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Ethono Medicinal Study of Swabi, Pakistan

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Abstract:

Medicinal plants consist of active biochemical constituents that give definite physiological responses in different diseases. The present study was conducted to get folk knowledge of district Swabi about identification and usage of various medicinal plants. The area has large variability with regard to climate that produces a large number of medicinal plants. The detailed information about 24 medicinally important species was gathered from local experts. Acacia arabica is used in digestive, urinary and respiratory problems. Allium sativum is

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used in cholera, hypertension, chronic cough and asthma. Aloe vera has healing properties and facilitates healing of any kind of skin wound. Amaranthus spinosus have antioxidant, anti-malarial and anti-inflammatory properties. Bauhinia variegata acts as a remedy in skin problem especially skin discoloration and also in bluntness. Cannabis sativa exudes are used as stimulant, analgesic and antispasmodic. Capsella bursa is used for internal and external bleeding, diarrhea and reduces high blood pressure. Chenopodium album is used for peptic ulcer, dyspepsia and hepatitis. Cichorium intybus root is used in the treatment of jaundice and liver enlargement. During this study, botanicals with known medicinal values were greatly influenced by gender, site and age; the latter was the most significant factor in Swabi. The outcomes of this study shows that Pakistan has medicinally rich flora that possesses great potential for using as antibiotic substitutes, and it is also desirable to explore the mystery of unknown flora for curing various diseases.

Key words: Chemical constituents, District Swabi-Pakistan, Ethno medicinal, Folks, Medicinal plants, Mercuric chloride

INTRODUCTION

Those plants which have active ingredients for the treatment of certain diseases are known as medicinal plants or herbs. In other words, the plants which have healing properties are termed as medicinal plants (Napar *et al.,* 2012). The basic human protective and remedial health needs have been meeting by botanicals since ancient times (Farombi, 2003; Karatas and Aasim, 2014; Jan *et al.,* 2015). More than nine thousand plants have been estimated to possess medicinal potentials, throughout the world. These plants have been extensively used in crude form at household level as well as by the traditional medicine practitioners such as Unani, Chinese Medicine and Japanese System (Malik *et al.,* 2005; Mazid *et al.,* 2012).

The phytochemistry and pharmacognosy are the two important disciplines used in the science of the medicinal plants. Medicinal plants consist of active biochemical constituents and give a definite physiological response in different diseases in humans as well as in animals. So, photochemistry is a division of chemistry which concerns with chemical processes of plant life and also with the chemical compounds yielded by plants, while the molecules characteristically in plants are called phytochemicals. The medicinal plants produce various phytochemicals like alkaloids, carotenoids, flavonoids, fatty acids, terpenoids, polysaccharides and aromatic compounds (Gunduz, 2013). Pharmacognosy is derived from the Greek word "pharmakon" which means drug and "gnosis" means knowledge, so it is the branch of medicine and biology which concerns with the study of the action of drug, in other words it is the study of the interactions that takes place between the living organisms and chemicals that produce normal or abnormal biochemical function is known as pharmacognosy (Fatima *et al.,* 2013).

The various medicinal plants in form of trees, herbs, shrubs, climbers, rhizomes, bulbs and grasses are used for the preparation of medicines. For the treatment of external or internal illness, various medicines are prepared from specific parts of plants like roots, barks, floral parts, leaves and buds (Mathew and Abraham, 2006). In literature, a large number of diseases namely stomach ailments, headache, sore of eyes, common cold, heart burn, brain diseases, ulcers, diarrhea, different kinds of fevers, skin diseases and diabetes etc have been reported to treat with the applications of specific herbal medicines (Jin *et al.,* 2006; Radad *et al.,* 2006). Medicinal plants are also a rich source of antioxidants that enhance the antioxidant efficiency of plasma and hence reduce the risk of cancer and heart diseases (Prior and Cao, 2000).

Pakistan has about 50000 registered practitioners of traditional medicine called Tebb-e-Unani and 60 percent of its

population use herbal medicines prescribed by traditional practitioners (Malik *et al.,* 2005). There are many institutions for Tabb Education in Pakistan; some of these are Hamdard Medical College for Tabb, Qarshi Medical College for Tabb, Falkon Medical College for Tabb. These institutions are registered from National Council for Tabb. Swabi has huge and attractive mountains that lie on north side and it is present between two rivers i.e. Indus River and Kabul River of Pakistan. There are a large number of medicinal plants that naturally grow in region Swabi of Pakistan i.e. *Acacia arabica, Acacia modesta, Allium sativum, Aloe vera, Amaranthus spinosus, Bauhinia varigata, Cannabis sativa, Capsella bursa, Chenopodium album, Cichorium intybus L., Citrus medica, Convolvulus arvensis, Coriandrum sativum, Cuscuta reflexa, Cypperus rotundus, Datura strmonium, Eucalyptus lanceolata, Eugenia janbolana, Euphorbia helioscopia, Fagonia critica, Ficus carica, Foeniculum vulgare, Fumairia perviflora, Hibiscus esculentus, Hibiscus rosa-sinensis etc.*

It has been expected that 80% of population of developing countries depend upon the conventional medicines (WHO, 2000). But with the passage of time, the popularity and demand of these medicinal plants has been increasing in both developed and under-developing countries of the world due to the reason that natural products have less negative effects, being non-narcotic and available to poor people at very low cost (Shariff *et al.,* 2006). Keeping in view the health benefits of medicinal plants, the present study was conducted in order to find out the chemical constituents and medicinal uses of selected plants of District Swabi, Pakistan. Therefore, we first time report an evaluation of 24 selected species of district Swabi, Pakistan for phytochemical properties along with their taxonomic nature.

MATERIALS AND METHODS

This research study was conducted in diverse areas of district Swabi, while taxonomic and chemical constituent study was carried out at laboratory of plant taxonomy, Abdul Wali Khan University, Mardan Khyber Pakhtunkhwa-Pakistan.

***Medicinal plants survey*:** After thorough study of literature, the study trips were planned keeping in mind the blooming period of medicinal plants. Two different methods were followed during fields. In first method, observations were kept, while visiting different localities. In second method of questionnaire, study visits were made in different villages to conduct interviews with herbal physicians, local inhabitants, timber dealers and drug dealers to gain the information about the different medicinal plants. Elder persons and local Hakims were given preference because they knew well the actual uses of medicinal plants in their folk knowledge. The local names, local uses, economic importance and other relevant information were collected by interviewing and questionnaire forms filling. The questions about uses of plants, rate of utilization, availability and their market values were also discussed with local people. The information about medicinal plants was also collected via literature survey and common observations.

***Collection of medicinal plants*:** The first trip was arranged to the plain areas of Swabi including Tarakai, Dagai, Ismaila, Zeda and Topai. Another trip was arranged to hilly areas of Swabi including Sheraghund Hills, Naranje Hills and Shah Mansur Hills (Figure 1). During the medicinal plants collection 3-5 specimens per plant were collected and captured their photographs. Some dried parts of the medicinal plants were also collected from Pansari shops.

***Medicinal plants preservation*:** After the medicinal plants collection, they were properly set on blotting papers and old newspaper for absorbing moisture in order to avoid plants spoilage, attack of fungi and rotting. The newspapers were

changed after every 24 hours. The plants were dried and made them moisture free by this process for twenty days. The plants were also sprayed with fungicides (2% $HgCl_2$ dissolved in ethanol) in order to prevent the fungal attack. This process was completed in two months. Subsequently, the preserved plants were mounted on stranded herbarium sheets for conducting taxonomic study at laboratory of plant taxonomy, Abdul Wali Khan University, Mardan Khyber Pakhtunkhwa-Pakistan.

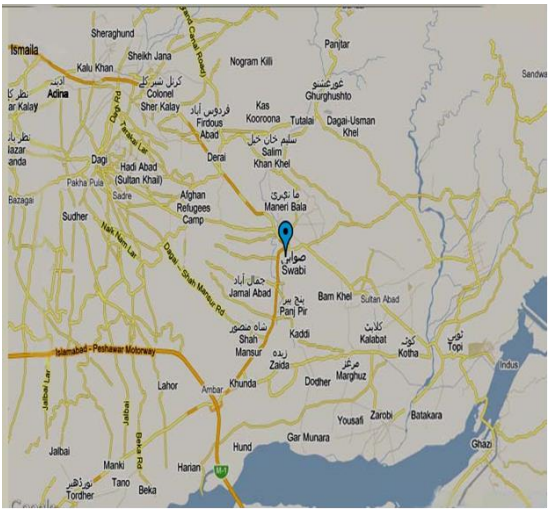

Figure1. Map of study sites of hilly and plain areas of Swabi, Pakistan

RESULTS AND DISCUSSION

The various medicinal plants, trees, herbs, shrubs, climbers, rhizomes, bulbs and grasses are used for the preparation of medicines. The specific parts of the plants have active ingredients such as roots, barks, floral parts, leaves and buds that play medicinal roles in various diseases. The stomach ailments, headache, sore of eyes, common cold, heart burn, brain diseases, ulcers, diarrhea, malaria, skin diseases, diabetes many other diseases are treated by herbal medicines.
District Swabi consists of two zones; hilly area and plain area. The hilly area is the rich zone of medicinal plants as compared

to the plain area. The hilly areas of Swabi include Sheraghund Hills, Naranje Hills and Shah Mansur Hills, while plain area includes Tarakai, Dagai, Ismaila, Zeda and Topai. During the field work, plants were collected from both hilly and plain areas (Figure 2; Table 1). The climate of Swabi is extremely hot in summer and very cold in winter. The temperature rises up to 48 °C during June-July, while in November temperature rapidly falls down up to – 1 °C. July, August and December are called the months of rainy season because rainfall occurs mostly in these three months. High humidity is being prevailed around the whole year. Due to great variations in climate, a myriad of botanicals are grown in district Swabi. This study of flora for medicinal purposes provides us knowledge about local names, genus and species names, chemical constituents of twenty-four plants belonging to 18 families (Table 1; Figure 2). The ethno medicinal study reveals the multiple uses of the reported medicinal plants for curing various diseases. For example, *Acacia arabica* is used to provide a smooth coat over swellings, digestive, urinary and respiratory tract. It is also useful for coughs, sore throat, fistulas, hemorrhoids, bleeding, catarrh, eyewash, skin disorders, dysentery, as an antioxidant and anti-cancerous. Its bark is used in diarrhea, dyscentery, astiringent and also used as a tan. Its gum on the bark is used in the preparation of the mucilage which is use for diabetes. *Acacia modesta*'s gum is useful for restorative, stimulant, sexual tonic, pain killer especially backache, while its ash is used in chew/snuff preparation. *Allium sativum* is used in cholera, for control of hypertension, to kill intestinal worms. It is beneficial in removing pains especially in arthritis, sciatica and chest pain. It is used to kill string bites. The juice of this plant removes ear pain, chronic asthma, coughs and improves vision of eyes. It is an excellent anti-infectious agent and is helpful in reducing microbial infection. It acts as a remedy to prevent gagerine. It increases sperm counts and regains vigor after debility. It also helps in removing menstrual problems. *Aloe*

vera has healing property and its oral and topical use has been found to heal any kind of wound, burn and it speeds up the recovery time in case of surgery. It is used in the treatment of liver diseases and used as aperients. *Amaranthus spinosus* have antioxidant, anti-malarial, analgesic, immuno-modulatory, antiprotozoal, anti-inflammatory properties. Its roots act as stringent and diuretic especially for colic and eczema. *Bauhinia variegata* acts as a remedy in skin problem especially skin discoloration and also in bluntness. Its bark acts as anti-fever, bleeding piles, anthelmintic, stimulant, while pasting of bark removes skin ailments and scrofula. *Cannabis sativa* exudes act as stimulant, analgesic, antispasmodic, diuretic and acronarcotic poison for vomiting, anorexia, weight loss, spasticity and painful conditions (neurogenic pain). *Capsella bursa* is used for internal and external bleeding, diarrhea. It is antiseptic, brings urination, lowers the high blood pressure. Its seeds are stimulant, astringent, antiscorbic and act as a source for blood vessels to contract, loosen up or expand *Chenopodium album* is used for peptic ulcer, intestinal worms, dyspepsia, flatulence, urinary retention, kidney diseases, hepatitis, quenches the thirst, laxative, diuretic, aparient, anthelmintic and acts as a sexual stimulant. *Cichorium intybus* is used in hepatitis, diuretic, refrigerant, astringent, appetizer, hypoglycaemic. It has tonic effect upon the liver and digestive tract, fevers and vomiting. Its roots and leaves are appetizer, cholagogue, depurative, hypoglycaemic and laxative; the root has been confirmed to treat jaundice, liver swelling, gout and rheumatism. *Citrus medica* is used in hepatitis, increase the bile secretion, promote digestion, diuretic, refrigerant, astringent. The essential oil has been found as an antibiotic. The mixture of citrus juice and wine was found as remedy to poison. *Convolvulus arvensis* increases flow of bile and its discharge from the body. It is also urine-inducing, laxative and strongly purgative. A tea made from the flowers is laxative and is also used in the treatment of fevers, wounds

healing, antiellergic. *Coriandrum sativum* oil is used to refresh and uplift the mind and also used as stimulant. It is carminative, refrigerant, aphrodistic and helps for mental tiredness, serious headache, nervousness. It removes neurasthenic and rheumatic pain and its roots are helpful in treating bilious disorders. It is purgative, blood purifier, good for brain, used. It has been utilized in Ayurvedic medicine to remove the problems of urinating and jaundice. It is also anti-cough. *Cyperus rotundus*'s root is acrid, anthelmintic and is used in treating fever, leprosy and dysentery. It is also helpful in removing stomach pain, epilepsy, opthalmia, emmenagogue, diaphoretic, dyspepsia, urinary concretions. *Datura stramonium* is poisonous in nature; it is used as sedatives, anti-asthmatic, anodyne, antispasmodic. Large doses may cause death, smaller doses cause varying symptoms like thirst, impaired vision, flushed skin leading to convulsions and coma. Its leaves are smoked with tobacco for asthma. *Eucalyptus camaldulensis* is pain-killer; antiseptic, harsh, red gum from eucalyptus is a traditional remedy for cold, stomach pain. It is anti-coughs and is helpful in diarrhea, dysentery, bleeding, spasm and wounds. *Eugenia jambolana* bark is used as mouthwash for ulceration and gum. Its seeds are used as a remedy in diabetes as they contain glucoside jambuline which has the power of preventing the pathological conversion of starch into sugar. Fresh juice of the leaves is very effective for bloody dysentery. *Euphorbia helioscopia* is hydragogue, cathartic and its roots are anthelmintic, its seeds are used in cholera, neuralgia, rheumatism, purgative and warts, while its stem is used for constipation. *Fagonia arabica* is antibilious, antiviral, antibacterial, anticancer and antimicrobial. It is used as prophylactic against smallpox in children. *Ficus carica* is used for the treatment of cancer, demulcent, digestive, emollient, galactogogue, pectoral, stomachic. Its fruit is used as laxative in constipation, for cough and throat infections. *Foeniculum vulgare* is used in digestion, healthy for losing

weight, detoxifier, increasing metabolism, indigestion and helps with morning illness and bloating. *Fumaria parviflora* is used in anthelmintic, aperient, alterative, syphilis, scrofula, leprosy, use for fever, laxative, diuretic, diaphoretic, constipation, febrifuge, skin disease and blood purifications. *Hibiscus esculentus* is demulcent, mucilaginous, and the leaves are said to make an excellent emollient, laxative. Okra treats lung inflammation, intestinal tract, asthma, and irritable bowel. *Hibiscus rosa-sinensis* is antibacterial, acerbic, soporific and tonic. Its parts which have medicinal properties are leaves, seeds and mature calyces which show diuretic and antiscorbutic potentials. Fruit is antiscorbutic. Roots are bitter having aperitive and tonic properties. Leaves are local remedy for soothing cough. The extract of flower can be used in liver disorders, lowering high blood pressure and lowering cholesterol level in blood serum. It is anti-stomachic, breathing and nerves problems.

There is no scientific method for collection and preparation of medicinal plants in local areas of Swabi. However, in first step, the plant is selected and then medicinal part of the plant is collected. In second step, the collected part is preserved properly to prevent deterioration (destruction of plant by fungus etc). Subsequently, the collected part is dried properly, grind and at last the dosage form is selected depending upon the medicinal properties of that plant. The dosage figure may be in the form of syrup, capsule, medicated wines tablets and creams etc.

In light of these surveys to different locations of Swabi, we suggest that there is a dire need to devise new policy for the improvement of medicinal plants. Government should launch different agricultural extension programs regarding medicinal plants. The awareness should be made among local people of Swabi, so that they can easily understand and equipped with day-today knowledge regarding medicinal plants. Some more surveys must be arranged in district Swabi in order to create

awareness among local people for the conservation of indigenous plants. The government should encourage and educate local people especially farmers and Hakeems relating to medicinal plants. Educational institutes of medicinal plants in the country should be opened which can be a great source of consciousness among people because at some times the local people take overgrazing, and cut the whole plant only for single branch. Moreover, marketing system of medicinal plants is very poor in the country which can be improved by taking the initiatives.

CONCLUSION:

The present study indicated that majority of pastoral community of Swabi relied on medicinal plants in various human ailments. It might be due to the reason that herbal treatment is cost effective, safe and free from any side effect. The village elders, local healers and farmers had sufficient knowledge about medicinal plants identification and their medicinal uses. Now the need of the hour is that efforts should be made to explore knowledge about the proper usage of medicinal herbs in order to get relief from dangerous diseases. There are some serious threats such as overexploitation, habitats loss and very poor seed germination that are causing evanesce of these plants from the earth. Therefore, attempts must be done by *in situ* or *ex-situ* and by *in vitro* techniques in order to conserve these beneficial plant species that are used to cure harmful diseases.

Table 1. Ethno-medicinal study of selected plants from Swabi, Pakistan

Botanical name	Local name	Biochemistry of medicinal plants	Uses
Acacia arabica	Kikar	Arabic acid, Caumarin, Benzoic acid, Flavonoids, Gallic acid, Chlorogenic acid, Tannin, Salicylic acid Linamarin.	Useful for digestive, urinary and respiratory problems
Acacia modesta	Palusa	Fatty acids, Non-protein amino acids, Alkaloids, Terpenes, Cyanogenic glycosides, Cyclitols and	Gum is useful for restorative, stimulant,

		Fluoroacetate	sexual tonic and pain killer especially backache
Allium sativum	Lihsen/Uga	Allicin, Flavonoids, Diallyl sulphate, Diallyl disulfide, Alliin, Ajoene, Epinephrine, Phyocidin, Phytonides, Ascorbic acid, Sapogenin, Selenium, Steroid, Sitosterol, Glycosides, Allyl propyl disulfide	Useful for cholera, hypertension, chronic cough, asthma and to kill intestinal worms
Aloe vera	Kenvar	Traces of alkaloid, Aloin, Triglyceride Glucommannans, Salicylic acid, Steroids, Isobarbelion, Resin, Amino acids, Gum, Uronic acid, Chrycophanic acid, Barbaloin and Ribonucleic acid	Have healing properties and facilitates healing of any kind of skin wound
Amaranthus spinosus	Chalvere	Amaranthine, Isoamaranthine, Potassium nitrate, Hydrocyanic acid, Valine, Serine, Vitamin-B, B2 & C, Alanine, Campesterol, Nicotinic, Oleic, Palmatic, Linolic & Stearic acid	Have antioxidant, anti-malarial and anti-inflammatory properties
Bauhinia variegata	Kachnar	Tannic acid, Fatty oil, Glucose, Fibre, Flavonoids, Quercetin, Rutin, Quercetrin, Apigenin, Apigenin 7-O-glucoside, Flavanone, Linolenic acid	Helpful in managing skin discoloration, baldness and bilious.
Cannabis sativa	Bahng	Cannabionol, Tetrahydrocannabitriol, Cannabidiolic acid, Cannabidiol, Cannabigerol, Cannabine, Cannin-resin, Pseudo cannabinol, Cannabigerolic acid, Cannabichromene, Cannabichromenic acid, Choline, Trigonelline, Muscarine	Exudes are used as stimulant, analgesic, antispasmodic and acronarcotic poison for vomiting, anorexia and weight loss
Capsella bursa	Chambraka	Protein, Fat, Carbohydrate, Fatty oil, Amino acid, Arginine, Aspartic acid, Cysteine, Fatty oil, Inosetol, Malic, Citric, Tannic, Thyocynic, Tartaric, Bursenic acids, vitamin C	Useful for internal and external bleeding, diarrhea and reduces high blood pressure
Chenopodium album	Bathu	Saponins, Cholin, Lanolinic acid, Albuminoids, Chenopodin, Betalin, Ascaridole	Useful for peptic ulcer, intestinal worms, dyspepsia
Cichorium intybus	Kasni	Sugar, Alpha-Amyrin, Taraxerone, Baurenyl acetate Beta-sitosterol	Root is used in jaundice and liver enlargement.
Citrus medica	Lamoon	Citric acid, Sulphuric acid, Glucose, Linalool, Campene, Calcium, d-x-pinene, d-limonene, Ascorbic acid, Phosphorus, Citrine	*Citrus medica*'s essential oil is regarded as antibiotic
Convolvulus arvensis	Prevate	Pyrrolidine alkaloids, Convolvuline, Tropane, Alkaloids Tropine, Tropinone, Pseudotropine and Cuscohygrine	Urine-inducing, laxative, strongly purgative
Coriandrum sativum	Danyaan	Aromatic acids, Linalool, Geranyl acetate, γ-terpinene, Cineole, Cymene, Terpineol, Dipentene, Phellandrene, Pinene, Terpinolene	Helpful for alleviating rheumatism and arthritis pain
Cyperus rotundus	Dila	Tannins, Saponins, Carbohydrates, Sesquiterpene, Alkaloids, Rotundine, Minerals and vitamins.	Root acts as local remedy for leprosy, indigestion and biliousness. It is anti-fever
Datura stramonium	Datura	Hyoscyamine, Tropane, Scopolamine, Atropine and Malic acid, Potassium nitrate,	Useful for sedatives, anti-asthmatic and antispasmodic
Eucalyptus camaldulensis	Lachi	Essential oil, 77% of which is cineol, 5–11% tannin, Cuminal, Phellandrene, Aromadendren, Valerylaldehyde, Geraniol, Cymene, Phellandral	Anesthetic, antiseptic, astringent and is used in cold, colic and coughs
Eugenia jambolana	Jamoo	Oxalic acid, , Tannin, Beta sitosterol, Elagic acid, Mirisetin, Melic acid, Gallic acid and Aromatic oil Betulenic acid	Bark is used as mouthwash for ulceration and gum. Its seeds are used as a remedy in diabetes
Euphorbia helioscopia	Peryan doly	Methyl esters, Diterpene polyesters, Terpene compounds	Roots are anthelmintic, its seeds are used in cholera, while its stem is used for constipation
Fagonia	Azghake	Eryl alcohol, Chinovic acid, Arginine, Glycine,	Used as prophylactic

arabica		Leucine, Phenylalanine, Oleanolic acid, Campesterol, Asterol, Harmine, Alanine, Isoleucine and Lysine	against smallpox in children
Ficus carica	Enzar/Injeer	Proteins, Calcium, Phosphorus, Carotene, Carbohydrates, Nicotinic acid, Minerals, Riboflavin, Ascorbic acid and Iron	Used for the treatment of cancer and pectoral
Foeniculum vulgare	Kaga/Sump	Anethole, Phenolic ether, D-fenchone, Keton, Methyl chavicol, Terpinol, Limonene, Estragole, Fatty oil, Carbohydrates	Used in digestion and weight loss
Fumaria parviflora	Papra	Rutine, Fumaric acid, Hydroxycinnamic acid	Used in aperient, syphilis, scrofula and leprosy
Hibiscus esculentus	Bendi	Proteins, Myristic acid, Palmitic acid, Stearic acid, Palmitoleic acid, Cellulose, Oleic acid, Lignin, Linoleic acid and Hemicellulose	Treats lung inflammation, intestinal tract, asthma and irritable bowel
Hibiscus rosa-sinensis	Badsha pasant	Quercetin-3-diglucoside, Beta-sitosterol, Stigmasterol, Cholesterol, Erogosterol, Citric, Tartaric, Fructose, Glucose, Sucrose, Taraxeryl acetate, Campesterol and Oxalic acids	Acts as an aphrodisiac, cholagogue, demulcent, emollient and tonic

Figure 2. Collection of medicinal plants from hilly and plain areas of Swabi (A) *Acacia arabica* (B) *Acacia modesta* (C) *Allium sativum* (D) *Aloe vera* (E) *Amaranthus spinosus* (F) *Bauhinia variegata* (G) *Cannabis sativa* (H) *Capsella bursa* (I) *Chenopodium album* (J) *Cichorium intybus* (K) *Citrus medica* (L) *Convolvulus arvensis* (M) *Coriandrum sativum* (N) *Cyperus rotundus* (O) *Datura stramonium* (P) *Eucalyptus camaldulensis* (Q) *Eugenia jambolana* (R) *Euphorbia helioscopia* (S) *Fagonia arabica* (T) *Ficus carica* (U) *Foeniculum vulgare* (V) *Fumaria parviflora* (W) *Hibiscus esculentus* (X) *Hibiscus rosa-sinensis*

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