# Application of ethnobotanical indices to document the use of medicinal plants in Tehsil Kallar Syedan, District Rawalpindi, Punjab, Pakistan

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## Research

## Abstract

*Background.* Ethnobotanical studies report the customary uses of plants used by the local communities across the world. The goal of present study was to census the ethno-medicinal uses of local plants used by the natives of Tehsil Kallar Syedan, District Rawalpindi by using quantitative ethnobotanical indices.

*Methodology.* Ethnobotanical surveys were carried out during March 2018 to April, 2022 to document traditional uses of medicinal plants by using semi-structured questionnaires. The gathered data was examined by using quantitative indices comprising frequency of citation (FC), relative frequency citation (RFC), use value index (UV) and fidelity level (FL%).

*Results.* In total, 169 medicinal plant species belonged to 136 genera and 54 families have been documented from this region which are being used to treat or prevent common diseases. The informants included people of different age groups. Poaceae was the most widely used family (17 species). Major life form of plants was herb (61%); while leaves (35%) were highly used in preparing recipes. RFC values ranged from 0.11 to 0.78; while UV ranged from 0.10 to 0.82. A total of 13 species showed highest FL of 100%. Most medicinal applications involved the whole plant (50.8%), although leaves (32.5%), roots (10.0%), flowers (8.2%), stems (5.9%), seeds (3.5%), bark (3.5%), fruit (1.7%), latex (1.7%), bulbs (1.1%), rhizomes (0.5%), and tubers (0.5%) were also used.

*Conclusion.* This research appraisal provides some additional and novel use along with higher RFCs and UVs which may serve as benchmark for phytochemical analysis and novel therapeutic properties.

*Key words:* Ethnobotanical indices, Traditional plants, Ethno-medical knowledge, Traditional medicines, *Herbalists,* Kallar Syedan

## Background

Ethno-medicinal studies have historically been very effective ways to understand the traditional uses of local plants and to identify botanical sources from which modern medicines can be derived (Ali *et al.* 2018, Hosseinzadeh *et al.* 2015). Traditional knowledge can be very helpful in identifying medically useful plant species, which may later be used for drug production (Baydoun *et al.* 2015). Indeed, folk information and ethnomedical records of the uses of local plant species have contributed significantly to drug development (Wangchuk *et al.*2015). Currently, twenty five percent of all medical drugs are primarily plant-based; factory-produced replicates of plant-derived chemicals also account for a huge proportion of today's drugs (Bano *et al.* 2014). The essential role of natural products in recent medical developments is unquestionable. In recent years, the role of plants in drug development and production has prompted researchers to focus on the traditional uses of plants, known as ethnomedicine, to further our understanding of the potential medical uses of wild flora (Jantan *et al.* 2015, Umair *et al.* 2017).

Quantitative ethnobotany emerged as a reaction to the apparent "partisanship" of previous approaches to scientific enquiry (Sillitoe 2019). A modern perspective is that traditional communities have in-depth knowledge of the medical uses of their native flora, and that ethnobotanical data and phytosociological inventories are useful tools for researchers seeking to understand regional botanical information and the potential medical uses of local flora (Patra *et al.* 2019, Albuquerque 2009).

More than 80 % of world population especially that of developing countries including Pakistan rely on traditional medicines for all or some of their therapeutic needs (Ali *et al.* 2023, Liaqat *et al.* 2023). Over 600 plant species are thought to be used therapeutically in Pakistan. The majority of these plants are present in northern and western Pakistan, in Himalayan regions, which are floral biodiversity hotspots, with over 8000 species of flowering plant (Ahmad *et al.* 2017).

The documentation of traditional medical knowledge and practices is an important part of heritage conservation (Abbott *et al.* 2014). Validation of ethno-medicinal uses of plants can help in confirmation of their use as medicinal plants. Moreover, the collection of data on ethno-medicinal plants can be useful in drug discovery and development in future. Timely collection and documentation of such data can help in conservation of knowledge before it is lost forever (Singh *et al.* 2023). The scope of collection of ethno-medicinal data is beyond any doubt especially in remote areas where healthcare facilities are not sufficient (Singh *et al.* 2023). The area of Tehsil Kallar Syedan of District Rawalpindi is blessed with natural beauty of vegetation and is used by the local residents for their daily healthcare needs. It is hypothesized that the local flora is ethno-medicinally valuable, and it should be studied for its uses. In the present study, we documented the traditional medicinal uses of plants collected from the local residents of Tehsil Kallar Syedan of Rawalpindi District. The aim of the current study was to: (i) enlist the species of flora that are traditionally used for medical purposes; (ii) to evaluate the ethno-medicinal data using FC, RFC, FL and UV indices in order to explore most popular species in this regard.

## Materials and Methods

### Study area

The study was carried out in Tehsil Kallar Syedan, district Rawalpindi. Kallar Syedan is geographically located at latitude (33°.59) 33° 35'24'' North of the Equator and longitude (73°C .38) 73° 22' 47'' East of the Prime Meridian on the Map of the world. The study area is about 3000 to 4000 feet above the sea level. The core study area contains approximately 100 villages. The native language of most local people is Pothwari, and around 80 % of the region's inhabitants are culturally Punjabi. The maximum and minimum mean temperature in Kallar Syedan Tehsil in summer ranges between 97.6 °F (36.6 °C) and 74.4 °F(27.92 °C) whereas in winter it is between 74.5 °F(27.92 °C) and 44.6 °F (16.74 °C) respectively. The mean annual rainfall is about 27 inches (675 mm) in summer and about 9 inches (225 mm) in winter. Half of the annual rainfall occurs in July and August an average of about 10.2 inches (255 mm) in each of that two month.

### Data collection

Field work was carried out from March, 2018 to April, 2022. Data was collected from 10 major remote sites (*Sakot*, *Arazi, Bhatti, Bagh Boota, Balimah, Banal, Barota, Dera Khalsa, Darkali Sher Shahi and Samote*), those areas which are deprived of primary health care facilities by making total 25 frequent visits to the study area in four different seasons. The data was collected from 200 informants aged between 20 and 80 years by following standard methods described by Ijaz *et al.* (2016). The survey was done by using proper semi-structured interviews and group discussions as well. A checklist of questions was prepared in English language for undertaking interviews and

discussions (Opie 2019). The questionnaire contained no strict questions and informants were allowed to speak spontaneously, without pressure and in the local languages (Brown *et al.* 2015). Key questions about medicinal plants were on local name of a particular medicinal plant, types of disease treated, mode and method of remedy preparation, parts of the plants used (Abera 2014). Socio-cultural information about informants was also collected during interviews. The informants were interviewed in their local language Pothowari (Ali 2018). Ethically written acceptance was collected from the main office of the district and also from the head person of the village. The purpose of the present study was also explained to each informant in order to remove their hesitation and to encourage them that their knowledge will be a great contribution in the scientific literature (Spradley, 2016, Khan *et al.* 2014).


Figure 1. Map of the study area

**Specimen Collection and Identification**

The reported medicinal plants were collected from natural vegetation and home gardens during the field walks and habits of the plants were listed (Khan *et al.* 2014). The collected voucher specimens were taken to the Department of Chemical and Life Sciences, Qurtuba University of Science and Information Technology, Peshawar, Pakistan. Specimen identification and confirmation was undertaken by using Flora of Pakistan and taxonomic experts. Herbarium specimens with their labels were stored at the Qurtuba University of Science and Information Technology, Peshawar, Pakistan.

**Data Organization**

The collected ethnobotanical data was entered in Excel spreadsheet 2007 and summarized using graphical statistical methods such as percentages (Ngarivhume *et al.* 2015). The habit of the plants was categorized into three categories, that is, herbs, shrubs, and trees. The part used by the healers for the preparation of ethnomedicines was grouped under 11 classes, that is, leaves, whole plant, root, fruit, bark, and so forth (Xavier *et al.* 2015). Human ailments treated in the study area were categorized into various categories like anti-inflammatory, digestive, diuretic, anti-diabetic, astringent, analgesic, dermatological, and anti-constipation. Route of administration was divided into oral, and topical.

**Data Analyses**

***Frequency of citation (FC)***

The frequency citation states the percentage of informers that cited the plant species for a particular use (Hilou *et al.* 2014, Ahmad *et al.* 2018, Khan *et al.* 2018, Rehman *et al.*, 2023).

The following formula was used to calculate FC values;

$$\text{FC}\ (\%) = \frac{No.of\ informants\ who\ cites\ the\ species}{Total\ number\ of\ informants} x100$$

***Relative frequency of citation (RFC)***

The Relative Frequency Citation (RFC) is described like the proportion of the total of times of an incident occurs to the entire amount of incidents (Liu *et al.* 2015). In an ethnobotanical investigation, we ought to state that this is the proportion of informers that reveal the utilization of a plant (FC) to the entire amount of informers for the whole plants throughout the study (N) (Khan *et al.* 2018, Rehman *et al.* 2023). It concludes the comparative significance of plant species depending upon the number of informers for all species as well as entire informers interviewed during the investigation (Yasin *et al.* 2019). This was done by dividing "FC" through the number of informers during the whole study (N) (Anderson 2014). RFC is defined with the given formula;

$$\text{RFC} = \frac{FC}{N} (0 < RFC > 1)$$

While FC is meant for the frequency of citation as well as it states the number of informers interviewed for a species which quote its usages. That index differs from 0 (zero), as no one mentions that the plant species as helpful to 1 (one) during the situation as here have been a highest amount of informers which believe a plant species helpful (Smetana *et al.* 2019). In ethnobotanical study, RFC indicates the native significance of plants species present within a region (Ahmad *et al.* 2018, Umair *et al.* 2019).

***Use value (UV)***

The use value is an ethnobotanical index which indicates the comparative significance of plant species recognized regionally depending upon the amount of documented usages for every species (Hussain *et al.* 2018). It was calculated by dividing entire usages stated via the entire informers for a particular plant species (∑Ui) by the entire number of informers (N) who reported on the plant species throughout the study (Malik *et al.* 2018, Rehman *et al.* 2023). The formula for use value is given as under;

$$\text{UV} = \sum \frac{Ui}{N}$$

whereas UV stands for use value, "Ui" is the total of usages mentioned through all informants for a particular plant species as well as ∑Ui is the amount of the entire usages stated via the whole informers for a particular species. The use value demonstrates the comparative significance of regionally recognized flora (Khan *et al.* 2018, Rehman *et al.* 2023).

***Fidelity Level (FL)***

The fidelity level expressed the preference revealed for single species above others, for curing a specific disease (Rehman *et al.* 2023, Tugume *et al.* 2016). The largest fidelity level verifies maximum uses of the plant species for a specific disorder, where small fidelity level validates a broad series of curative usages however along with a small frequency for every disorder (Tounekti *et al.* 2019). It was computed via the subsequent formula given below;

$$\text{FL}\ (\%) = \frac{Ip}{Iu} x100$$

Whereas "$I_p$" is the number of informers who provided information regarding usage of species for a specific disease group; while, "$I_u$" is the number of informers describing the usage of that plant for some disease type. The maximum fidelity level rate (100%) is attained from flora for that nearly the entire usage statements declare utilizing that in almost the similar manner, while little fidelity level value is achieved from flora which is employed for numerous diverse intentions (Singh *et al.* 2019). Likewise, the maximum fidelity level validates maximum uses of the plant species for a specific disease, while small fidelity level validates extensive series of curative usages however via a small frequency for every disorder (Rehman *et al.* 2023, Zahoor *et al.* 2017).

## Results and Discussion

### Demographic features of the participants

Over 200 respondents were interviewed, and approximately 70 % of them were male. Although people of various tribal ethnicities live in the Tehsil Kallar Syedan area; however, traditional ethno-medical knowledge is supposed to be relatively uniform across the region. Informants included traditional herbal practitioners, who were able to provide particularly in-depth information regarding the use of specific plants as treatments. It is noteworthy that mostly men serve as traditional herbal healers/hakims in most areas of the country. The women in Pakistan are usually reluctant to run such business. The women practice medicinal plants in the households preferably. Not even a single hakim was a woman in the area. This fact can be supported by the fact that the women in remote areas of Pakistan, mostly prefer to take control of household stuff instead of running their businesses outside homes. This could be attributed to the religious and socio-cultural conditions of the country. They were also able to provide information on various less common uses of native flora. Older participants were able to name a greater number of species, and medical uses for these plants. All informants took immense interest in this study and furnished all sort of informations in their local language.

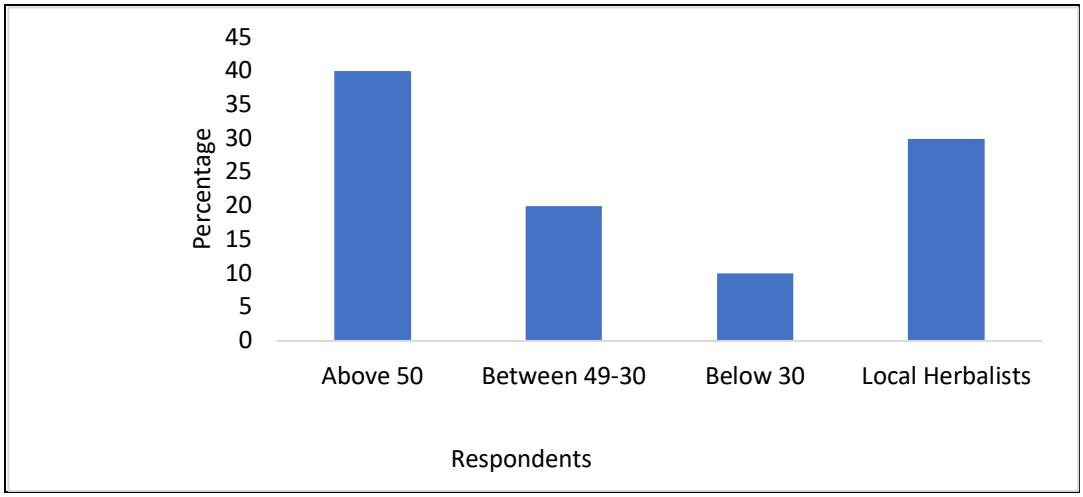


Figure 2. Percentage of respondent's groups.

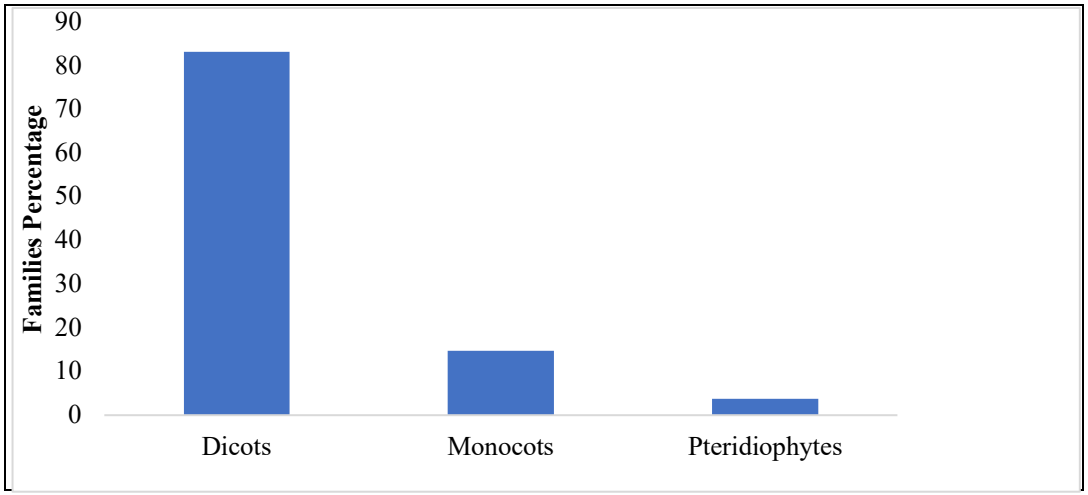


Figure 3. Percentage of families belonging to different plant groups from Tehsil Kallar Syedan, District Rawalpindi.

**Medicinal plant diversity**

The Tehsil Kallar Syedan, District Rawalpindi is endowed with wealth of medical plants and 169 plant species belonging to 136 genera and 54 families have been documented which are used by the local people to treat different ailments. Poaceae was the most widely used family, with 17 species reported by the local residents for its medicinal value. It was followed by Asteraceae and Fabaceae (14 species each), Brassicaceae (10 species), Lamiaceae (8 species), Amaranthaceae and Solanaceae (7 species each). The families with minimum use were Acanthaceae, Anacardiaceae, Arecaceae, Asparagaceae, Asphodelaceae, Cannabinaceae, Caricaceae, Commelinaceae, Cupressaceae, Ebenaceae, Musaceae, Oxalidaceae, Plantaginaceae, Plantanaceae, Rutaceae, Sapindaceae, Simaroubaceae, Verbenaceae, Vitaceae, Zingiberaceae with one species each reported for its ethno-medicinal use. The majority of plants were herbaceous nature (60%), followed by trees (28%) and shrubs (10%). The results agree with the other studies conducted in other parts of Pakistan and other countries. A study was conducted in North Waziristan Khyber Pakhtunkhwa, Pakistan and concluded that traditional healers use 67 medicinal plants for the treatment of a variety of disorders in the studied region (Rehman *et al.* 2022). Another study reported that the natives use variety of plants grouped into 18 major disease categories like gastrointestinal, dermatological, antipyretic, blood disorders, etc. They use 25 plant species for gastrointestinal disorders, followed by 13 species for dermatological infections (Khan *et al.* 2014). Another study conducted in Naban river watershed national nature reserve, Yunnan, China recorded 199 medicinal plants belonging to 73 families from the study area. The majority of the utilized species were collected from the forest area (51.9%), followed by fallow land (22.52%), arable fields (14.5%), and homegardens (11.08%) (Ghorbani *et al.* 2011).

**Plant part(s) used**

Whole plant parts have been the major utilized parts (50.8%) subsequently leaves (32.5%), roots (10.0%), flowers (8.2%), stems (5.9%), seeds (3.5%), barks (3.5%), fruits (1.7%), latex (1.7%), bulbs (1.1%), rhizomes (0.5%), tubers (0.5%). The therapeutic plant species have been commonly utilized via the native inhabitants of the region within their traditional medications to cure different diseases as well as ailments since a very long time. It has been discovered that maximum number of the plant species were Anti-inflammatory (40%), followed by digestive disorders remedies (36%), Diuretic (33%), Anti-diabetic (22%), Astringents (21%), Analgesic (20%), against skin diseases (19%), Anti-constipation (9%), as well as additional (47%) various disorders in Figure 4. The whole plant parts of therapeutic plant species are frequently taken in the form decoction, infusion and powder to treat diabetes, constipation, and to cure various stomach disorders. It was found that (40 %) of the plants used as Anti-inflammatory which include, *Acacia modesta* Wall., Amaranthus viridis, *Achyranthes aspera*, *Asparagus gracilis*, *Ailanthus altissima, Adiantum capillus-veneris*, *Achyranthes bidentata*, *Artemisia scoparia*, *Allium cepa*, *Avena sativa, Bambusa arundinacea*, *Bidens chinensis*, and *Citrullus colocynthis* were used to treat constipation. This survey reported that 22.4% of the recorded plants were used as anti-diabetic including *Carissa opaca, Curcuma zedoaria*, *Dalbergia sissoo*, *Eucalyptus lanceolata*, *Ipomoea carnea*, *Malvastrum coromandelianum*, *Morus nigra*, *Melia azadirachta*, *Olea europaea* and *Pennisetum glaucum*.

***Relative frequency of citation (RFC) and use value (UV)***

The RFC and UV indices are applied to select potential plant species for further pharmacological study and recommendation in drug development. The relative frequency citation (RFC) index authenticates the frequency of citation of medicinal plant species used for various ailments. The current study recognized the highest value of RFC for *Mentha longifolia* (0.37%), followed by *Rosa indica* (0.36%), *Mangifera indica* & *Phoenix sylvestris* (0.35% each), *Grewia optiva* (0.34%), and *Ficus elastica* (0.33%), shown in Fig. 5. The position of these plant species correspond to the fact that they were reported by maximum number of informants, therefore having high FC. The UV demonstrates the relative importance of plant species and families for a population. In the present investigation, the UV of the reported medicinal plant species varied from 0.09 to 0.39 (Table1). The highest UV along with maximum UV was calculated for *Justicia adhatoda* (0.35), Rosa indica (0.37), *Zea mays* (0.38), and *Mentha longifolia* (0.39) as shown in Fig. 6. These findings demonstrate the extensive use of above-mentioned species in the treatment of various ailments by the local inhabitants /healers and the consciousness of indigenous peoples, which makes such medicinal plants, the first choice to treat disease. The less use of *Adiantum capillus-veneris* for medicinal purpose is also supported by the findings of Monari *et al.* (2022). Similarly less and non-popular use of *Asparagus gracilis* has also been documented by Tariq *et al.* (2019). Surprisingly, *Achyranthes aspera* was reported to be less important as medicinal plant in the study area as opposed to its diverse uses reported by Raju *et al.* (2022). The reason for its less use may be due to less accessibility and minimum ethno-botanical uses. The results of UV in the present study were comparable with previously reported from Hafizabad district, Pakistan. This finding is in-line with the results of current study.

Table 1. Medicinal plant species along with voucher number, botanical name, family, local names, medicinal applications, and route of administration.

| Voucher No. | Botanical names | Family | Local name | Medicinal uses | Part use | Route | FC | RFC | ∑Ui |
|---|---|---|---|---|---|---|---|---|---|
| HZ-QUP-20181 | *Acacia modesta* Wall. | Fabaceae | Phulai | The powdered gum roasted in desi ghee and used for impotency, backache, leucorrhea and as sexual tonic | S* | Oral | 30 | 0.15 | 38 |
| HZ-QUP-20182 | *Acacia nilotica* Willd. ex Dilel | Fabaceae | Kikar | Bark, leaves, flowers and unripe fruits are taken in equal quantity and made into powder used in steatorrhea, nocturnal emission and premature ejaculation, gum in the form of mucilage is used as astringent in dysentery | B, L, Fl, Fr | Topical Oral | 45 | 0.22 | 49 |
| HZ-QUP-20183 | *Amaranthus viridis* L. | Amaranthaceae | Choleri | Leaves are cooked in curry formation and given as emollient to treat constipation and as vermifuge | W | Oral Topical | 30 | 0.15 | 35 |
| HZ-QUP-20184 | *Amaranthus spinosus L.* | Amaranthaceae | Cholai khardar | Extract of roots is used to cure excessive menstruation, snake bites, toothache, fevers and urinary troubles | R | Oral Topical | 25 | 0.12 | 32 |
| HZ-QUP-20185 | *Allium sativum* L. | Amaryllidaceae | Lessan/Thom | Leaves and bulb are used as kitchen spice to treat digestive disorders and lowering blood cholesterol | B* | Oral | 43 | 0.21 | 48 |
| HZ-QUP-20186 | *Allium cepa* L. | Amaryllidaceae | Piaz | Juice along with equal quantity of honey and egg roasted in desi ghee and used in improving sexual debility and weakness, seed powder is used to increase semen production. Juice with honey given to treat cough and cold, juice burnt in sesame oil and poured into ear to relief | B*,R | Oral Tropical | 50 | 0.25 | 58 |
| HZ-QUP-20187 | *Achyranthes aspera* L. | Amaranthaceae | Putkanda | The ash of whole plant is traditionally processed to obtain salt which is given with honey to treat cough, cold, asthma, and joints pain | L | Oral | 23 | 0.11 | 30 |
| HZ-QUP-20188 | *Achyranthes bidentata* Blume. | Amaranthaceae | Lindri | The root powder is given to treat joints pain, ease in childbirth, menstrual pain and leucorrhea, juice of leaves used as digestive, powder of whole plant is given in high blood pressure due to increase of cholesterol | R, W | Oral | 30 | 0.15 | 35 |

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|---|---|---|---|---|---|---|---|---|---|
| HZ-QUP-20189 | *Asparagus gracilis* Royle ex Baker. | Asparagaceae | Chau | Dried shoots are made into powder and given as tonic and as diuretic, leaves are cooked as vegetable for diuretic digestive and in diabetes, powder of dried roots is given for increasing in male fertility | R,S | Oral | 25 | 0.12 | 32 |
| HZ-QUP-201810 | *Ailanthus altissima* (Mill.) Swingle | Simaroubaceae | Tun/Daravya (Jangli Dhrek) | Powder of whole plant is used to treat dysentery, cough, gastric problems, anemia, hemorrhage, mental Illness, and leucorrhea | W | Oral | 35 | 0.17 | 43 |
| HZ-QUP-201811 | *Adiantum capillus-veneris* L. | Pteridaceae | Hansraj | Powder of whole plant is used to cure headache, kidney problems, female genital disorders and in wound healing | W | Oral | 15 | 0.07 | 25 |
| HZ-QUP-201812 | *Arundo donax* L. | Poaceae | Narr | Root powder is mixed with egg albumin and used to stimulate menstrual discharge, also treat headaches, dropsy, toothache and enhanced milk production | R | Topical | 25 | 0.12 | 34 |
| HZ-QUP-201813 | *Artemisia scoparia* Waldst.& Kit. | Asteraceae | Afsanteen jhan | Bark extract is used to treat athlete's foot, small pox, fever, skin infectious diseases, and hepatitis | B | Topical | 34 | 0.17 | 43 |
| HZ-QUP-201814 | *Albizia lebbeck* (L.) Beneth. | Fabaceae | Shirin | Leaves and bark are taken in equal quantity and powdered used to treat leprosy, toothache, skin diseases, treat cough | B<br>L | Oral | 43 | 0.21 | 52 |
| HZ-QUP-201815 | *Aloe vera* (L.) Burm.f. | Asphodelaceae | Kanwar ghandal | Paste of leaves gel is applied to treat dandruff, and skin problems | L | Topical | 35 | 0.17 | 43 |
| HZ-QUP-201816 | *Avena sativa* L. | Poaceae | Jai/Javi | Paste of leaves and shoots are taken in equal quantity and used to treat dysentery, insomnia, headaches, epilepsy, rheumatism, kidney problems, vomiting, cholera | L<br>S* | Topical<br>Oral | 35 | 0.17 | 43 |
| HZ-QUP-201817 | *Abelmoschus esculentus* (L.) Moench. | Malvaceae | Bhindi | Powder of whole plant is mix in desi ghee and used to treat syphilis, cuts, wounds, boils, dandruff, phlegm, obesity, cardiovascular disease, fatigue, and improve memory | W | Topical | 63 | 0.31 | 69 |
| HZ-QUP-201818 | *Aster alpinus* L. | Asteraceae | Rangeen phool | Paste made of roots is used to treat skin problems | R | Topical | 15 | 0.07 | 26 |
| HZ-QUP-201819 | *Brassica rapa* L. | Brassicaceae | Shaljam/Turnip | Powder of whole plant is used to treat cancer, breast tumors, and skin cancer | W | Topical | 28 | 0.14 | 33 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HZ-QUP-201820 | *Brassica campestris* L. | Brassicaceae | Sarsoon | Root, stem and leaves are taken in equal quantity and made into powder used for leucorrhea, menstrual disorders, gleets, body weakness, internal pain, constipation, and chronic cough | R, S*, L | Oral | 63 | 0.31 | 67 |
| HZ-QUP-201821 | *Brassica oleracea* L. | Brassicaceae | Phool Gobi | Leaves and shoots powder is used to cure gout, *rheumatic* diseases, pneumonia, cholesterol, diabetes, and neural disorders | L,S | Oral | 50 | 0.25 | 56 |
| HZ-QUP-201822 | *Boerhavia diffusa* L. | Nyctaginaceae | Senati | Powder of whole plant is made into decoction and used to relieve pain, indigestion, anemia, asthma, jaundice, obesity, cough, kidney disorders, and heart tonic | W | Oral | 30 | 0.15 | 45 |
| HZ-QUP-201823 | *Boerhavia Procumbens* Banks ex Roxb. | Nyctaginaceae | Senati | Powder of roots and leaves is used to treat jaundice, constipation, gonorrhea, cough, edema, dropsy, flue, and reduce bleeding from nose | R, L | Oral | 23 | 0.11 | 31 |
| HZ-QUP-201824 | *Bombax ceiba* L. | Malvaceae | Simbal | Powder of whole plant is treating cholera, fractures, coughs, urinary problems, influenza, snake bites, dysentery, ulcers, syphilis, leprosy, pimples, constipation, piles, stomachache and stimulate menstrual cycle | W | Oral Topical | 34 | 0.17 | 38 |
| HZ-QUP-201825 | *Bougainvillea spectabilis* Willd. | Nyctaginaceae | Kagzi Phool | Decoction of whole plant is given to treat cancer, diabetes, anemia, pain and inflammation. The paste is applied to skin infection. The smog is used as mosquitocidal. | L,F | Oral, External | 43 | 0.21 | 52 |
| HZ-QUP-201826 | *Bambusa arundinacea* (Retz.) Willd. | Poaceae | Bans | Decoction of leaves and roots is made to stimulate menstrual cycle, to treat dysmenorrhea and pain in abdomen. | R, L | Oral | 45 | 0.22 | 52 |
| HZ-QUP-201827 | *Butea superba* Roxb. ex.Willd. | Fabaceae | Chachra | Paste made from root is taken in a cup of water and given to facilitate an easy delivery, treat skin-ageing, male sexual disorders and increase breast milk | B,R | Oral | 30 | 0.15 | 38 |
| HZ-QUP-201828 | *Bidens chinensis* (L.) Willd. | Asteraceae | - | An infusion of whole plant is used to treat rheumatism, ear infection, kidney problems, headaches, abdominal trouble, and ease child delivery | W | Topical Oral | 17 | 0.08 | 28 |

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|---|---|---|---|---|---|---|---|---|---|
| HZ-QUP-201829 | *Broussonetia papyrifera* (L.) LHer. ex. Vent. | Moraceae | Jangli Toot | Decoction of whole plant is used as tonic, laxative, treat dysentery and cure skin disorders | W | Oral | 38 | 0.19 | 43 |
| HZ-QUP-201830 | *Bauhinia variegata* L. | Fabaceae | Kachnar,Kulyar | Juice of whole plant is used to treat dysentery, hemorrhoids, piles, edema, laxative, wound healing and cure stomach disorders | W | Oral | 43 | 0.21 | 53 |
| HZ- QUP-201831 | *Barbarea vulgaris* W.T. Aiton. | Brassicaceae | Peeli Sarson | Tea made from leaves is used to treat wounds, as appetizer, anti-scorbutic, and diuretic | L | Oral | 25 | 0.12 | 30 |
| HZ- QUP-201832 | *Cymbopogon citratus* (DC.) Stapf | Poaceae | Lemo Grass | Soap made from leaves is used to treat rashes, itchy and swollen skin | L | Oral | 34 | 0.17 | 44 |
| HZ-QUP-201833 | *Carissa opaca* Stapf ex Haines | Apocynaceae | Garanda | Whole plant is boiled in water used to treat respiratory disorders, liver disorders, blood deficiencies, rheumatism, and kidney stones | W | Oral | 45 | 0.22 | 50 |
| HZ-QUP-201834 | *Commelina paludosa* Blume | Commelinaceae | Chora Gha | Decoction of leaves and roots is used to treat wounds, skin infections, boils, ulcers, irregular menstruation, expel the placenta after birth, colds, sore throat, relief fever, and treat malaria | L,R | Oral | 32 | 0.16 | 39 |
| HZ-QUP-201835 | *Cynodon dactylon* (L.) Pers. | Poaceae | Khabal Gha | Decoction of whole plant is used to treat heart disorders, bleeding, skin troubles, cough, diarrhea, dysentery, epilepsy, headache, hemorrhage, hypertension, snake bite, tumors, warts, and wounds | W | Oral | 65 | 0.32 | 68 |
| HZ-QUP-201836 | *Calotropis procera* (Aiton) W.T. Aiton. | Apocynaceae | Aak | Powder of leaves is used in the treatment and cure of asthma lepers | L | Oral | 54 | 0.27 | 62 |
| HZ-QUP-201837 | *Cedrela toona* Roxb.exRottler & Willd. | Meliaceae | Toon. /Daravya (Jangli Dhrek) | Gum obtained from bark is used to treat impotency, healing wounds, fever, diabetes, dysentery, skin infection, blood diseases, skin diseases (allergy and pimples) | B,F | Oral | 42 | 0.21 | 53 |
| HZ-QUP-201838 | *Coriandrum sativum* L. | Apiaceae | Dhania | Whole plants parts are used to treat indigestion, loss of appetite, convulsion, insomnia, joints pain, anxiety, fever, and vomiting | W | Oral | 65 | 0.32 | 72 |
| HZ-QUP-201839 | *Curcuma zedoaria* (Christm).Roscoe. | Zingiberaceae | Kachor | Decoction of leaves and rhizome is used to treat respiratory disorders, diarrhea, aphrodisiac, dyspepsia, pain and to heal wounds | L, R* | Oral | 45 | 0.22 | 53 |

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| HZ-QUP-201840 | *Cucurbita pepo* L. | Cucurbitaceae | Kadu | Decoction of whole plant is used to treat cancer, anemia, skin diseases, brain diseases, and rheumatism | W | Oral | 63 | 0.31 | 69 |
| HZ- QUP-201841 | *Cupressus arizonica* Greene | Cupressaceae | Saroo | Powder of leaves is used to cure anemia, rheumatism, and hemorrhoid | L | Oral | 46 | 0.23 | 53 |
| HZ- QUP-201842 | *Carica papaya* L. | Caricaceae | Papeeta | Whole plant parts are effective in treatment of digestive disorders, tonsils, warts, cancer, tumors of the uterus, piles, syphilis, asthma, rheumatism, urine acidity, jaundice, and sore teeth | W | Oral | 54 | 0.27 | 62 |
| HZ- QUP-201843 | *Cenchrus ciliaris* L. | Poaceae | Bera | Powder of whole plant is used to treat urinary tract infections, menstrual disorders, diuretic, emollient, pain, and wounds | W | Oral | 58 | 0.29 | 65 |
| HZ- QUP-201844 | *Crotalaria medicaginea* Lam. | Fabaceae | Chasko | Juice of leaves is used to treat syphilis, asthma and rheumatism | L | Oral | 24 | 0.12 | 32 |
| HZ- QUP-201845 | *Chenopodium ambrosioides* L. | Amaranthaceae | Chandan bathoo | Decoction of leaves is used to treat tumor, fever, diabetes, dysentery, and skin infection | L | Oral | 45 | 0.22 | 53 |
| HZ- QUP-201846 | *Cyperus rotundus* L. | Cyperaceae | Nagar mooth | Roots are boiled along with equal quantity of mint (*Mentha arvense*) and given to treat dermatologic disorders, lesions, and menstrual pain. | R,T | Topical | 50 | 0.25 | 54 |
| HZ- QUP-201847 | *Cyperus iria* L. | Cyperaceae | Kas Gha | Whole plant is used to treat respiratory problems, backache, rheumatism, and regulate menstruation | W | Oral | 43 | 0.21 | 47 |
| HZ- QUP-201848 | *Cyperus niveus* Retz. | Cyperaceae | - | Powder of whole plant is used to treat diarrhea, respiratory problems, and backache | W | Oral | 25 | 0.12 | 28 |
| HZ-QUP-201849 | *Cestrum nocturnum* L. | Solanaceae | Raat Ki Rani | Decoction of dried leaves is used to cure epilepsy, nervous imbalances, headaches, asthma, cough, anorexia, vomiting, abdominal disorders, diarrhea, digestive disorders, and burns | L,F | Oral Topical | 65 | 0.32 | 69 |
| HZ- QUP-201850 | *Conyza bonariensis* (L.) Cronq. | Asteraceae | - | Powder of leaves is used to cure respiratory problems, backache, asthma arthritis, and wound healing | L | Oral | 26 | 0.13 | 28 |
| HZ-QUP-201851 | *Cassia fistula* L. | Fabaceae | Keenjal/Amaltas | Ripe seeds are used as purgative, tonic, laxative, decoction of roots is applied to purify wounds and ulcers | R ,S | Oral | 53 | 0.26 | 64 |
| HZ-QUP-201852 | *Citrus medica* L. | Rutaceae | Girgal /Khatta | Decoction of roots is used to treat respiratory problems and backache, fruits are used in the treatment of cough, cold and malaria | R,F | Oral | 30 | 0.15 | 43 |

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| HZ- QUP-201853 | *Colebrookea oppositifolia* Sm. | Lamiaceae | Pansra | Powder of roots is used to treat wounds, fractures and epilepsy | R | Oral | 43 | 0.21 | 53 |
| HZ- QUP-201854 | *Catharanthus roseus* (L.) G.Don. | Apocynaceae | Sada Bahar | Infusion of flowers is used to treat mild diabetes; decoction of roots is used to treat dysmenorrhea | F,R | Oral | 56 | 0.28 | 64 |
| HZ- QUP-201855 | *Cannabis sativa* L. | Cannabaceae | Bhang | Extract of whole plant is used to treat cough, anorexia, arthritis and migraine | W | Oral | 65 | 0.32 | 70 |
| HZ-QUP-201856 | *Callistemon viminalis* Cheel. | Myrtaceae | Bottle Bursh | Paste of whole plant is used to treat skin infections, anti- microbial, anti- inflammatory, anti- oxidant, anti-pyretic | W | Topical | 65 | 0.32 | 69 |
| HZ- QUP-201857 | *Convolvulus arvensis* L. | Convolvulaceae | Hiran khuri | Powder of roots is used to treat fevers, wounds, reduce excessive menstrual flow, and relief constipation | R | Topical | 42 | 0.21 | 48 |
| HZ-QUP-201858 | *Citrullus colocynthis* (L.) Schrad. | Cucurbitaceae | Kaura Kado | Dried unripe fruit pulp contains drug colocynth is used to treat fever, constipation, dropsy, piles | F | Oral | 24 | 0.12 | 32 |
| HZ- QUP-201859 | *Chorispora tenella* DC. | Brassicaceae | - | Powder of leaves is used as anti-bacterial, anti-oxidant | L | Oral | 19 | 0.09 | 25 |
| HZ- QUP-201860 | *Capsella bursa-pastoris* L. | Brassicaceae | Jungli Saro | Tea made from whole plant is used as astringent, diuretic, anti-microbial, anti-inflammatory, anti-oxidant, cardiovascular, reproductive, and anti-cancer | W | Oral | 11 | 0.05 | 19 |
| HZ-QUP-201861 | *Dodonaea viscosa* (L.) Jacq. | Sapindaceae | Sanatha | Powder of roots is used to treat rheumatism, itching, indigestion, diarrhea, constipation, irregular menstruation, skin infections, hemorrhoids, sore throat, fractures and snake bites | L | Topical | 68 | 0.34 | 72 |
| HZ-QUP-201862 | *Dactylocteniumaegyptium*(L.) Willd. | Poaceae | Galwatra | Powder of whole plant is used to accelerate childbirth, dysentery, typhoid fever, kidney pains, ulcers and smallpox | W | Oral | 33 | 0.I6 | 39 |
| HZ- QUP-201863 | *Digera muricata* Mart | Amaranthaceae | Tandla | Decoction of shoots and flowers cure digestive problems, urinary disorders, laxative, enhance lactation, anti-microbial, and diuretic | S,F | Oral | 24 | 0.12 | 32 |
| HZ-QUP-201864 | *Datura innoxia* Mill. | Solanaceae | Datura | Paste of whole plant is used to treat fevers, diarrhea, skin diseases, piles, ulcers, colds, asthma, cardiac disorders, impotency, malaria, baldness, respiratory disorders, rheumatism, ear ache and eye diseases | W | Topical | 58 | 0.29 | 64 |

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| HZ- QUP-201865 | *Diospyros kaki* L.f. | Ebenaceae | Japani Phal | Powder of whole plant is used to treat fever, constipation | W | Oral | 65 | 0.32 | 68 |
| HZ- QUP-201866 | *Dalbergia sissoo* DC. | Fabaceae | Tali | Powdered of whole plant is used to treat dysentery, gonorrhea, boils, pimples, eye pain, swellings, painful urination, bleeding disorders, leprosy and nausea | W | Oral | 56 | 0.28 | 59 |
| HZ-QUP-201867 | *Daucus carota* L. | Apiaceae | Gaajar | Infusion of whole plant is used to treat digestive problems, kidney problems, bladder diseases, dropsy, delayed menstruation and lowering cholesterol | W | Oral | 65 | 0.32 | 70 |
| HZ- QUP-201868 | *Eucalyptus camaldulensis* Dehnh. | Myrtaceae | Safaida | Infusion of whole plant is used to cure cough, diarrhea, bladder inflammation and cuts | W | Oral | 68 | 0.34 | 69 |
| HZ- QUP-201869 | *Eucalyptus lanceolata* L. | Myrtaceae | Safaida | Paste of leaves is used to treat skin diseases, respiratory system, diabetes, wounds, dental disorders, eliminates intestinal worms, asthma, bronchitis and plaque | L | Topical | 65 | 0.32 | 68 |
| HZ-QUP-201870 | *Eruca sativa* Mill. | Brassicaceae | Jamaha | Powder of leaves and fruits is used as anodyne and stomachic | L, F* | Oral | 56 | 0.28 | 63 |
| HZ-QUP-201871 | *Eriobotrya japonica* (Thunb.) Lindl. | Rosaceae | Loquat | Decoction of whole plant is used to treat fever, colds, cough and cancer | W | Oral | 64 | 0.32 | 69 |
| HZ- QUP-201872 | *Euphorbia royleana* Boiss. | Euphorbiaceae | Thor | Powder of stem is used to treat asthma | S | Oral | 45 | 0.22 | 48 |
| HZ- QUP-201873 | *Euphorbia granulata* Forssk. | Euphorbiaceae | - | Methanolic extract of leaves is used to treat intestinal worms, snake bites, scorpion stings and hepatitis | L* | Oral | 26 | 0.13 | 29 |
| HZ-QUP-201874 | *Euphorbia helioscopia* L. | Euphorbiaceae | Doodal | Seeds mixed with the roasted pepper are used in the treatment of fever, skin eruptions, cholera, purgative, tumors and wound healing | S | Paste | 43 | 0.21 | 49 |
| HZ-QUP-201875 | *Euphorbia hirta* L. | Euphorbiaceae | - | Decoction of whole plant is used to treat female disorders, respiratory ailments, dysentery, jaundice, pimples, digestive problems, tumors, improves immune system, improves sexual health and skin health | W | Oral Topical | 24 | 0.12 | 32 |
| HZ- QUP-201876 | *Eriosema psoraleoides* G. Don | Fabaceae | Klath | Powdered leaves are used as carminative, and analgesic | L | Oral | 23 | 0.11 | 28 |

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| HZ-QUP-201877 | *Fumaria indica* (Hausskn.) Pugsley | Papaveraceae | Papara | Decoction of leaves is used as analgesic, treat aches, pains, fever, influenza, liver complaints, vomiting, constipation, dyspepsia, purifies blood, diuretic, diaphoretic and jaundice | L | Oral | 56 | 0.28 | 64 |
| HZ-QUP-201878 | *Flacourtia indica* (Burm.f.) Merr. | Salicaceae | Kakoh | Infusion of leaves is used to treat asthma, pneumonia, body pains, kidney complaints, snake bite, cough, fever, pneumonia and throat infection | L | Oral | 67 | 0.33 | 69 |
| HZ-QUP-201879 | *Ficus carica* L. | Moraceae | Anjeer | Powdered of leaves and fruit is used to treat cancer, digestive disorders and tonic | L,F | Oral | 54 | 0.27 | 63 |
| HZ-QUP-201880 | *Ficus elastica* Roxb. ex Hornem. | Moraceae | Rubber plant | Leaves extract is used to treat skin infections, allergies, wounds and sores | L | Oral | 67 | 0.33 | 69 |
| HZ- QUP-201881 | *Morus alba* L. | Moraceae | Peepal | Decoction of leaves is used to treat asthma, diabetes, diarrhea, epilepsy, gastric problems and sexual disorders | L | Oral | 50 | 0.25 | 56 |
| HZ-QUP-201882 | *Grewia optiva* J.R. Drumm. ex Burret | Malvaceae | Dhaman | Paste of leaves is used to treat indigestion, gastric problems and lubricant during difficult childbirth | L | Topical | 68 | 0.34 | 69 |
| HZ- QUP-201883 | *Galinsoga quadi radiata* Ruiz & Pav. | Asteraceae | - | Paste of whole plant is used to treat skin inflammations and wounds | W | Topical | 26 | 0.13 | 28 |
| HZ-QUP-201884 | *Hibiscus rosa-sinensis*L. | Malvaceae | Shoo Flower | Paste of whole plant is used to treat ulcers, boils, sores, coughs and colds and sore eyes | W | Topical | 58 | 0.29 | 63 |
| HZ-QUP-201885 | *Helianthus annuus* L. | Asteraceae | SurajMukhi | Tea made from leaves is used to treat high fevers, malaria, lung ailments, rheumatic aches, pains, sores, swellings, snake bites and spider bites | W | Oral | 65 | 0.32 | 68 |
| HZ- QUP-201886 | *Heliophila coronopifolia* L. | Brassicaceae | - | Powdered of leaves is used to treat skin disorders, rashes, eczema | L | Oral | 45 | 0.22 | 47 |
| HZ-QUP-201887 | *Imperata cylindrica* (L.) P.Beauv. | Poaceae | Sroot | Decoction of flowers, roots and leaves is used to treat wounds, urinary tract infections, nose bleeds, jaundice, indigestion, diarrhea and dysentery | F,R,L | Oral | 57 | 0.28 | 59 |
| HZ-QUP-201888 | *Ipomoea pes-tigridis* L. | Convolvulaceae | Jungli Bail | Decoction of whole plant is used to treat sores, boils, pimples, tumors, dropsy, wound healing, headaches and snake bites | W | Oral | 25 | 0.12 | 27 |
| HZ- QUP-201889 | *Ipomoea carnea* Jacq. | Convolvulaceae | Gul-e-Abbasi | Latex and leaves are used to treat wound healing, sedative | L,L* | Oral | 56 | 0.28 | 64 |
| HZ- QUP-201890 | *Iberis sempervirens* L. | Brassicaceae | Candytuft | Decoction of whole plant is used as tonic, digestive, relieving wounds, gout | W | Oral | 25 | 0.12 | 29 |

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| HZ- QUP-201891 | *Jasminum grandiflorum* L. | Oleaceae | Motia | Decoction of flowers and leaves is used to relieve coughs, headaches, skin diseases, urinary tract infections, depressant, sedative, wound healing | F,L | Oral Topical | 64 | 0.32 | 68 |
| HZ- QUP-201892 | *Jasminum sambae* (L.) Aiton. | Oleaceae | Chameli | Decoction of whole plant is used to treat ulcers, skin disorders, cancer, asthma, fractures | W | Oral Topical | 64 | 0.32 | 68 |
| HZ-QUP-201893 | *Jacaranda mimosifolia* D.Don | Bignoniaceae | Gul-e-Nilam | Decoction of whole plant is used to cure syphilis, ear infection, ulcers, diarrhea, dysentery, boils, fungal infections | W | Oral | 54 | 0.27 | 57 |
| HZ-QUP-201894 | *Justicia adhatoda* L. | Acanthaceae | Baikar | Powder of whole plant is used to cure phlegm, excessive menses, bronchitis, asthma, fever, jaundice, relieve pain, antiseptic, | W | Oral | 67 | 0.33 | 70 |
| HZ- QUP-201895 | *Lathyrus aphaca* L. | Fabaceae | Jangli Matar/ Jangli Phali | Powder of seeds and flower is used to cure toothache, skin problems | S*,F | Oral | 54 | 0.27 | 58 |
| HZ- QUP-201896 | *Lathyrus odoratus* L. | Fabaceae | Phool Matar | Decoction of seeds and flowers is used to treat stomachic disorders | S*,F | Oral | 68 | 0.34 | 69 |
| HZ- QUP-201897 | *Lantana camara* L. | Verbenaceae | Panch Phuli | Decoction of whole plant is used to cure skin itches, rheumatic joints, tuberculosis, asthma, toothache, headache, leucorrhea, fevers and constipation | W | Oral | 64 | 0.32 | 66 |
| HZ- QUP-201898 | *Launaea procumbens* (Roxb.) Amin. | Asteraceae | Peela Phool | Decoction of whole plant is used to treat fever, cancer, swellings, rheumatism, boils, kidney disorders, sexual diseases, diuretic, and reproductive disorders | W | Oral | 53 | 0.26 | 57 |
| HZ- QUP-201899 | *Luffa cylindrica* (L.) M. Roem. | Cucurbitaceae | Tori | Powdered of fruit is used to treat asthma, intestinal worms, skin diseases and stomach-ache | F | Oral | 67 | 0.33 | 69 |
| HZ-QUP-2018100 | *Mirabilis jalapa* L. | Nyctaginaceae | Gul-e-Abbas | Juice made from leaf and root is used to treat dropsy, muscular swellings, diarrhea, indigestion, fevers, menstrual disorders, inflammation and wounds | R,L | Oral | 57 | 0.28 | 59 |
| HZ-QUP-2018101 | *Mentha longifolia* (L.) L. | Lamiaceae | Jangli Podina | Decoction of whole plant is used to treat headaches, digestive disorders, fevers and carminative | W | Oral | 74 | 0.37 | 78 |
| HZ-QUP-2018102 | *Mentha arvensis* L. | Lamiaceae | Desi Podina | Tea made from leaves is used to cure fevers, headaches, stomach cancer, digestive problems, gall bladder problems, coughs , and insomnia | L | Oral | 68 | 0.34 | 71 |

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| HZ-QUP-2018103 | *Malvastrum coromandelianum* (L.) Garcke | Malvaceae | Peela Phool/Jungli Booti | Decoction of leaves is used to treat dysentery, wounds and sores, cough, lung diseases, jaundice, diabetes, relief muscular pain, fever, diarrhea and stomach pains | L | Oral | 23 | 0.11 | 28 |
| HZ-QUP-2018104 | *Musa paradisiaca* L. | Musaceae | Kaila | Juice of whole plant is used to treat diarrhea, epilepsy, relief headache, coughs, dysentery, leprosy, hemorrhages and digestive disorders | W | Oral | 68 | 0.34 | 69 |
| HZ-QUP-2018105 | *Morus alba* L. | Moraceae | Chita toot/Shehtoot | Juice of fruit is used to cure toothache, anemia, diabetes, constipation, colds, influenza, eye infections, asthma and coughs | F | Oral Topical | 57 | 0.28 | 59 |
| HZ-QUP-2018106 | *Morus nigra* L. | Moraceae | Kala Toot | Juice of fruit is used to relieve toothache, asthma, coughs, diabetes and constipation | F | Oral | 65 | 0.32 | 67 |
| HZ-QUP-2018107 | *Malva neglecta* Wallr | Malvaceae | Sonchal | Decoction of leaves is used to treat swellings, cough, hair loss, stomachache, asthma, hemorrhoids, sore throat, insect bites and respiratory diseases | L | Oral | 46 | 0.23 | 48 |
| HZ-QUP-2018108 | *Melia azadirachta* L. | Meliaceae | Dharek | Decoction of leaves is used to treat vomiting, piles, eye disorders, headaches, wound healing and blood disorders | L | Oral | 68 | 0.34 | 70 |
| HZ-QUP-2018109 | *Mangifera indica* L. | Anacardiaceae | Amb | Powder of whole plant is used to treat coughs, diabetes, bleeding piles, dysentery, throat problems and stomach-ache | W | Oral | 70 | 0.35 | 72 |
| HZ- QUP-2018110 | *Merremia aegyptia* (L.) Urb. | Convolvulaceae | Jungli Bail | Powder of leaves is used to cure burns | L | Oral | 27 | 0.13 | 29 |
| HZ-QUP-2018111 | *Ocimum basilicum* L. | Lamiaceae | Niaz Boo | Decoction of leaves and roots is used to treat dysentery, nausea, mental fatigue, colds and snake bites | L,R | Oral | 67 | 0.33 | 69 |
| HZ-QUP-2018112 | *Oxalis corniculata* L. | Oxalidaceae | Khat mith | Juice of leaves is used to treat influenza, urinary tract infections, diarrhea, snake bites, swellings, boils, pimples and insect bites | L | Oral | 69 | 0.34 | 70 |
| HZ- QUP-2018113 | *Olea europaea* L. | Oleaceae | Kahu | Decoction of whole plant is used to treat cancer, wound healing | W | Oral | 56 | 0.28 | 63 |
| HZ- QUP-2018114 | *Pennisetum glaucum* (L.) R.Br. | Poaceae | Bera | Powder of whole plant is used to treat diabetes, rheumatism, Alzheimer disease, cataracts, cardiovascular disease and liver disorders | W | Oral | 68 | 0.34 | 69 |

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| HZ-QUP-2018115 | *Pennisetum typhoides* (Burm.f.) Stapf& C. E. Hubb. | Poaceae | Bajra | Powder of whole plant is used to cure jaundice, leprosy, heart diseases, chest disorders and respiratory diseases | W | Oral | 35 | 0.17 | 45 |
| HZ- QUP-2018116 | *Prunus domestica* L. | Rosaceae | Khobani | Decoction of whole plant is used as laxative, stimulates respiration and improves digestion | W | Oral | 68 | 0.34 | 69 |
| HZ-QUP-2018117 | *Populus deltoides* W. Bartram ex Marshall | Salicaceae | Sufaida | Tea made from inner bark is used to cure rheumatism, relieve menstrual pain, whooping cough, tuberculosis, intestinal worms, colds, sores and boils | B | Oral | 64 | 0.32 | 67 |
| HZ- QUP-2018118 | *Platanus orientalis* L. | Platanaceae | Chanar | Decoction of leaves and bark is used to treat dysentery, wounds healing, diarrhea and toothache | L,B | Oral | 56 | 0.28 | 58 |
| HZ-QUP-2018119 | *Papaver somniferum* L. | Papaveraceae | Post | Powder seed were mixed with rose oil used for analgesic, dysentery, diarrhea, spasms, pain, respiratory disorders, neuromuscular disturbances, sexual dysfunction | S | Oral | 59 | 0.29 | 70 |
| HZ- QUP-2018120 | *Plantago ovata* Forssk. | Plantaginaceae | Jangli Asmghol | Seeds husk is used to treat diarrhea, cholesterol level, constipation and stomachic | S | Oral | 23 | 0.11 | 32 |
| HZ-QUP-2018121 | *Psidium guajava* L. | Myrtaceae | Amrood | Tea made from leaves is used to treat constipation, hepatitis, diarrhea, coughs, stomachache, dysentery, toothaches, skin complaints, wounds and ulcers | W | Oral | 69 | 0.34 | 70 |
| HZ-QUP-2018122 | *Punica granatum* L. | Lythraceae | Jungli Anar/Daro ona | Juice of seed is used to treat cancer, sore throats, coughs, urinary infections, digestive disorders, skin disorders, arthritis, diabetes, heart diseases, reduce cholesterol, jaundice, diarrhea, nose bleeds and stomachic | S* | Oral | 45 | 0.22 | 48 |
| HZ-QUP-2018123 | *Pongamia pinnata* (L.) Pierre | Lythraceae | Sukh Chain | Powder of whole plant is used to cure piles, skin diseases, wounds, rheumatism, colds, coughs, diarrhea, leprosy, cleaning gums, mouth ulcers and tonic | W | Oral | 48 | 0.24 | 50 |
| HZ-QUP-2018124 | *Polygonum monspeliense* Pers. | Polygonaceae | Jangli Gha | Powder of whole plant is used to treat dysentery, wounds, piles, diarrhea, bleeding of nose and sores | W | Oral | 63 | 0.31 | 65 |
| HZ-QUP-2018125 | *Pinus roxburghii* Sarg. | Pinaceae | Cheer | Powder of whole plant is used to cure skin complaints, wounds, ulcers, rheumatic disorders, burning of the body, cough, colds, and influenza | W | Oral | 69 | 0.34 | 70 |

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| HZ- QUP-2018126 | *Pinus sylvestris* L. | Pinaceae | Cheer | Powder leaves and stem are boiled in water and used to cure kidney disorders and respiratory complaints | L,S | Oral Topical | 25 | 0.12 | 29 |
| HZ-QUP-2018127 | *Phoenix sylvestris* Roxb. | Arecaceae | Khajoor | Juice made from whole plant is used to treat sore throats, fever, colds, gonorrhea, abdominal disorders, backache and diarrhea | W | Oral | 70 | 0.35 | 73 |
| HZ- QUP-2018128 | *Parkinsonia aculeata* L. | Fabaceae | Kikar | Decoction of whole plant is used to treat fever, malaria and rheumatism | W | Oral | 56 | 0.28 | 59 |
| HZ- QUP-2018129 | *Pteris cretica* L. | Pteridaceae | - | Decoction of whole plant is used to cure dysentery, boils, ulcers, wounds, diarrhea, and skin diseases | W | Oral | 25 | 0.12 | 28 |
| HZ-QUP-2018130 | Phlomoides tuberosa Moench | Lamiaceae | Moot Kapra | Powder of whole plant is used to treat intoxication, tuberculosis, cardiovascular diseases, rheumatoid arthritis, diarrhea, eye disorders and lung disease | W | Oral | 28 | 0.14 | 30 |
| HZ-QUP-2018131 | *Parthenium hysterophorus* L. | Asteraceae | Gandi Booti | Decoction of leaves is used to cure skin inflammation, rheumatic pain, diarrhea, malaria, fever, neurological disorders and urinary tract infections | L | Oral | 45 | 0.22 | 50 |
| HZ-QUP-2018132 | *Rosa indica* L. | Rosaceae | Desi Gulab/ Gulab (Pink flower) | Herbal tea prepared from *flower* petals is used to treat sore throat, enlarged tonsils, cardiac troubles, eye disease, gall stones, constipation and leucorrhea | F | Oral | 72 | 0.36 | 75 |
| HZ-QUP-2018133 | *Rosa damascena* Mill. | Rosaceae | Gulab | Decoction of flowers is used to treat abdominal pains, strengthen heart, menstrual bleeding, digestive problems, cough, wound healing, allergies and headaches | F | Oral | 67 | 0.33 | 70 |
| HZ-QUP-2018134 | *Rumex dentatus* L. | Polygonaceae | Jangli Palak | Leaves extract is used to cure indigestion, laxative and tonic | L | Oral | 45 | 0.22 | 54 |
| HZ-QUP-2018135 | *Raphanus sativus* L. | Brassicaceae | Mooli | Decoction of whole plant is used to treat intestinal parasites, asthma, indigestion and diarrhea | W | Oral | 68 | 0.34 | 69 |
| HZ-QUP-2018136 | *Rhynchosia minima* (L.) DC. | Fabaceae | Jungli Moong Phali | Powder of whole plant is used to treat diarrhea, dysentery and hemorrhoids | W | Oral | 24 | 0.12 | 32 |

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| HZ-QUP-2018137 | *Ricinus communis* L. | Euphorbiaceae | Harnool | Juice made from the leaves is used to cure abdominal disorders, backache, muscle aches, headache, constipation, gallbladder pain, menstrual pain, rheumatism and insomnia | L | Oral | 54 | 0.27 | 63 |
| HZ-QUP-2018138 | *Sapium sebiferum* (L.) Roxb. | Euphorbiaceae | Shisham/Tali | Decoction of whole plant is used to treat edema, constipation, boils, snake bites and skin ulcers | W | Oral | 68 | 0.34 | 69 |
| HZ- QUP-2018139 | *Sorghum heteroclitum* (Roxb.) Kuntze. | Poaceae | Baroo | Decoction of whole plant is used to relieve muscle pain | W | Oral | 25 | 0.12 | 29 |
| HZ-QUP-2018140 | *Sorghum drummondii* (Nees ex Steud.) Millsp. & Chase. | Poaceae | Baroo | Powdered of whole plant is used to treat urinary tract infections | W | Oral | 43 | 0.21 | 53 |
| HZ- QUP-2018141 | *Sorghum halepense* Pers. | Poaceae | Baroo | Powder of whole plant is used to cure blood disorders, urinary disorders | W | Oral | 45 | 0.22 | 49 |
| HZ- QUP-2018142 | *Salvia plebeia* R.Br. | Lamiaceae | Tukam malanga | Decoction of stem and leaves is used to treat wounds, diarrhea, gonorrhea and hemorrhoids | S, L | Oral | 24 | 0.12 | 28 |
| HZ- QUP-2018143 | *Salvia pansamalensis* Donn.Sm. | Lamiaceae | Saj Booti | Decoction of whole plant is used to treat gonorrhea, promote sexual power, toothache | W | Oral | 28 | 0.14 | 32 |
| HZ- QUP-2018144 | *Sonchus arvensis* L. | Asteraceae | Dudi | Tea made from leaves and roots is used to treat asthma, coughs, chest complaints | L,R | Oral Topical | 23 | 0.11 | 29 |
| HZ-QUP-2018145 | *Sonchus oleraceus* L. | Asteraceae | Dood Patar | Decoction of leaves is used to cure menstruation, diarrhea, warts, cancer, eye problems, anemia and inflammations | L | Oral | 35 | 0.17 | 42 |
| HZ-QUP-2018146 | *Saccharum bengalense* Retz. | Poaceae | Saroot | Decoction of leaves and stem is used to treat vomiting, mental diseases, obesity, burning sensation, piles, sexual weakness, respiratory troubles and dysentery | L,S | Oral | 45 | 0.22 | 49 |
| HZ- QUP-2018147 | *Saccharum ravennae* (L.) L. | Poaceae | - | Powder of whole plant is used to cure body pains | W | Oral | 23 | 0.11 | 27 |
| HZ-QUP-2018148 | *Solanum tuberosum* L. | Solanaceae | Alu | Powder of whole plant is used to treat ulcers, pain, swellings, skin rashes, hemorrhoids, swollen gums and burns | W | Oral | 68 | 0.34 | 69 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HZ-QUP-2018149 | *Solanum melongena* L. | Solanaceae | Baingan | Decoction of whole plant is used to regulate high blood pressure, cure painful joints, burns, intestinal disorders, toothache, diabetes, cholera, bronchitis, dysentery and skin infections | W | Oral | 69 | 0.34 | 70 |
| HZ-QUP-2018150 | *Solanum surattense* Burm.f. | Solanaceae | Moakri | Decoction of whole plant is used to treat cancer, bronchitis, asthma, fever, piles, laxative and toothache | W | Oral | 43 | 0.21 | 48 |
| HZ-QUP-2018151 | *Solanum villosum* Mill. | Solanaceae | Katch Match | Extract of whole plant is used to cure toothache, stomachache, fever, swellings, tonsillitis and tonic | W | Oral | 65 | 0.32 | 69 |
| HZ-QUP-2018152 | *Solanum nigrum* L. | Solanaceae | Mako/ Kach mach | Decoction of leaves is used to treat sores, boils, wounds, toothaches, diarrhea, eye diseases and headaches | L | Oral | 56 | 0.28 | 59 |
| HZ- QUP-2018153 | *Spinacia oleracea* L. | Amaranthaceae | Palak | Juice made from leaves is used as carminative, laxative, cure urinary disorders, breathing and jaundice | L | Oral | 68 | 0.34 | 70 |
| HZ-QUP-2018154 | *Syzygium cumini*(L.) Skeels | Myrtaceae | Jaman | Decoction of whole plant is used to treat sore throat, bronchitis, asthma, dysentery, ulcers, cancer, diarrhea, digestive complaints, piles, pimples and stomachache | W | Oral | 54 | 0.27 | 59 |
| HZ-QUP-2018155 | *Thevetia peruviana* (Pers.) K. Schum. | Apocynaceae | Peeli Kaner | Decoction of whole plant is used to cure sores, ulcers, malarial fever, snake bites, toothache, fevers, rheumatism, skin complaints, tumors, headaches and colds | W | Oral | 24 | 0.12 | 28 |
| HZ-QUP-2018156 | *Tagetes minuta* L. | Asteraceae | Sad Brga | Decoction of whole plant is used to treat skin infections, digestive tract problems, dysentery, coughs and mumps | W | Oral | 43 | 0.21 | 49 |
| HZ- QUP-2018157 | *Themeda anathera* Hack. | Poaceae | Jharu Gha | Powder of leaves is used to treat inflammatory disorders | L | Oral | 65 | 0.32 | 68 |
| HZ-QUP-2018158 | *Trichodesma indicum* R.Br. | Boraginaceae | - | Extract of whole plant is used to cure constipation | W | Oral | 24 | 0.12 | 28 |
| HZ-QUP-2018159 | *Trichosanthes cumerina* L. | Cucurbitaceae | Prohl | Decoction of flowers is used to treat cough, headache, fever, tumors, boils, diarrhea, stomachic, malaria and laxative | F | Oral | 56 | 0.28 | 59 |
| HZ-QUP-2018160 | *Tridax procumbens* L. | Asteraceae | Lindri | Decoction of leaves is used to treat wounds, liver disorders, boils, dysentery, diarrhea, diabetes, sores and ulcers | L | Oral | 45 | 0.22 | 48 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| HZ-QUP-2018161 | *Trachyspermum ammi* (L.) Sprague. | Apiaceae | Ajwain | Powder of fruit is used to treat indigestion, fatigue, abdominal pain, flatulence, diarrhea and respiratory distress | F | Oral | 68 | 0.34 | 70 |
| HZ- QUP-2018162 | *Taraxacum officinale* G. H. Weber ex Wiggers. | Asteraceae | - | Decoction of leaves is used to treat infections, bile and liver problems, improves digestion and laxative | L | Oral | 24 | 0.12 | 28 |
| HZ-QUP-2018163 | *Vitis vinifera* L. | Vitaceae | Angoor | Juice made from leaves and fruit is used to cure coughs, bleeding, cholera, dropsy and nausea | L,F | Oral | 68 | 0.34 | 73 |
| HZ-QUP-2018164 | *Vitex negundo* L. | Lamiaceae | Bna | Extract made from leaves is used to treat abdominal gas pain, headache, toothache, asthma, cough, ulcers, boils and wounds | L | Oral | 67 | 0.33 | 69 |
| HZ-QUP-2018165 | Vachellia nilotica (L.) P.J.H. Hurter & Mabb. | Fabaceae | Kikar | Extract of whole plant is used to cure dysentery, diarrhea, throat pains, chest complaints and cough | W | Oral | 68 | 0.34 | 70 |
| HZ-QUP-2018166 | *Xanthium strumarium* L. | Asteraceae | Lindri | Extract of whole plant is used to treat malaria, kidneys disorders, tuberculosis, high fevers, bladder complaints, help women expel the afterbirth | W | Oral | 54 | 0.27 | 59 |
| HZ-QUP-2018167 | *Zea mays* L. | Poaceae | Makai | Decoction of leaves and stem is used to treat diabetes, dysentery, hepatitis, influenza, and pneumonia | L,S | Oral | 70 | 0.35 | 76 |
| HZ-QUP-2018168 | *Zizyphus mauritiana* Lam. | Rhamnaceae | Bair | Powder of whole plant is used to purify the blood, cure anemia, dyspepsia, ulcers, and burns | W | Oral | 68 | 0.34 | 69 |
| HZ-QUP-2018169 | *Ziziphus oxyphylla* Edgew. | Rhamnaceae | Mamooi | Decoction of flower and fruit is used to treat liver diseases, skin diseases, mouth sores, earache, eye diseases and high blood pressure | F, F* | Oral | 69 | 0.34 | 74 |

**Part use:** L= leaf, L*= latex, S= stem, S*= seed, B= bark, B*= bulb, F= fruit, F*= flower, T= tubers, W= whole plant, frequency of citation (FC), relative frequency of citation (RFC), use value (UV).

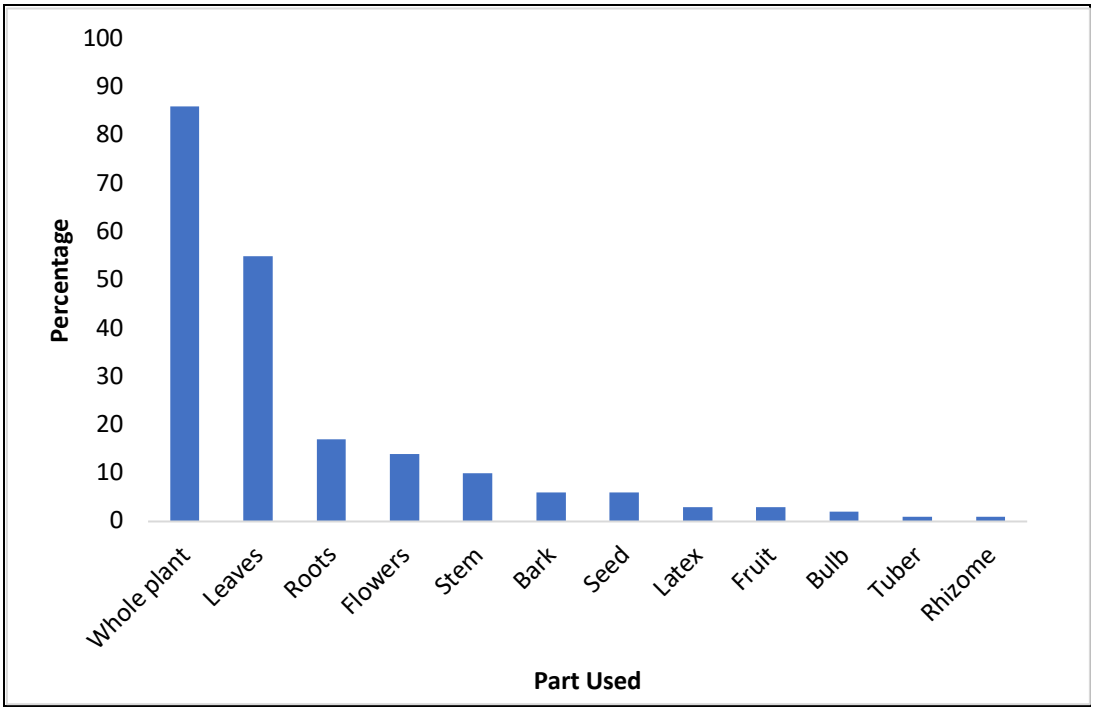


Figure 4. Plant parts used for the preparation of recipes by the natives of Tehsil Kallar Syedan, District Rawalpindi.

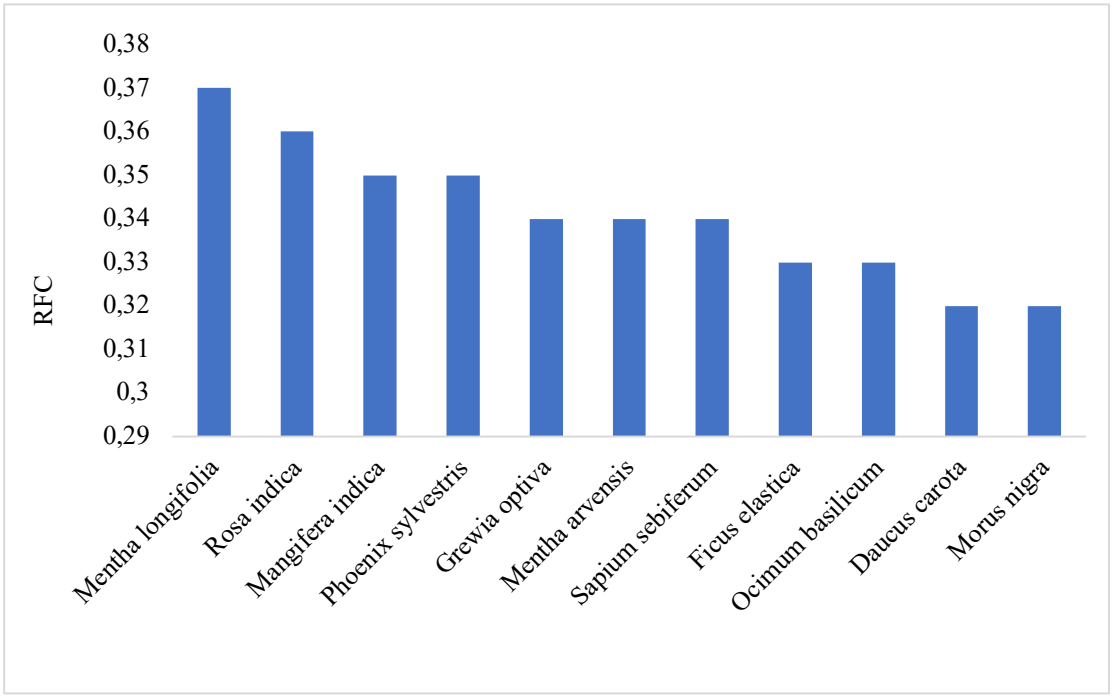


Figure 5. Plant species with highest RFC for ethno-medicinal uses from Tehsil Kallar Syedan, District Rawalpindi.

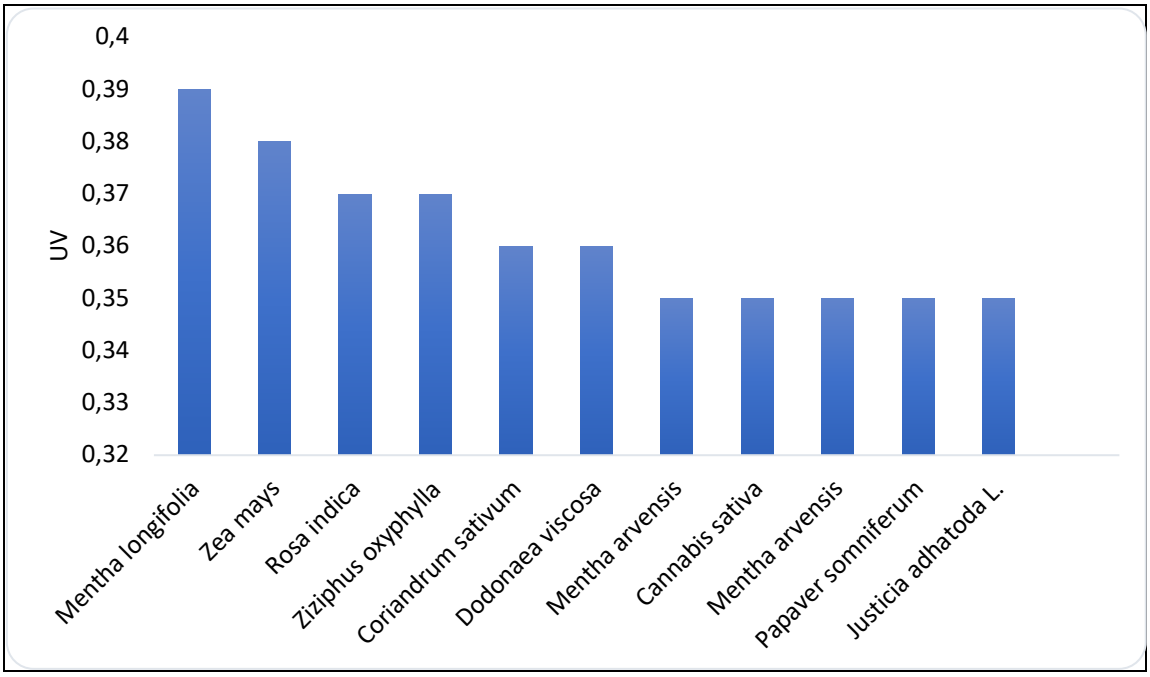


Figure 6. Plant species with UV for ethno-medicinal uses of plants from Tehsil Kallar Syedan, District Rawalpindi.

***Fidelity level***

The fidelity level (FL) index is used to notify plant species that are most favored by the indigenous people to treat certain diseases. Plant species with highest medicinal uses in a given area have maximum value of FL, i.e., 100%. Generally, the high-fidelity level of a species shows the abundance of a particular disease in a specific area and the utilization of plant species by the local people to treat it. The most commonly used medicinal plants in the study area with 100% FL were *Acacia nilotica, Avena sativa, Brassica campestris, Bambusa arundinacea, Curcuma zedoaria, Citrullus colocynthis, Dalbergia sissoo, Ficus religiosa*, *Justicia adhatoda, Morus nigra*, *Psidium guajava, Raphanus sativus, Zizyphus mauritiana* which were used as astringent, to treat obesity, diuretic, carminative, antidiabetic, analgesic, anti-inflammatory, expectorant, to treat cough, constipation etc.. *Barbarea vulgaris* had the lowest FL (61%), while *Amaranthus spinosus* and *Capsella bursa-pastoris* showed bit higher FL (62%) and even higher FL of 65% was shown by *Merremia aegyptia*. The fidelity level values in this study varied from 61% to 100% that showed excessive use of plants by the native inhabitants in frequent way because of its remedial prospective not only in study area but in further areas of Pakistan as well. Plant species having high FL are seen as particularly interesting for biological, phytochemical, and pharmacological studies to evaluate and prove their validity to introduce novel drugs and herbal products (Ouelbani *et al.* 2016; Rehman *et al.* 2023).

Table 2. Fidelity level value of medicinal plants frequently reported against a particular disease.

| **Medicinal plants** | **Ailments** | **Ip** | **Iu** | **FL value%** |
|---|---|---|---|---|
| *Acacia modesta* Wall. | Analgesic | 20 | 25 | 80% |
| *Acacia nilotica* H.Karst. | Astringent | 35 | 35 | 100% |
| *Amaranthus viridis* L. | Vermifuge | 25 | 32 | 78% |
| *Amaranthus spinosus* L. | Cure excessive menstruation | 15 | 24 | 62% |
| *Allium sativum* L. | Treat cardiovascular diseases | 30 | 35 | 85% |
| *Allium cepa* L. | Anti-diabetic | 30 | 35 | 85% |
| *Achyranthes aspera* L. | Treat asthma | 15 | 19 | 78% |
| *Achyranthes bidentata* Blume. | Reduce menstrual pain | 25 | 30 | 83% |
| *Asparagus gracilis* Royle ex Baker. | Sedative | 19 | 25 | 86% |
| *Ailanthus a*ltissima Swingle | Anti-inflammatory | 22 | 24 | 91% |
| *Adiantum capillus-veneris* L. | Analgesic | 16 | 23 | 69% |
| *Arundo donax* L. | Diuretic | 19 | 22 | 86% |
| *Artemisia scoparia* Waldst.& Kitam. | Astringent | 17 | 25 | 68% |
| *Albizia lebbeck* (L.) Benth. | Antiseptic | 22 | 27 | 81% |

| | | | | |
|---|---|---|---|---|
| *Aloe vera (L.)* Burm.f. | Treat skin problems | 21 | 26 | 80% |
| *Avena sativa* L. | Anti- obesity | 21 | 21 | 100% |
| *Abelmoschus esculentus*(L.) Moench. | Diuretic | 33 | 36 | 91% |
| *Aster alpinus* L. | Anti-inflammatory | 11 | 16 | 68% |
| *Brassica rapa* L. | Treat cancer | 23 | 28 | 82% |
| *Brassica campestris* L. | Diuretic | 40 | 40 | 100% |
| *Brassica oleracea* L. | Laxative | 30 | 36 | 83% |
| *Boerhavia diffusa* L. | Purgative | 16 | 19 | 84% |
| *Boerhavia procumbens* Banks ex Roxb. | Anti-microbial | 16 | 19 | 84% |
| *Bombax ceiba* L. | Astringent | 21 | 25 | 84% |
| *Bougainvillea spectabilis* Willd. | Analgesic | 25 | 31 | 80% |
| *Bambusa arundinacea* Willd. | Diuretic | 33 | 33 | 100% |
| *Butea superba* Roxb. | Cures anemia | 14 | 20 | 70% |
| *Bidens chinensis* (L.) Willd. | Antiulcer | 15 | 18 | 83% |
| *Broussonetia papyrifera* Vent. | Laxative | 33 | 37 | 89% |
| *Bauhinia variegata* L. | Cure stomach disorders | 35 | 41 | 85% |
| *Barbarea vulgaris* R.Br. | Diuretic | 11 | 18 | 61% |
| *Cymbopogon citratus* Stapf | Anti-bacterial | 23 | 26 | 88% |
| *Carissa opaca* Stapf ex Haines | Treat kidney stones | 30 | 35 | 85% |
| *Commelina paludosa* Blume | Astringent | 13 | 19 | 68% |
| *Cynodon dactylon* (L.) Pers. | Expectorant | 40 | 46 | 86% |
| *Calotropis procera* (Aiton) Dryand. | Anti-fertility | 23 | 26 | 88% |
| *Cedrela toona* Roxb.ex Rottler | Analgesic | 22 | 27 | 81% |
| *Coriandrum sativum* L. | Cureindigestion | 30 | 35 | 85% |
| *Curcuma zedoaria* (Christm).Roscoe. | Carminative | 29 | 29 | 100% |
| *Cucurbita pepo* L. | Diuretic | 32 | 37 | 86% |
| *Cupressus arizonica* Greene | Anti-microbial | 24 | 26 | 92% |
| *Carica papaya* L. | Cure jaundice | 26 | 29 | 89% |
| *Cenchrus ciliaris* L. | Treat wounds | 15 | 20 | 75% |
| *Crotalaria medicaginea* Lam. | Anti-bacterial | 17 | 19 | 89% |
| *Chenopodium ambrosioides* L. | Cure diabetes | 23 | 26 | 88% |
| *Cyperus rotundus* L. | Analgesic | 20 | 23 | 86% |
| *Cyperus iria* L. | Febrifuge | 18 | 23 | 78% |
| *Cyperus niveus* Retz. | Treat backache | 21 | 24 | 87% |
| *Cestrum nocturnum* L. | Mosquito-repellent | 25 | 27 | 92% |
| *Conyza bonariensis* (L.) Cronq. | Wound healing | 16 | 20 | 80% |
| *Cassia fistula* L. | Laxative | 24 | 30 | 80% |
| *Citrus medica* L. | Anti-diabetic | 22 | 25 | 88% |
| *Colebrookea oppositifolia* Sm. | Treat wounds | 15 | 17 | 88% |
| *Catharanthus roseus* (L.) G.Don. | Anti-bacterial | 16 | 21 | 76% |
| *Cannabis sativa* L. | Narcotic | 25 | 28 | 89% |
| *Callistemon viminalis* Cheel. | Anti- microbial | 23 | 30 | 76% |
| *Convolvulus arvensis* L. | Relief constipation | 21 | 24 | 87% |
| *Citrullus colocynthis* (L.) Schrad. | Anti-diabetic | 26 | 26 | 100% |
| *Chorispora tenella* DC. | Anti-bacterial | 23 | 28 | 82% |
| *Capsella bursa-pastoris* L. | Diuretic | 15 | 24 | 62% |
| *Dodonaea viscosa* (L.) Jacq. | Treat rheumatism | 25 | 32 | 78% |
| *Dactyloctenium aegyptium* (L.) Willd. | Relieve kidney pains | 24 | 29 | 82% |
| *Digera muricata* Mart | Laxative | 17 | 22 | 77% |
| *Datura innoxia* Mill. | Pain killer | 26 | 32 | 81% |
| *Diospyros kaki* L.f. | Treat constipation | 29 | 34 | 85% |
| *Dalbergia sissoo* DC. | Analgesic | 29 | 29 | 100% |
| *Daucus carota* L. | Carminative | 30 | 35 | 85% |
| *Eucalyptus camaldulensis* Dehnh. | Expectorant | 23 | 29 | 79% |
| *Eucalyptus Lanceolata* L. | Cure asthma | 17 | 24 | 70% |

| | | | | |
|---|---|---|---|---|
| *Eruca sativa* Mill. | Diuretic | 26 | 31 | 83% |
| *Eriobotrya japonica* (Thunb.) Lindl. | Anti-diabetic | 27 | 34 | 79% |
| *Euphorbia royleana* Boiss | Anti-microbial | 16 | 20 | 80% |
| *Euphorbia granulata* Forssk. | Purgative | 27 | 34 | 79% |
| *Euphorbia helioscopia* L. | Anti-bacterial | 25 | 29 | 86% |
| *Euphorbia hirta* L. | Treats dysentery | 24 | 29 | 82% |
| *Eriosema psoraleoides* G.Don | Analgesic | 16 | 20 | 80% |
| *Fumaria indica* (Hausskn.) Pugsley | Analgesic | 25 | 30 | 83% |
| *Flacourtia indica* (Burm.f.) Merr. | Expectorant | 17 | 20 | 85% |
| *Ficus carica* L. | Laxative | 27 | 34 | 79% |
| *Ficus elastica* Roxb.ex Hornem. | Astringent | 24 | 28 | 85% |
| *Ficus religiosa* L. | Anti-inflammatory | 32 | 32 | 100% |
| *Grewia optiva* J.R.Drumm.ex Burret | Anti-microbial | 24 | 29 | 82% |
| *Galinsoga quadriradiata* Ruiz & Pav. | Treat wounds | 16 | 21 | 76% |
| *Hibiscus rosa-sinensis* L. | Laxative | 18 | 23 | 78% |
| *Helianthus annuus* L. | Diuretic | 25 | 35 | 71% |
| Heliophila coronopifolia L. | Anti-bacterial | 16 | 20 | 80% |
| Imperata cylindrica (L.) P.Beauv. | Febrifuge | 26 | 30 | 86% |
| *Ipomoea pes-tigridis* L. | Purgative | 23 | 27 | 85% |
| *Ipomoea carnea* Jacq. | Wound healing | 25 | 30 | 83% |
| *Iberis sempervirens* L. | Anti-rheumatic | 24 | 26 | 92% |
| *Jasminum grandiflorum* L. | Anti-microbial | 26 | 32 | 81% |
| *Jasminum sambae* (L.) Aiton. | Cure skin disorders | 24 | 29 | 82% |
| *Jacaranda mimosifolia* D.Don | Cure ulcers | 25 | 30 | 83% |
| *Justicia adhatoda* L. | Expectorant | 28 | 28 | 100% |
| *Lathyrus aphaca* L. | Treat toothache | 24 | 27 | 88% |
| *Lathyrus odoratus* L. | Treat stomachic disorders | 26 | 30 | 86% |
| *Lantana camara* L. | Antiseptic | 24 | 29 | 82% |
| *Launaea procumbens* (Roxb.) Amin. | Treat kidney disorders | 17 | 19 | 89% |
| *Luffa cylindrica* (L.) M. Roem. | Anti-inflammatory | 26 | 31 | 83% |
| *Mirabilis jalapa* L. | Diuretic | 28 | 34 | 82% |
| *Mentha longifolia* (L.) L. | Carminative | 29 | 35 | 82% |
| *Mentha arvensis* L. | Cure digestive problems | 30 | 36 | 83% |
| *Malvastrum coromandelianum* (L.) Garcke | Analgesic | 25 | 34 | 73% |
| Musa paradisiaca L. | Laxative | 28 | 35 | 80% |
| *Morus alba* L. | Treat anemia | 29 | 36 | 80% |
| *Morus nigra* L. | Treat coughs | 38 | 38 | 100% |
| *Malva neglecta* Wallr | Diuretic | 24 | 29 | 82% |
| *Melia azadirachta* L. | Anti-diabetic | 30 | 38 | 78% |
| *Mangifera indica* L. | Treat dysentery | 34 | 38 | 89% |
| *Merremia a*egyptia (L.) Urb. | Anti-bacterial | 15 | 23 | 65% |
| *Ocimum basilicum* L. | Carminative | 32 | 35 | 91% |
| *Oxalis corniculata* L. | Febrifuge | 25 | 30 | 83% |
| *Olea europaea* L. | Analgesic | 25 | 35 | 71% |
| *Pennisetum glaucum* (L.) R.Br. | Cure rheumatism | 24 | 27 | 88% |
| *Pennisetum typhoides (*Burm.f.) Stapf & C.E. Hubb. | Treat jaundice | 26 | 32 | 81% |
| *Prunus domestica* L. | Improves digestion | 28 | 32 | 87% |
| *Populus deltoides* W.Bartram ex Marshall | Relieve the menstrual pain | 25 | 29 | 86% |
| *Platanus orientalis* L. | Anti-inflammatory | 27 | 30 | 90% |
| *Papaver somniferum* L. | Analgesic | 30 | 38 | 78% |
| *Plantago ovata* Forssk. | Laxative | 24 | 28 | 85% |
| *Psidium guajava* L. | Treat constipation | 39 | 39 | 100% |
| *Punica granatum* L. | Cure digestive disorders | 28 | 35 | 80% |
| *Pongamia pinnata* (L.) Pierre | Treat wounds | 23 | 28 | 82% |

| | | | | |
|---|---|---|---|---|
| *Polygonum monspeliense* Pers. | Diuretic | 26 | 30 | 86% |
| *Pinus roxburghii* Sarg. | Diuretic | 24 | 29 | 82% |
| *Pinus sylvestris* L. | Antiseptic | 23 | 32 | 71% |
| *Phoenix sylvestris* Roxb. | Diuretic | 34 | 38 | 89% |
| *Parkinsonia aculeata* L. | Anti-diabetic | 25 | 29 | 86% |
| *Pteris cretica* L. | Astringent | 16 | 20 | 80% |
| *Phlomoides tuberosa* Moench | Sedative | 18 | 23 | 78% |
| *Parthenium hysterophorus* L. | Cure rheumatic pain | 27 | 30 | 90% |
| *Rosa indica* L. | Cure eye diseases | 43 | 46 | 93% |
| *Rosa damascena* Mill. | Treat digestive problems | 35 | 43 | 81% |
| *Rumex dentatus* L. | Relief indigestion | 26 | 34 | 76% |
| *Raphanus sativus* L. | Carminative | 40 | 40 | 100% |
| *Rhynchosia minima* (L.) DC. | Laxative | 23 | 29 | 79% |
| *Ricinus communis* L. | Analgesic | 23 | 32 | 71% |
| *Sapium sebiferum* (L.) Roxb. | Purgative | 35 | 40 | 87% |
| *Sorghum heteroclitum* (Roxb.) Kuntze. | Anti-microbial | 23 | 28 | 82% |
| *Sorghum drummondii* (Nees ex Steud.) Millsp. & Chase. | Purgative | 25 | 30 | 83% |
| *Sorghum halepense* Pers. | Diureti | 23 | 29 | 79% |
| *Salvia plebeia* R.Br. | Anti-inflammatory | 27 | 32 | 84% |
| *Salvia pansamalensis* Donn.Sm. | Astringent | 24 | 30 | 80% |
| *Sonchus arvensis* L. | Sedative | 23 | 28 | 82% |
| *Sonchus oleraceus* L. | Sedative | 28 | 30 | 93% |
| *Saccharum bengalense* Retz. | Diuretic | 30 | 35 | 85% |
| *Saccharum ravennae* (L.) L. | Analgesic | 35 | 38 | 92% |
| *Solanum tuberosum* L. | Anti-microbial | 40 | 48 | 83% |
| *Solanum melongena* L. | Treat dysentery | 40 | 48 | 83% |
| *Solanum surattense* Burm.fil. | Anti-bacterial | 41 | 46 | 89% |
| *Solanum villosum* Mill. | Treat stomachache | 26 | 30 | 86% |
| *Solanum nigrum* L. | Purgative | 30 | 35 | 85% |
| *Spinacia oleracea* L. | Carminative | 56 | 58 | 96% |
| *Syzygium cumini* (L.) Skeels | Diuretic | 34 | 36 | 94% |
| *Thevetia peruviana* (Pers.) K.Schum. | Febrifuge | 27 | 32 | 84% |
| *Tagetes minuta* L. | Diuretic | 24 | 34 | 70% |
| *Themeda anathera* Hack. | Anti-bacterial | 28 | 30 | 93% |
| Trichodesma indicum R.Br. | Anti-inflammatory | 29 | 32 | 90% |
| *Trichosanthes cucumerina* L. | Laxative | 23 | 26 | 88% |
| *Tridax procumbens* L. | Antiseptic | 16 | 27 | 59% |
| *Trachyspermum ammi* (L.) Sprague. | Treat abdominal pain | 28 | 34 | 82% |
| *Taraxacum officinale* F.H.Wigg. | Diuretic | 37 | 40 | 92% |
| *Vitis vinifera* L. | Laxative | 40 | 45 | 88% |
| *Vitex negundo* L. | Cure asthma | 28 | 34 | 82% |
| Vachellia nilotica (L.) P.J.H.Hurter & Mabb. | Antiseptic | 23 | 27 | 85% |
| *Xanthium strumarium* L. | Anti-rheumatic | 35 | 40 | 87% |
| *Zea mays* L. | Purgative | 54 | 58 | 93% |
| Zizyphus mauritiana Lam. | Expectorant | 60 | 60 | 100% |
| *Ziziphus oxyphylla* Edgew. | Anti-diabetic | 46 | 52 | 88% |

## Conclusion

In the current study, a number of ethno-medicinally important plant species have been documented that are highly valuable and precious which are being used for enhancing quality of life of the people residing in the study area. Native plants are used to treat a variety of ailments, and local people are still heavily reliant on wild flora for the treatment of many illnesses. Modern medical provision in the region is very limited, and 'folk' drugs are highly important. Our research provides baseline information on the traditional uses of local plants, and acts as the first

step in establishing a dialogue between folk health healers and scientific researchers. We argue that further ethno-botanical research is needed to continue to bridge this gap, and that such efforts are likely to yield medically important discoveries. Moreover, ethno-botanical information is of considerable worth for administrators and policy-makers, to identify key wild species which need protection. Our FL value metric indicates how frequently different plant species are used by local people, and also indicates the medical specificity of given curative plant species. We suggest plants with high FL values should be priorities for future drug discovery investigations.

## Declarations

***Ethics approval and consent to participate:*** *The consent of all participants of study was taken before any sort of questioning. The respondents were thoroughly guided on the importance of data and its contribution towards research and betterment of society.*

***Consent for publication:*** *The consent of all authors was taken. All authors agreed for submission of article for publication.*

***Availability of data and materials:*** *The data has been included in the manuscript here.*

***Competing interests:*** *The authors declare that they do not have any competing interests.*

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***Authors' contributions:*** Huma Zareef performed the practical work, Muhammad Tayyab Gul, Rahmatullah Qureshi and Hanan Aati provided guidance/supervision and support in data collection and writing the first draft of article, Mehmooda Munazir interpreted the data, reviewed and edited the manuscript for submission.

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