

Ethno botanical uses of wild plants of Karachi

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Abstract

An ethnobotanical study was carried out in the Karachi, Pakistan during 2021-2022 to examine the uses of the local wild flora and traditional knowledge of local residents about the applications of the wild plants in their area. In this survey, the Indigenous knowledge on the regional ethnobotanical applications of plants was acquired through questionnaires and interviews, and each respondent was specifically questioned about the specific application of a plant. Most plants are utilized as medicines for a variety of illnesses and play significant role among local residents and physicians, herbalist, farmers, and other people who live in villages.

Each specimen was placed in taxonomic order with its scientific name, family name, vernacular name, plant habit, part used, and local knowledge of its uses. 58 different wild plants belonging to 28 families from the study region were identified as being used locally for a variety of purposes. The local population has traditionally relied on the plants for their food, shelter, health,

fodder, fuel, medicine, and numerous cultural uses. They have also used the plants as a source of various medicines for different maladies.

Keywords

Medicinal plants, Karachi, wild plants, Ethnobotanical uses

1. INTRODUCTION

Pakistan has many economically valuable plants. Pakistan is a crucial component of the plant diversity of Central Asia. These include plants that are vital for food, fodder, medicine, lumber, etc. (Vavilov, 1950).

Karachi is the largest and economically important city of Pakistan. According to metrological department, Karachi is located at 24.906 degrees latitude, 67.082 degrees longitude, with an elevation of 125 ft. A maximum elevation change of 177 ft. and an average elevation above sea level of 122 ft. characterize the topography within 2 miles of Karachi, respectively. There are very small height

fluctuations within 10 kilometers (604 ft.). There are considerable height changes within 50 kilometers (3,547 feet). The winters are brief, pleasant, dry, and sometimes windy and most of the year is clear. The summers are hot, unpleasant, arid, and windy. The average annual temperature ranges from 12-35°C, rarely falls below 12 or rises over 35°C. Since, the overall weather of Karachi is warm, so growing season of plants doesn't vary too much throughout the year. Though, the rainy months cause the seasonal changes and variety of vegetation in Karachi.

According to flora of Karachi, Jafri (1966), featured flora from 3,530 sq. km. of the Karachi district. The Karachi district is a rich vegetative area for plant collectors, due to its diverse range of habitats, including the sea coast in the south, marshes, fixed and non-fixed sand dunes, calcareous hills, rocky mounds, and rivers of Lyari and Malir, The Malir and Hub River and their surrounding areas are heavily inhabited with a broad range of wild/natural vegetation, including bushes, shrubs, trees, and cultivation including crops, vegetables, and fruits (Rohde, 2020).

Ethnobotanical study means the study of the interaction between people and plants or the use of the plants in various ways by people (Hussain, 2021). John Harshberger, a US botanist, coined the word "ethnobotany" in 1895 to research the ethnomedicinal plants that the original inhabitants of an area (Mahmood, 2012). Some ethnobotanically and medicinally important plants were reported from the other regions of the Pakistan such as Khan *et al.*, 2012 studied some medicinal plants of Poonch Valley, Azad Kashmir, wild herbs of Central Punjab were reported by Zereen *et al.*, 2013, as well as wild flora in the remote areas of Northern Pakistan were studied by Khan *et al.*, 2016, survey of the

medicinal flora of Harighal, Azad Jammu & Kashmir by Amjad *et al.*, 2020. Likewise, Rahim *et al.*, (2023) also studied ethnobotany of medicinal plants in Surghar Range of Pakistan. Moreover, Rehman *et al.*, (2023), reported ethnobotanical study of medicinal plants used by the indigenous communities of Shawal Valley, District North Waziristan, Pakistan.

Literature reveals that no work has been done on the ethnobotanical uses of wild plants of Karachi. The objective of the study is to look for potential medical and ethnobotanical uses of the wild valuable plants that are frequently found nearby our region. The distribution of recorded species and usage of herbal medication will also be scientifically validated by this kind of investigation.

2. MATERIALS AND METHODS

Study Site

The research was carried out in several possible stands throughout Karachi. Karachi is Pakistan's largest and most populated city, as well as the capital of Sindh province. It is Sindh's primary seaport. The city covers an area of 3,527 km² (1,362 sq. miles). Karachi is situated on the Arabian Sea coast in the country's south. 24°51'2" N 67°02'2" E are its geographic coordinates. Karachi has a warm, tropical, and arid climate with low average precipitation of about 250 mm.

Field Trips

The field trips lasted two years (2021-2022). Observations, interviews, and guided field visits were used to conduct the research.

Data collection

Field observations, group discussions, and interviews with local residents, villagers, hakims, local physicians, herders, and farmers etc.

Approx. 50 informants, 30 men and 20 women with various academics background such as, Illiteracy, elementary education, secondary education, and a bachelor's degree were involved to collect ethno-medicinal data. Informants of different ages (ranges from 30 to 70) were chosen at random from several regions of East and West sides of Karachi such as Hub District, Malir District, Korangi District, Saadi town, Shah Latif town, University of Karachi. Moreover, some villages, highway roads, and market assessments were also made.

To document ethnobotanical knowledge, a questionnaire was created. The acquired data was also double-checked and compared to particular ethnobotanical literature.

3. RESULTS AND DISCUSSION

Medicinal plants play a vital role in human health for centuries, and traditional medicine is used by about 80% of the world's population (Alves, 2005). Numerous sample studies have listed over 600 types of medicinal plants used in Pakistani rural communities to cure common illnesses (Wondimu, 2007).

In this study, 58 wild plants belonging to 28 families which were observed and found in Karachi that are used mostly by rural inhabitants as traditional medicine, food and for other purposes whereas, some plants are used for multipurpose (Table 1).




Karachi is a big city, the people of the city are running in a busy routine and don't follow the traditional culture and they prefer ready-made things. Moreover, the shopping malls, buildings, apartments are increasing day by day as the pop-






ulation of Karachi is increasing, these developments are ultimately reducing the vegetation in city. However, there are still some villagers, herbalists, and farmers etc. who follow the traditional knowledge to avoid allopathic or modern medicine. For instance, inaccuracy of medicine preparation or herb used by local inhabitants, may cause the life of people and plants at risk. (Noman *et al.* 2013).


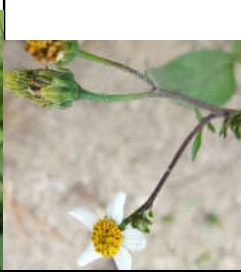



Malir and Hubs River areas contain some diverse plants as compare to other areas. Though, Shah Latif town and Saadi town are the less populated areas, for this reason vegetation is at higher level. Korangi is mostly considered as an industrial area, yet it also contains some regions where wild and cultivated plants are found.



Mostly, medicine preparation required different species, as a result various species used for similar medicinal purpose. During this study, the observed species are considered to be divided into three major groups (i) Food for human or animal, (ii) Medicinal purpose (iii) Housing or accessories.

The current study reveals that herbs are most commonly used for the utilization among all (Fig.1). 54% herbs were utilized for the ethnobotanical use while utilization of trees are 25% that may cause deforestation as the wood is used for furniture making etc. In addition, the result of this study also reveals that the whole plant is mostly collected for the extraction from plant which is mainly used for the medicinal purpose (Fig.2). This much use of wild plants may cause a threat to some rare, endemic plants and also disturb the plant diversity of Karachi.

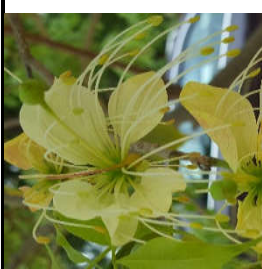




Table 1. Ethnobotanical Uses of Wild Plants of Karachi							
S.no	Specie Name	Family	Vern. Name	Habit	Parts Used	Ethnobotanical Uses	Plants Picture
1	<i>Barleria prionitis</i> <i>subsp.induta</i> (C.B. Clarke) Brummitt&J.R.I.Wood	Acanthaceae	khussara	Shrub	Whole Plant	For the treatment of tuberculosis and whooping cough, a bitter extract similar to quinine is employed.	N/A
2	<i>Blepharis indica</i> <i>Stocks</i> ex T.Anderson	Acanthaceae	Bhangari , Asad	Under shrub	Leaves, Seeds	Seed boil with milk use as a tonic. Fresh leaves as a galactagogue agent are given to cattle.	
3	<i>Zaleya pentandra</i> L. Jeffery	Aizoaceae	itsit	Herb	Whole plant	Snake bite and as a fodder for cattle	
4	<i>Achyranthe saspara</i> L.	Amaranthaceae	Chirchit/ Chaff flower	Herb	Whole plant	It has beneficial therapeutic characteristics and is used to treat diabetes, rheumatoid arthritis, malaria etc	





5	<i>Aerva javanica</i> (Burm.f.) Juss. ex Schult.	Amaranthaceae	Kapok	Herb	Whole Plant	The plant has veterinary medicinal properties. The most common use is the inflorescence of plant for stuffing pillow Cushions & mattresses	
6	<i>Amaranthus viridis</i> L.	Acanthaceae	Chaulai	Herb	Whole Plant	Dysentery and inflammation are treated with a decoction of the entire plant	
7	<i>Digera muricata</i> L. Mart.	Acanthaceae	Jungli Chaulai	Herb	Whole Plant	This edible plant is calming, somewhat laxative in big quantities and astringent to the bowels in moderate amounts; helpful in biliousness	
8	<i>Calotropis procera</i> (Aiton) Dryand.	Asclepiadaceae	Aak/ Milkweed	Shrub	Bark, leaves and latex	The latex of this plant has been shown to possess potent anti-inflammatory and antioxidant properties and used as a medicine.	
9	<i>Leptadenia pyrotechnica</i> (Forssk.) Decen	Asclepiadaceae	Khip,kip/ Jivanti	Shrub	Whole plant	Species is medicinally important, its stem and branches used for making local houses and also used its fibers which is produced with seeds.	

10	<i>Pergularia daemia</i> (Forssk.) Chiov.	Asclepiadaceae	Utaran	Herb	Whole Plant	<p>The plant is astringent, acrid, anthelmintic, emetic, thermogenic, expectorant, antipyretic and laxative</p> 
11	<i>Bidens pilosa</i> L.	Asteraceae	Kumra, Kumur, Kurei	Herb	Whole Plant	<p>Effective for the cure of cancer, cardiovascular diseases, inflammation/immune modulation, gastrointestinal disease diabetes, microbial infections, and hypertension. It is used for the therapy of coronary heart disease, high blood pressure, diabetes, gastrointestinal diseases, respiratory diseases, skin diseases, cuts and wounds</p> 
12	<i>Eclipta prostrata</i> L.	Acanthaceae	Bhringraj Bhangra	Herb	Whole Plant	<p>Seeds are diuretic and also applied externally to ulcers and inflamed parts, they also yield a fatty oil which may contain therapeutic value in preventing atherosclerosis</p> 
13	<i>Asphodelus tenuifolius</i> Cav.	Asphodelaceae	Piaz, Jungli piaz	Herb	Seeds	<p>The plant is used to treat throat infections, sores, boils, insect stings and ulcers</p> 
14	<i>Heliotropium subulatum</i> (DC.) Vatke	Boraginaceae	Hathisu-ndi	Herb	Whole plant	


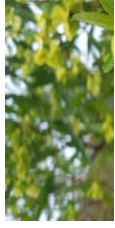





15	<i>Trichodesma indicum</i> (L.) R. Br.B25	Boraginaceae	Chota kulpha	Herb	Whole Plant	The root is made into a paste to apply on the swelling mainly of the joints, it is also used to treat dysentery and fever. The herb is credited with emollient and diuretic properties	
16	<i>Cordia myxa</i> L.	Boraginaceae	Lasora	Tree	Bark, Fruit	Fruit is mucilaginous, sweetish and edible. It has astringent, antheimintic, diuretic, demulcent and expectorant properties. A decoction of the bark is used in dyspepsia and fevers.	
17	<i>Millettia hortensis</i> L.	Bignoniaceae	Neem chambeli	Tree	Stem, bark and Flowers	Wood used for furniture and also used to treat lungs related diseases. Aromatic flowers has soothing and relaxant effects for respiratory disorders.	
18	<i>Tecomella undulata</i> (Roxb.) Seeman	Bignoniaceae	Lahura	Tree	Stem, bark, leaves and seeds	Bark used as mild relaxant, cardiotonic, choleric agents and also treat eczema and syphilis. The seeds are used to treat sores and abscesses. The leaves are used as a fodder for goats and cattle.	N/A








19	<i>Commiphora wightii</i> (Arn.) Bhandari	Burseraceae	Gugal/ Mukul	Shrub	Gum	It is largely used as an incense, in medicine and perfumery, and also used to adulterate myrrh.	
20	<i>Cadaba farinosa</i> Forsk.	Capparidaceae	Dabi/ kodhab	Herb	Roots, stem & leaves	The leaves are used to cure a variety of internal illnesses, dermatological diseases, cough, colds, and dysentery. General body pains are treated with the wood ashes.	
21	<i>Capparis decidua</i> (Forsk) Edgew	Capparidaceae	Karil, karir	Tree	Roots, stem and, leaves	It contains antioxidant and anti-diabetic activity. Wood use for making boat in Sindh, fruit used in pickled.	
22	<i>Cleome brachycarpa</i> Vahl ex DC.	Capparidaceae	Ponwar	Herb	Whole plant	Fodder for animals, it is also reported to be useful for inflammations, scabies, bone and joint diseases and rheumatism.	
23	<i>Cleome viscosa</i> L.	Capparidaceae	Hurhuri/ Wild Mustard/ Tickweed	Herb	Leaves, Seeds	Leaves and seeds are edible, rubifacient, sudorific and vesicant and anthelmintic, also use for external wounds	

24	<i>Crataev adansonii</i> DC.	Capparidaceae	Barna	Tree	Bark and leaves	It contains therapeutic properties. Bark used as a tonic, and fodder. Its bark powder is used to treat uterine, kidney, and gastrointestinal infections as well as urinary tract infections.	
25	<i>Gynandropsis gynandra</i> L. Briq.	Capparidaceae	Hurhuria, Karalia	Herb	leaves	Leaves are rubifacient and vesicant. The juice of the leaves mixed with oil treated earache	
26	<i>Cressa cretica</i> L.	Convolvulaceae	Rudranti	Herb	Whole plant	Used as carminative, tonic and aphrodisiac and locally used for fodder.	
27	<i>Citrullus colocynthis</i> L. Schrard	Cucurbitaceae	Indryan, Hanzal, Tumba	Herb	Fruits and seeds	The drug colocynth is derived from the dried pulp of mature fruits that have been separated from the skin and seeds.	
28	<i>Coccini agrandis</i> L. Voigt	Cucurbitaceae	kanduri/ ivy gourd	Herb	Whole plant	Fruit is edible. Plants also used in indigenous system of medicine in treatment of skin diseases, bronchitis and diabetes	N/A
29	<i>Mukiamadaras patana</i> L. M.J. Roem.	Cucurbitaceae	Chirati/ Agumaki	Herb	Whole plant	The plant is expectorant and also prescribed for chronic diseases.	

30	<i>Diospyros lotus</i> L.	Ebenaceae	Amlok	Tree	Fruits and seeds	Fruit edible, anti febrile and used to promote secretions. Plant is antiviral and seed regarded as sedative	N/A
31	<i>Acacia Senegal</i> L.Willd.	Mimosaceae	Khair/ Gum arabic tree	Tree	Gum	Gum use medicinal. It is used as a demulcent and an emulsifying agent; also for making mucilage.	
32	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Mimosaceae	Jungle Jalebi	Tree	Pods	Pods are edible. Seeds are commonly used for their anti-inflammatory, antifungal and anti diabetic properties.	
33	<i>Prosopis cineraria</i> L.druce	Mimosaceae	Jand, Kandii/ Chaf	Tree	Pods	Pods used as a fodder. Seeds are eaten. The bark is used as a treatment for scorpion song and rheumatism.	N/A
34	<i>Moringa concanensis</i> Ni mmo ex Dalz.&Gibs	Moringaceae	Suhanjana	Tree	Fruits	It is used to treat ascites, rheumatism, and also contain circulatory and cardio stimulants properties.	
35	<i>Neuradaprocu mbens</i> L.	Neuradaceae	Chapari, Kua dhal/ Sand Button	Herb	Leaves, Seeds	Leaves and seeds used as medicinal purpose, also used as a tonic and an important source of fodder.	
36	<i>Oxalis corniculata</i> L.	Oxalidaceae.	Khatti Boot i/ Amrul	Herb	Whole plant	As vegetables leaves used, plant juice mixed with onion is used to remove warts.	N/A

37	<i>Clitoria ternatea</i> L.	Papilionaceae	Gokran, Supli, Apara jit	Shrub	Leaves, roots and flower	laxative and emetic. Roots are reported to be nervine tonic, laxative, purgative, demulcent, and antidote. Flower	 
38	<i>Parkinsonia aaculeata</i> L.	Papilionaceae	Vilaytikar	Tree	Whole plant	The plant is reported to be used as antipyretic. The leaves are considered as diaphoretic, antiseptic and also use to treat fevers, epilepsy and vomiting.	
39	<i>Portulaca oleracea</i> L.	Portulacaceae	Kulfeka sag	Herb	Leaves	It demonstrates a broad spectrum of pharmacological activities, such as antibacterial, wound- healing qualities.	
40	<i>Portulaca quadrifida</i> L.	Portulacaceae	Nunuka sag, lunkibuti	Herb	Leaves, Seeds	Leaves are diuretic, use in dysuria and externally applied in erysipelas.	N/A
41	<i>Anagallis arvensis</i> L.	Primulaceae	Jonkmari	Herb	Whole plant	It is used for joint ailments and snake bites/ dog bites.	
42	<i>Ziziphus Anumularia</i> (Burm.f.) W.&Arn.	Rhamnaceae	Malla, jherberi	Shrub	Leaves, Fruits	Fruit is astringent and cooling agent. Leaves are also applied scabies and boils, smoke from dried leaves inhaled to treat cold and cough.	N/A
43	<i>Salvadora oleoides</i> decne.	Salvadoraceae	Pilu, jhal, Khabbar	Shrub	Roots, leaves and fruits	Use to relieve cough	N/A

44	<i>Salvadora persica</i> L.	Salvadoraceae	Pilu	Shrub	Branches and fruit	Branches commonly used as toothbrush, ripe fruit used as medicine	
45	<i>Dodonaea viscosa</i> L. Jacq.	Sapindaceae	Sanatha	Shrub	Whole plant	laxative, antipyretic, sudorific, eczema, skin ailments, wound healing, rheumatism and to treat burns and	
46	<i>Madhuca longifolia</i> (Koenig) Macbride	Sapotaceae	Mahua	Tree	Bark, flowers and fruits	They are used for coughs, colds and bronchitis and diseases of the stomach. Fruits as aphrodisiac and seeds is laxative	
47	<i>Mimusops elengi</i> L.	Sapotaceae	Mulsari	Tree	Bark, flowers and fruits	Bark is used as gargle. Bark, flowers and fruits are astringent and anthelmintic.	
48	<i>Datura innoxia</i> Miller	Solanaceae	Datura	Herb	Fruits and seeds	It is used as anesthetic in surgeries and also used to prevent motion sickness	
49	<i>Solanum nigrum</i> L.	Solanaceae	Mako	Herb	Whole plant	Treated dropsy and used as febrifuge, anti-diarrheal, antiseptic and anti-dysenteric properties.	
50	<i>Solanum surattense</i> Burm. f.	Solanaceae	Kandiari, Kantakari, Kate li	Herb	Whole plant	Roots and seeds are expectorant. Flower and fruits showed anti-asthmatic activity.	

51	<i>Withania somnifera</i> L. Dunal	Solanaceae	Asgand	Shrub	Roots, Leaves	Roots are used to treat leucoderma, nervous breakdown, insomnia, constipation. The bark and irregularly rounded galls (Sakun hi Sindhi) are astringent and galls used for tanning and also as a gargle.	 
52	<i>Tamarix aphylla</i> L. Karst.	Tamaricaceae	Lal-jhau	Tree	Barks, galls	Fiber extracted from this plant. Roots & leaves used to treat gonorrhoea and seed used to cure pneumonia.	
53	<i>Corchorus aestuans</i> L.	Tiliaceae	Chonch	Herb	Whole plant	Used in emollient and cooling agent.	
54	<i>Corchorus depressus</i> L. stocks	Tiliaceae	BohPhali, Munderi	Herb	Whole plant	The plant is known for bitter astringent, tonic, febrifuge, stimulative, laxative anti-septic.	
55	<i>Fagonia indica</i> Burm. f.	Zygophyllaceae	Dhamasa	Undersh rub	Seeds	Seeds are used to treat affections of urinary discharge, and impotency, sexual impotency and cardiovascular diseases.	
56	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Gokhru	Herb	Leaves, Seeds	Seeds are useful as an anthelmintic.	
57	<i>Zygophyllum simplex</i> L.	Zygophyllaceae	Alethi	Herb			

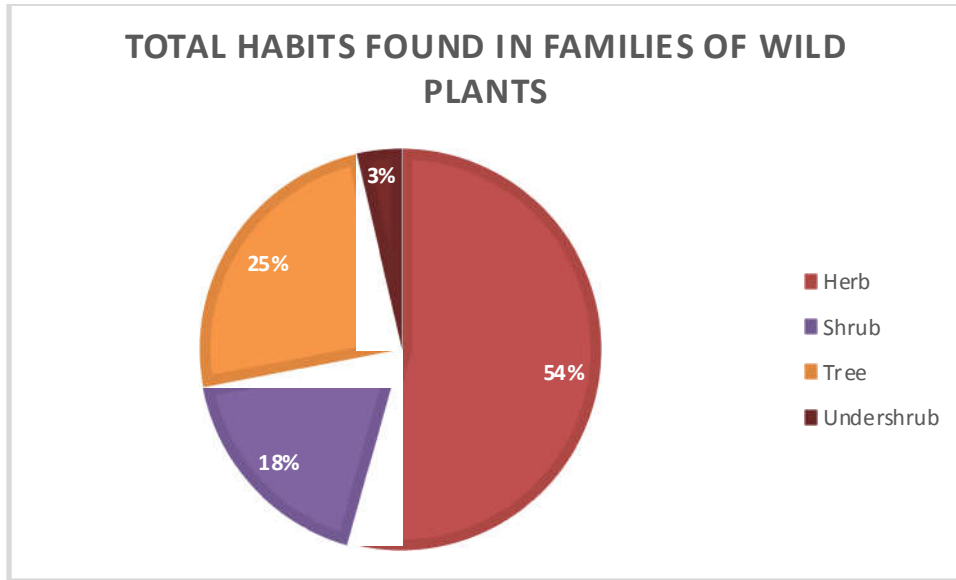


Fig. 1 Representation of the habits of medicinal plants

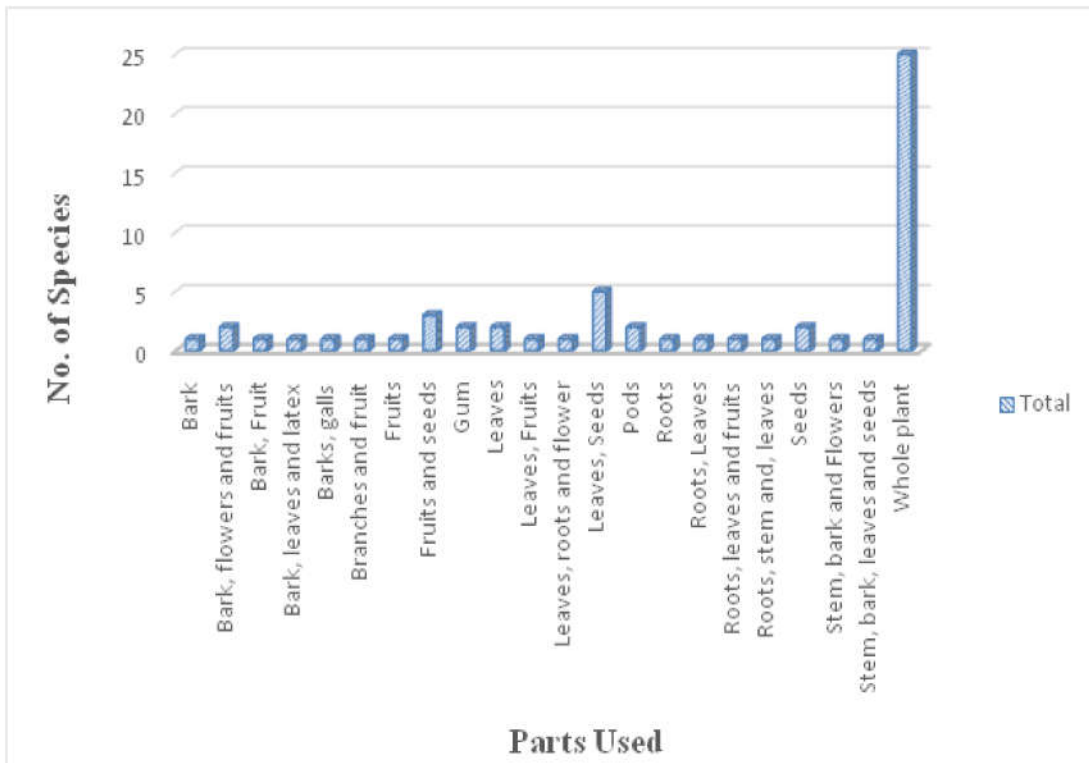


Fig. 2: Representation of different parts used for ethno botanical purpose.

4. CONCLUSION

The results of the current investigation showed that there are many different resources of medicinal plants and their therapeutic benefits in the studied region. Traditional knowledge about medicinal and ethnobotanical uses of wild plants is bounded among herbalists, villagers, farmers and rural women as compare to the people live in cities and town, and they have ready-made facilities and mostly prefer the allopathic medicine and don't go towards traditional medicines. For instance, the application and employment of the plants can damage the diversity as well as spread the inaccurate information. However, young generation can verify the traditional uses by the research, for this reason this study is also authenticated by the literature. Lack of knowledge and interest of young generations and local people may cause severe threats to flora of Karachi and healthy lifestyle of residents.

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