	KisankoorSponda/Spellanii	Pn	S	WP	½ kg fresh leaves ground with salt; paste is orally administered for 5–6 days for gastric problems. Plant soaked in water and infusion is used for abdominal pain. Powered seeds are given twice a day in small dose for stomachache for 2-3 days.	Abdominal pain, Gastric problems Vomiting Abdominal pain Stomachache	Gallyat	Hayat et al.,2008; Ballabh & Chaurasia., 2009; Tareen et al.,2010; Noor et al.,2012; Sultana et al.,2006
Phyllanthus emblica L. Euphorbiaceae	Amla	A	T	B, F	Bark and fruit decoction use orally	Inflammation Dysentry	Makerwal & Gulla Khel	Abbasi et al.,2013; Hussain et al.,2008
Pimpinella stewartii Dunn. Umbelliferae		P	S	F	Fruit is eaten	Carminative	Chitral	Afzal et al.,2009; Awan et al.,2001
Plectranthus rugosus Wall. Lamiaceae	Spairkay	A	S	Sh	Decoction and powder is used	Inflammation	Jhelum	Alamgeer et al.,2013

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Pongamia pinnata L. Papilionaceae	Sukh Chain	P	T	L	Powder is taken orally	Gas trouble	Lahore_ Islamabad motorway	Mahmood et al.,2013
Prunus armeniaca L. Rosaceae	Zule	P	T	F	The decoction of the dried fruits is used	Laxative and Purgative	Balochistan	Sher et al.,2009
Psidium guajava L. Myrtaceae	Amrood, Guava	P	T	Fr, L	Whole fruit is eaten simply as a purgative. Fresh leaves and paste of tender twig with cold water is taken orally for diarrhea	Purgative, Blood dysentery Diarrhea	Karak	Hussain et al.,2010; Shadangi et al.,2012; Adnan et al.,2014
Ricinus communis L. Euphorbiaceae	Hernoli, Castor oil	P	S	S	Seed oil is used	Constipation	Swat, Lahore-Islamabad motorway	Abbas et al.,2013; Hussain et al.,2010; Arshad et al.,2011
Rosa damascena Mill. Rosaceae	Gulab.	P	S	Fl	Powdered flowers with Quercus fruit is used	Hemorrhoid and Ulcer	Punjab	Iqbal et al.,2011; Amir et al.,2013
Rosa indica L. Rosaceae	Gulab	P	S	Fl	Petals of flowers and sugar are put in jar for two to three days and the product (gulkand) is taken for constipation and abdominal pain.	Constipation and Abdominal pain	Punjab, D. I. Khan	Khan et al.,2013; Sultana et al.,2006; Mussarat et al.,2014
Rosa webbiana Wall. Rosaceae	Palwari	B	S	F, Fl	Flower and fruit juice is consumed to cure stomach pain.	Stomachache	Balochistan	Singh et al.,2012; Wazir et al.,2004
Salix alba L. Salicaceae	Walla	P	T	B, L	Decoction is used	Diarrhea, Dysentry	Rawlakot-Azad jamu & Kashmir	Mardaninejad et al.,2013; Qureshi et al.,2006
Salvadora oleoides Decne. Salvadoraceae	Banbakhara ,Jhal	B,A	S	L, F, St	Decoction of leaf, fruit and stem used. The unripe fruits are pickled and used to treat constipation.	Diarrhea, Purgative Constipation	Leepa Valley Muzaffarabad, Gilgit	Shaheen et al.,2012
*Salvadora persica*L. Salvadoraceae	Peelu	B/P	S	S, L	Decoction is used	Constipation Stomachache	Jalalpur Jattan, Gujrat	Tareen et al.,2010
Salvia cabulica Bth. Labiatae	Matetav	A	H	L	Leaves are soaked in water and the decoction is used	Stomachache	Jhelum	Tareen et al.,2010
Sisymbrium irio L.Brassicaceae	Jangli sarsoo	A	H	S	Crushed seeds are used	Dysentery, Diarrhea Vomiting	Dir, kohistan valley	Murad et al.,2013; Hussain et al.,2008
Solanum miniatum Beruh. Solanaceae	Peelak.	P	H	L	Decoction takentwice a day for 6-7 days	Abdominal swellowing	Poonch Valley Azad Kashmir	Abbas et al.,2013; Iqbal et al.,2011
Solanum nigrum L. Solanaceae	Mako	A	H	WP	Whole plant infusion use orally for diarrhea.Ripe fruits are directly given orally for constipation. Plant juice is used for dysentery.	Diarrhea Constipation Dysentry	D. I. Khan Karak	Mussarat et al.,2014; Murad et al.,2012
Solanum surattense Burm. Solanaceae	Kanderi, Mahukeri	A	S	WP	Pills of plant use for vomiting.200 g fresh plant is boiled with black pepper and salt and given orally	Stomachache Vomiting Indigestion	Poonch Valley Azad Kashmir	Abbas et al.,2013; Murad et al.,2012
Spinacea oleracea L. Chenopodiaceae	Paluk	A	H	L	Boil 5–8 leaves in water and take orally	Stomach calming	Khushab	Adnan et al.,2014; Akhter et al.,2013
Swertia chirata L. Gentianaceae	Chiraita	B	H	WP	Aerial parts are dried and crushed to use for stomach trouble and digestive disorders.Whole plant decoction is taken orally for gastro-entritis.	Indigestion Gastroentritis	Kala Bagh	Arshad & Ahmad., 2004; Ningombam et al.,2014
Tecomella undulate Bignoniaceae	Purpak	A	H	B	Decoction of the bark is used	Constipation Stomachache	Mansehra	Tareen et al.,2010; Safa et al.,2012

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Tephrosia lupinifolia DC. Papilionaceae	Fish Poison	A	H	R, L, St, B	Powder of plant parts	Stomachache, Diarrhea	Southern punjab	Hussain et al.,2010; Arshad et al.,2011
Terminalia chebula Retz. Combretaceae	Harar	B	T	F	Powdered fruit is mixed with water or cow's or goat's milk and taken	Stomachache	Dir Kohistan Valley	Ignacimuthu et al.,2006
Thymus linearis Benth. Labiatae	Sew	A	H	WP	Whole plant is boiled in water and used	Indigestion Carminative	Sialkot	Ali & Qaiser., 2009; Noor et al.,2012; Humayun., 2007
Thymus serphyllum L. Labiatae	Pangdum	P	H	WP	Seeds are grinded and one spoon used daily with water. Powder of flowers is mixed in “Gur” and given as vermicide.	Abdominal pain, internal wound Worms	Mirpur, AJK	Shah & Khan., 2006; Farooq et al.,2012; Qureshi et al.,2007
Tordylium nodosum L Apiaceae	Hoso beta	A	H	R	The juice of the root is used	Indigestion	Bannu	Khan et al.,2013
Trachyspermum ammi L. Umbelliferae	Ajwain	A	T	S	Seeds are eaten before meal with water or milk	Stomachache, Digestive disorder	Valley Alladand Dehri Malakand	Humayun et al.,2006; Iqbal et al.,2011
Trachyspermum ammi L.Umbelliferae	Ajwain	P	H	S	Seeds are taken with little salt	Gas trouble	Chitral	Sultana et al.,2006
Tribulus terrestris L. Zygophyllaceae	Bakhra, spalani	A	H	F	The powder of fruits is mixed in water and taken	Diarrhea	Gallyat	Hussain et al.,2008; Prusti & Behera., 2007
Typha angustata B & C.Typhaceae	Lokhay	P	H	L	Dry the leaves are grind and cooked	Gas trouble	Booni Valley, Chitral	Adnan et al.,2014
Verbiscum thepsus L. Schryophylaceae	Ghadi Kan	A	H	WP	Tea of leaves is used	Dysentry Diarrhea	Jalalpur Jattan, Gujrat	Abbas et al.,2013; Noor et al.,2012
Veronica anagallis L. Plantaginaceae	Hazar booti	A	H	WP	Whole plant is used	Stomach upset	Jalalpur Jattan, Gujrat	Gulshan et al.,2012
Viola odorata L. Violaceae	Banafsha	P	H	R	Oil is used	Abdominal pain	Malakand	Chaudary et al.,2013
*Viola serpens*Wall. Violaceae	Binafsha	P	T	F, L	One cup of decoction is used three times in a day	Inflammation	Malakand	Begum et al.,2014
Vitex agnus-castus L. Verbenaceae	Gowanik	A	T	S	Seeds are boiled in water and decoction is used	Stomachache	Malakand	Tareen et al.,2010
Vitex negundo L. Verbenaceae	Marvandi	P	T	S, L, R, St, B	Powder of *T. ammi* seeds, *V. negundo* dried seeds and table salt is taken with water twice a day	Cholera, Gas trouble,Worms, Carminative	Malakand	Abbasi et al.,2010; Safa et al.,2012
Withania coagulans Dunal.Solanaceae	Khapyanga , Paneer	A	H	F	Fruit is used for dyspepsia and flatulence.Five to six fruits is taken with water like tablet for abdominal pain.	Dyspepsia Abdominal pain	Swat, Karak, D. I. Khan	Murad et al.,2013; Mussarat et al.,2014; Farooq et al.,2012
Withania somnifera L. Solanaceae	Shapianga	A	H	F, L, S	Flower and leaf decoction use in treatment of Anthelmintic. Put 2–3 seeds or fruits into the water and then eat	Helminths Carminative	Bannu	Adnan et al.,2014
Xanthium strumarium L. Asteraceae	Chhota Dhatura	A	H	L, R	Decoction is used.	Laxative	Khirthar National Park, Rawalpindi	Hussain et al.,2010; Waris et al.,2012; Arshad et al.,2011
Zanthoxylum armatum L. Rutaceae	Gojri	P/A	S	L, S, F	50 g seed are orally administered with flour	Indigestion	Humzoni Nwa	Abbas et al.,2013
Zataria multiflora Boiss. Labiatae	Thrushnagh ooli	P	S	L, Sh	Powder is used	Diarrhea, Stomachache	Sialkot	Ali & Qaiser., 2009; Safa et al.,2012

Key: Aerial part= AP, Bark= B, Flower bud= FB, Flower= F, Fruit= Fr, Latex= La, Leaves= L, Pulp= P, Resin= Re, Rhizome= Rh, Root= R, Sap= Sp, Seed= S, Stem= St, Twig= Tw, Whole plant= WP, Wood= W, Tree= T, Herb= H, Shrub= S, Annual= A, Biannual= B, Perennial= P

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Table 2: Ecological status of plant species.

Plants	Wild/ Cultivated	Endemic	Ecological status	Refrences
Acacia nilotica	Cultivated	Endemic	Endangered	Ahmad et al., 2012; Abbasi et al., 2010
Achillea millefolium			Vulnerable	Khan., 2011
Acorus calamus			Endangered	Humayun et al., 2006
Aesculus indica			Endangered	Khan., 2011
Ajuga bracteosa		Endemic	Threatened	Qamar et al., 2010; Akhtar et al., 2013
Albizia lebbeck	Wild		Endangered	Ahmad., 2007; Ahmad et al., 2012
Allium sativum	Cultivated		Protected	Hussain et al., 2012; Ahmad et al., 2012
Barberis lyceum		Endemic	Threatened	Qamar et al., 2010; Akhtar et al., 2013
Bergenia ciliate	Wild		Threatened	Abbas et al., 2013; Humayun et al., 2006; Qamar et al., 2010
Bunium persicum			Critically endangered	Khan., 2011
Cannabis sativa	Wild	Endemic	Proteced	Abbas et al., 2013; Ahmad et al., 2012; Akhtar et al., 2013
Capparis decidua	Wild	Endemic	Vulnrable	Khan & Hussain., 2013; Ahmad et al., 2008
Dalbergia sisso	Wild	Endemic	Endngered	Ahmad., 2007; Ahmad et al., 2012; Ahmad et al., 2008
Dodonaea viscosa	Wild	Endemic	Enangered	Ahmad., 2007; Khan & Hussain., 2013; Ahmad et al., 2008
Elaeagnus angustifolia	Wild		Vulnerable	Abbas et al., 2013; Khan., 2011
Ephedra gerdiana	Wild	Endemic	Threatened	Abbas et al., 2013; Qamar et al., 2010; Shaheen et al., 2012
Grewia tenax	Wild		Endangered	Ahmad et al., 2012
Melia azedirach	Cultivated		Vulnerable	Ahmad et al., 2012; Khan & Hussain., 2013
Mentha arvensis	Wild		Vulnerable	Abbas et al., 2013; Khan., 2011
Mentha longifolia	Wild	Endemic	Near threatened	Abbas et al., 2013; Khan., 2011; Ahmad et al.,2009
Mentha viridis			Protected	Hussain et al., 2012
Morus nigra	Cultivated		Endangered	Khan & Hussain., 2013; Ahmad et al., 2012
Ocimum bacilum	Cultivated		Vulnerable	Ahmad et al., 2012; Khan & Hussain., 2013
Olea ferruginia	Wild	Endemic	Endangered	Ahmad et al., 2012; Ahmad et al., 2008
Origanum vulgare	Wild	Endemic	Vulnerable	Abbas et al., 2013; Khan., 2011; Akhtar et al., 2013
Oxalis carniculata	Wild	Endemic	Protected	Ahmad., 2007; Hussain et al., 2012; Akhtar et al., 2013
Phyllanthus emblica			Endangered	Ahmad et al., 2012
Plectranthus rugosus			Vulnerable	Ahmad et al., 2012
Rosa indica	Wild		Vulnerable	Ahmad., 2007; Khan & Hussain., 2013
Salvadora oleoides	Wild	Endemic	Endangered	Ahmad., 2007; Khan & Hussain., 2013; Ahmad et al., 2008
Thymus linearis	Wild	Endemic	Critically Endangered	Abbas et al., 2013; Khan., 2011; Akhtar et al., 2013
Viola serpens	Wild		Threatned	Sher et al., 2011; Abbas et al., 2013
Vitex negundo			Vulnrable	Khan & Hussain., 2013
Zanthoxylum armatum	Wild	Endemic	Critcally Endangered	Ahmad., 2007; Ahmad et al., 2012; Akhtar et al., 2013

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