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Ethnomedicinal Profile of Flora of District Sialkot, Punjab, Pakistan

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Abstract: An ethnomedicinal profile of 112 species of remedial herbs, shrubs, and trees of 61 families with significant gastrointestinal, antimicrobial, cardiovascular, herpetological, renal, dermatological, hormonal, analgesic and antipyretic applications have been explored systematically by circulating semi-structured and unstructured questionnaires and open ended interviews from 40-74 years old mature local medicine men having considerable professional experience of 10-50 years in all the four geographically diversified subdivisions i.e. Sialkot, Daska, Sambrial and Pasrur of district Sialkot with a total area of 3106 square kilometres with population density of 1259/km^2, in order to unveil botanical flora for world. Family *Fabaceae* is found to be the most frequent and dominant family of the region. © 2020 NTMS.

Keywords: Analgesic, Antipyretic, Renal, Gastrointestinal, Dermatological.

1. Introduction

Study of green extracts as therapeutic agencies have emerged as a major field of science. Plants are effective less cost biological repositories of medicinal compounds witnessed for a large series of ailments by traditional medicine men in geographically diversified District, Sialkot in province of Punjab in Pakistan (1). About 50% of plants of worldwide flora (2), is presenting valuable potentials, prior to high-throughput screening and the post-genomic era of scientific research for curing a list of acute and chronic disorders since times of ancient civilizations (3), with technically nil drawbacks (4), both for human and animals entitled as unani, folk, eastern, or indigenous medicine (5). Despite of a rapid economic race riding over the horse of science and technology, almost over three-fourth of the total world population is facing a drastic rundown of allopathic medicines.

Herbal medicines are reported as curative agents for 80% of this population by World Health Organization (WHO) (6). WHO has ultimately reiterated the usage of traditional herbal medicines for primary health care for these parts of world (7). Pakistan being the 10th most populated country (8) is categorized under low income countries (9). Poor sanitary system of rural area is triggering the pathogenic bacteria for causing serious infectious diseases like gastro-intestinal, pneumonia, pulmonary, renal, antimicrobial, and dermatological disorders at rapid pace (10). About 61.6% of the total of rural population of Pakistan is supposed to rely on readily available herbal bank (11).

About 6000 medicinal plants are reported in Pakistan under various surveys (12), with 600/6000 flowering plants which are executing medicinal properties. Pharmaceutical industry is indulged with more than

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half from natural origin even in this modern world of pharmaceutical drug development.

It has been identified that more than 88/119 plant based drugs were discovered as a result of research on medicinal plants. Pakistan is trading about 2500 species in the international market of organic medicine (13). Although Pakistan is an agricultural country chiefly (14), but unluckily with less emphasis to systematic cultivation of medicinal plants like Russia, Lucknow, European Union (EU) and China, where the total output earning of pharmaceutical industry largely depends upon the cultivation of such medicinal plant (15). For promotion of this hidden and less studied green bank of Pakistan, various areas have been searched out, but some are still hidden and demanding attention for their discovery. A well-planned systemization of botanical knowledge of the regions with higher consumption of these natural green agents can open a new market raise it not only for population of Pakistan, but also for international market at reasonable prices. Following this source of inspiration, we have selected District Sialkot as our test city to recover a new word of natural medicines. Sialkot is in the north-east of the Punjab province running along the Chenab River, in the north. It is a climatic heaven which dramatically lies partly in Forest (less humid) zone, while remaining large part of country is lying in Arid (dry) zone (16). The mentioned area is characterized by its humid subtropical climate. From one side it resides at the foothills of the snow-covered peaks of Kashmir, at an elevation of 256 meters above the sea level between 32°30' North latitude and 74°31' East longitude. Sialkot is just a few kilometers from Indian-occupied Jammu Kashmir in north, Gujrat by the North-West, Gujranwala by the West and Narowal by the south shown in Figure 1.

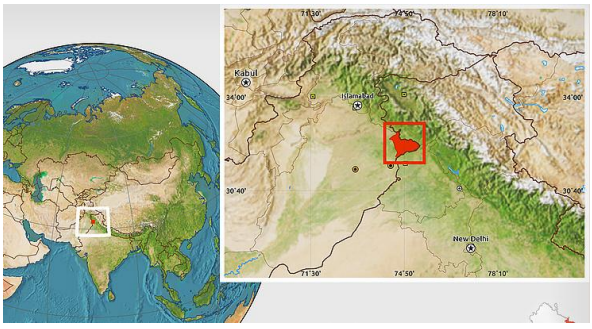

Figure 1: Satellite Location Map of Sialkot.

Three small seasonal streams viz. Aik, Behr and Palkhu are also provoking hands of natural growth of biodiversity of plants. The total area of the district is approximately 3.106 sq. kilometers comprising of four subdivisions with green ethnomedicinal floor. Average temperature of 23.64 ºC has been recorded, minimum of 5.7ºC in January that rises up to a maximum value of 40.7 ºC in June. Sialkot is among the regions with highest rainfall in Pakistan. Highest precipitation rate of 252 mm is recorded in August, and minimum in November. It is spitting, drizzling and heaven opening weather here often.

Previously an ethnomedicinal study of District Sialkot has been conducted by Zareen et. al. Medicinal package of about 48 plant species with 35 shrubs species belonging to 22 angiosperm families was documented. Indigenous people reported the use of medicinal shrubs for the treatment of human ailments of digestive tract, rheumatic pains, dermatological, cardiac and pulmonary problems etc. from a long period for generations to generations, with positive results (17).

An extended survey of Sialkot including all its sub-divisions has been carried out in order to explore hidden ethnomedicinal significance (18) of area in front of the world, which can provide a social and economic back to the inhabitants in the regard of their natural raw factories and establishment of an international market for the almost all countries of all sub continents existing at this time and space.

Figure 2: Plantation along famous Nala Aik of Sialkot

2. Material and Methods

Methodology was conducted in following rounds:

Round 1: To collect systemic facts and figures of ethnomedicinal flora of four subdivisions of District Sialkot, Punjab, Pakistan, four teams of well-trained members were designed to conduct a survey of all subdivisions. Random sampling of major medicinal plants used by all mature and experienced medicine men and individuals availing herbal medicines for health care in the selected regions is made. The conduction of the task was made by a survey through interview method. The interview consisted of unstructured open-ended questions to collect almost all possible basic information regarding following major questions.

1.Names of medicine men, along with their age and institute of training.
2. From how many years you are working in this field?
3.What are the local names of plants used as herbal remedies?
4.Which part (roots, shoots, stems, leaves, fruits or whole plant) is used for particular disease?
5.For which medical issue the mentioned plant is used?
Details of reporting individuals are given in Table 1:
Round 2: After collection of detailed raw information regarding above mentioned seven questions, a feedback of patients availing mentioned herbal medicines of the medicine men was recorded by circulating another questionnaire among sample of population consisting of ten questions and consequences regarding various herbal medicines
Based on statistical results of above feedback, a list of plants of with the most positive feedback was prepared. Short listed data of plants was searched out for the English names through search engine named under Google Urdu, because the raw data collected from local medicine men was in local national language Urdu and regional language Punjabi. English and Punjabi names were searched for their characteristic botanical information regarding habitats. A systematic table was designed containing botanical names of plants, local names, English names and families, parts of plants that are under use and mode of administration. The chemical constituents and medical significance of enlisted highest rated plants was investigated following literature review of those plants, that is get verified by a Doctor of Botany named Sadaf Honey Ghauri affiliated with Govt. Postgraduate College for Women at Mandi Bahauddin in Province Punjab of Pakistan. The data was correlated with the statements of medicine men for creating a valid report of credibility of plants and medicine men of four subdivisions of District. Sialkot, Punjab, Pakistan.
Round 3: Markets of whole District Sialkot was visited for collecting data regarding presence or cultivation of those plants in test city to check their market value. Then a complete result was drawn to attract the world towards ethnomedicinal flora, its medical significance supported with modern literature and a market of green medicinal chemicals in District Sialkot.

3. Results

In response of steps after first round, conduction of study tours, surveys, structured, semi-structured and unstructured interviews data of 112 plants of 61 families have collected and systematically arranged is given in following Table 2.
Data of Table exhibits wider variety of fertile ethnomedicinal flora of four subdivisions of District Sialkot. An overall contribution of four subdivisions fertile ethnomedical in total division flora of Sialkot district among its four subdivisions is given as followed in Figure 3.

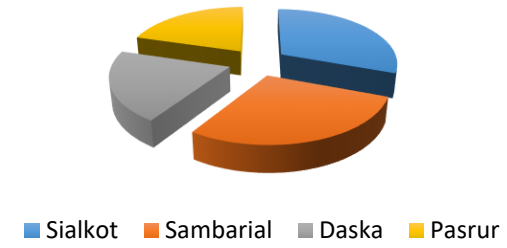

Figure 3: Comparative fraction of ethnomedicinal species of four subdivisions of Sialkot District.

Figure 3 depicts a relative ratio of ethno botanical species in Sialkot District with highest of 31% contribution with herbarium of 51 species constituting 26 herbs, 8 shrubs and 17 trees of Sialkot Subdivision itself, including Achyranthesaspera L., Adhatodavasica, Aegle marmelos L., Aloe Indica L., Asteracantha Longifolia, Azadirachtaindica, Cannabis Sativa, Centaureabehen. L, Citrus tangerina, Cercissiliquastrum, Convulvulusarvense, Cucumismelo var. agrestis Naudin, Cuscutareflexa Roxb, Cydonia oblonga, Cyperusrotundus L., Embeliaribes, Euphorbia hirta L., Euphorbia hypericifolia, Glycyrrhizaglabra L., Hibiscus rosasinensis L., Hyoscyamusniger, Ipomoea Eriocarpa, Indigoferatinctoria, Lavandula Officinalis Chaix, Leucasaspera (Jacq.) Ait., Malva sylvestris L., Melia azedarach L., Menthaviridis L., Mesua ferrea L., Murdanniapauciflora, Murraya exotica, Myristicafragrans Houtt, Myristicafragrans , Papaver somniferumL., Pipernigrum L., Pistacia Lentiscus, Phyllanthusemblica L., Plantago Ovata L., Polygonum Viviparum, Psoraleacorylifolia L., Pyrus communis, Rhyncosia minima, Ricinuscommunis L., Solanum nigrum L., Sphaeranthusindicus, Strychnos Nux-vomica L., Terminalia arjuna, Terminalia chebula, Terminalia Reticulata, Trigonellafoenum-graecum, Withaniacoagulans Dunal and Ziziphus jujuba Mill are the major medicinal species of Sialkot subdivision belonging to 26 families majorly Fabaceae, Lamiaceae, Euphorbiaceae, Malvaceae, Solanaceae and Rutaceae under higher frequencies but Amranthaceae, Liliaceae, Meliaceae, Calophyllaceae, Commelinaceae, Papaveraceae, Piperaceae, Cactaceae, Phyllanthaceae, Plantaginaceae, Polygonaceae, Convulvulaceae, Cucurbitaceae, Cuscutaceae, Cyperaceae, Myrsinaceae and Rhamnaceae, found with useful applications for gastric, hepatic, nerves, cardiovascular problems, gastrointestinal problems and viral infections and have earned confidence of people in these treatments while introduced in body as analgesic, antipyretic and nervonic tonics in particular.

Sambrial is second highly populated sub-division in this race with total of 38 botanical species including 22 herbs, 4 shrubs and 12 trees. Acacianilotica (L.) Delile, Achyranthusaspera Linn, Alliumcepa, Allium sativum, Aloe vera L, Bacopamonnieri (L.) Penn. Syn., Bambuseae, Calotropisprocera, Cassia Fistula, Catharanthusroseus, Cichoriumintybus, Cinnamomum Tamala, Cupressussempervirens L., Cinnamomumzeylanicum , Cymbopogoncitratus, Cyrillaracemiflora, Ficus Benghalensis L., Foeniculum vulgare, Fumariaofficinail L., Loliumperenne L., Malva sylvestris L., Menthapulegium, Nymphaea L., Onosmabracteatum, Piper nigrum L. , Plantago ovata, Santalum album L., Senna Alexandria, ShpaerathusIndicus, Solanum Nigrum, Solanum Pseudocapsicum, Sphaeranthusindicus, Syzygium Aromaticum, Syzygiumcumini, Terminalia arjuna, Tribulusterrestris, Xanthium strumarium L., Ziziphus jujuba, Zingiber officinale are the major ethnomedicinal species in sambrial subdivision under the umbrella of botanical families Amaranthaceae, Apiaceae, Apocynaceae, Asciepiadaceae, Asteraceae, Boraginaaceae, Caesalpiniaceae, Combretaceae, Cupressaceae, Cyrillaceae, Fabaceae, Fumariaceae, Liliaceae, Lamiaceae, Lauraceae, Malvaceae, Moraceae, Myrtaceae, Nymphaeaceae, Piperaceae, Plantaginaceae, Poaceae, Rhamnaceae, Santalaceae, Scrophulariaceae, Solanaceae, Zingiberaceae, and Zygophyllaceae, with frequent results as effective analgesics, antipyretics, anti-diabetic, purgative, gastric diseases, cardiovascular diseases, blood purifying agents, constituting 29% of total pie , with Asteraceae as the most dominent family of the mentioned subdivision. However, Daska and Pasrur contributes almost equally with 29 and 25 herbaceous species.

20 major botanical families Apiaceae, Apocynaceae, Araceae, Berberidaceae, Brassicaceae, Burseraceae, Combretaceae, Fabaceae, Liliaceae, Mimosaceae, Myristica, Myrtaceae, Nitrariaceae, Phyllanthaceae, Piperaceae, Rutaceae, Scrophulariaceae, Solanaceae, Zingiberaceaen and Zygophyllaceae consists of 31 species named Albizialebbeck, AllumSativum L, Amorphophalluspaeoniifolius, Anethumgraveolens, Berberisaristata, Brassica Compestris L., Butea monosperma, Phyllanthus Emblica., Piper longum L., Piper Nigrum L. Holarrhena Pubescens, Ciclospermum leptophyllum, Curcuma Longa L., Commiphora, Zingiber officinale, Datusa Metel L., Elettaria Cardamon, Foeniculum vulgare, Glycyrrhiza glabra, Myristica fragrans, Peganum harmala, Picrorhizakurrooa, Syzygium aromaticum, Terminalia chebula, Trachyspermumammi, Tribulusterristia, Trigonella foenum-graecum, Withaniasomnifera and Zingibir Officinale are recorded in flora of Daska subdivision.

Major botanical families of pasrur are Apiaceae, Asparagaceae, *Asteraceae,* Boraginaceae, Caesalpiniaceae, Caprifoliaceae, Cucurbitaceae, *Curculigoorchioides* Gaertn, Cyperaceae, Fabaceae, Fagaceae, Grossulariaceae, Lamiaceae, Lauraceae , Lythraceae, Malvaceae, Polygonaceae, Ranunculaceae and Tiliaceae constituting *Aconitum napellus L.,* Adiantumcapillus-veneris L., Alkannatinctoria L., *Asparagus racemosus,* Caesalpinia crista, *Chlorophytum borivilianum*, Cichoriumintybus, Cinnamomumtamala, Citrulluscolocynthis, Cordia obliqua, Corchorusolitorius , Curculigo Orchioides, Daucuscarota L., *Eleocharisdulcis,* Heliotropium strigosum, Nagar Bail, Nigella sativa L., *Ochromapyramidale, Persicariabistorta L., Polygonumbistorta* L., *Punicagranatum L.,* Quercusin fectoria, *Ribesnigrum,* Senna alexandrina and Vachellianiloticare the strengthiningpillers of the district.

3.1. Statistical Evaluation of Results:

Data shows that more than half of flora of Sialkot consists of herbs, then trees at the second peak, and finally the shrubs are in least quantity. In order to check the association of soil's fertility and growth of habits of plant chi-square test is applied. Results were found to be significant with P-value of 0.000 (P<alpha) hence concluding that soil of district of Sialkot whether from any subdivision is found to be highly fertile w.r.t the growth of different habits of plant.

Table 1: Details of local medicine men providing information.

Subdivision		Name of Medicine Men	Age	Area	Work Experience	Mother Institute
Sialkot	1	Hakim Nadar Khan Lodhi	45 Years	Chawinda Bazar Hakiman	20 Years	Tibia College Lahore
	2	Muhammad Razzaq	42 Years	Chawinda	20 Years	Tibia College Gujranwala
Sambrial	1	Muhammad Saleh	44 Years	Sambrial City	20 Years	Family occupation
	2	Akbar Ali	74 Years	-do-	50 Years	Private Source
	3	Manzoor	55 Years	-do-	10 Years	-do-
Daska	1	Hakim Khalil urRehman	40 Years		10 Years	Occupation of forefathers.
Pasrur	1	Hakim Muhammad Afzal	47 Years	Pasrur, Charwinda Phatak	18 Years	Tibia College Lahore
	2	Hakim Rana Saleem Ul Allah	72 Years	Pasrur City	37 Years	Tibiya College, Tib-e-Nabvi, Faisalabad

Table 1 depicts that data was collected by experienced and mature people in their fields from a mature age of minimum 42 to maximum 72 years, with experience of 10-50 years and 25 years on average.

Table 2: Systematic arrangement of data of ethnomedicinal flora of four subdivisions of District Sialkot Punjab Pakistan.

S. No	Botanical Name	Family Name	Habit	Local Name of Plant	Common Name of Plant	Part used	Application	Habitat
1	*Acacia nilotica (L.) Delile*	*Fabaceae*	Tree	*Kekar*	Babool, Thorn mimosa	Whole plant	For Semen Leakage, Nocturnal Ejaculation, Leucorrhea	Sambrial
2	*Aconitum napellus L.*	*Ranunculaceae*	Herb	*Meeth Talia*	Monk's-hood	Tuber	As Antibiotic	Pasrur
3	*Achyranthes aspera Linn*	*Amranthaceae*	Herb	*Puth Kanda*	Prickly Chaff	Powder	For Gastric Disorders, Pruritus, Asthma.	Sialkot, Sambrial
4	*Adiantum capillus-veneris L.*	*Pteridaceae*	Herb	*Partoshan*	Southern Maidenhair	Leaves	Control of Hormonal Secretions	Pasrur
5	*Adhatoda vasica*	*Acanthaceae*	Shrub	*Arosa*	Vasaka	Whole plant	For Jaundice, nausea.	Sialkot
6	*Aegle marmelos L*	*Rutaceae*	Tree	*Belgiri*	Bael	Fruit	For Viral Infections, Diarrhea, Flu, Purgation, Rheum, Diabetes.	Sialkot
7	*Alkanna tinctoria L.*	*Boraginaceae*	Herb	*Rattan Jot*	Alkanet	Leaves	Treatment of burned body	Pasrur
8	*Allium cepa*	*Liliaceae*/Amaryllidaceae	Herb	*Pyaz*	Onion	Stem	For treatment of Blood Pressure	Sialkot
9	*Allium sativum*	*Liliaceae*	Herb	*Lehsan*	Garlic	Stem	For treatment of Blood Pressure	Sambrial
10	*Aloe Indica L.*	*Liliaceae/ Xanthorrhoeaceae Liliaceae*	Herb	*Kanwar Gandal, Aluva*	Aloe vera	Leaves	As Analgesic, Antipyretic, Appetitive, for *removal of Intestinal Parasites, Relieve from*	Sialkot, Sambrial

							Dysmenorrhea pain.	
11	*Amorphophallus paeoniifolius*	*Araceae*	Herb	*Surana*	Elephant Foot	Corn of Rhizome	For Haemorrhoids	Daska
12	*Anethum graveolens*	*Apiaceae*	Herb	*Shatpushpa*	Dill	Dried Rippen Fruits	For relieve of Menstrual Pains	Daska
13	*Asparagus racemosus*	*Asparagaceae*	Herb	*Satawar*	Buttermilk root	Tubers	As male sexual tonic	Pasrur
14	*Asteracantha Longifolia*	*Acanthaceae*	Weed	*Talmakhana*	Hygrophila	Seed	As Nutritional Tonic, Exhilarant, for weight gain, a male sexual tonic, Hyper coagulability.	Sialkot
15	*Azadirachta indica*	*Meliaceae*	Tree	*Neem*	Nimba	Seed, Fruit,Flower,Bark	As Blood Purifier, Antipyretic, Sedative, Laxative, Resolvent and for Dermatological problems.	Sialkot
16	*Bacopa monnieri (L.) Penn. syn.*	*Scrophulariaceae*	Herb	*Jal Neem*	Brahmi	Whole plant	For Blood filtration	Sambarial
17	*Bambuseae*	*Poaceae*	Tree	*Tabashir Naqda*	Bamboo Silica	Stem, Pulp of fruit	As heart relaxant	Sambarial
18	Berberis aristata	*Berberidaceae*	Shrub	*Drauharidra decoction*	Indian berry	Roots, Stem	For Conjunctivitis	Daska
19	*Brassica Compestris L.*	*Brassicaceae*	Herb	*Lahuna oil*	Mustard	Seed oil	For earache	Daska
20	*Butea monosperma*	*Fabaceae/*Papilionaceae	Tree	*Plasha*	Flame of Forest	Seed	For Parasitic Infections	Daska
21	*Calotropis procera*	*Asciepiadaceae*	Weed	*Aak*	Milk Weeds/ Madar tree	Leaves, Roots, Latex	As Analgesic, Antipyretic effect	Sambrial
22	*Cassia Fistula*	*Fabaceae*	Tree	*Amal Tas*	*Golden Shower*	Fruit	As Purgative	Sambrial

23	*Catharanthus roseus*	*Apocynaceae*		*Sada Bahar*		Leaves	As Anti-diabetic	Sambrial
24	*Centaurea behen. L*	*Asteraceae*	Herb	*Bahiman*	White Behmen	Seed	For Leucoderma.	Pasrur
25	*Cercis siliquastrum*	*Fabaceae*	Tree	*Arghawan*	Judas-tree	Seed	For treatment of *hemoptysis*, component of ophthalmic medicines.	Sialkot
26	Cichorium intybus	*Asteraceae*	Herb	*Kasani*	Chicory	Seed	Gastric and Hepatic Tonic	Pasrur
27	*Cinnamomum tamala*	*Lauraceae*	Tree	*Kanwal Patta*	Bay Leaf	Fruit		Pasrur
28	*Cinnamomum zeylanicum*	*Lauraceae*	Tree	*Dar Cheeni*	Cinnamon	Bark	For stomach Treatment	Sambrial
29	*Citrullus colocynthis*	*Cucurbitaceae*	Herb	*Tuma*	Bitter Apple.	Tubers	As Anti-diabetic.	Pasrur
30	*Citrus tangerina*	*Rutaceae*	Tree	*Barhij Dandi*	*Citrus*	Dry leaves	For Febrifuge, Pruritus, Skin *abscess, Ringworms.*	Sialkot
31	*Commiphora*	*Burseraceae*	Tree	*Googgle*	Indian Badellium	Leaves	For Thyroid stimulation	Daska
32	*Corchorus olitorius*	*Tiliaceae*	Herb	*Jute*	Jew's Mallow	Seed	For Renal Disorders	Pasrur
33	*Cucumis melo var. agrestis Naudin*	*Cucurbitaceae*	Weed	*Chibbar*	Wild Water Melon	Seed, Fruit	For Dermatological and Gastric Problems	Sialkot
34	*Cupressus sempervirens L.*	*Cupressaceae*	Tree	*Jeriena*	Mediterranean Cypress	Whole plant	For Blood Purification	Sambarial
35	*Curculigo Orchioides*	*Curculigo orchioides Gaertn*	Herb	*Siyah Mosli*	Golden Eye Grass	Roots	As Muscular Tonics	Pasrur
36	*Curcuma Longa L.*	*Zingiberaceae*	Herb	*Haridra*	Turmeric	Rhizome	For Sprain, Wound Care	Daska
37	*Cuscuta reflexa Roxb*	*Cuscutaceae*	Tree	*Akash Bail*	Dodder	Stem	For Paralysis	Sialkot
38	*Cydonia oblonga*	*Rosaceae*	Tree	*Bahi Dana*	Quince	Seed	For Weight gain, Increase in Lactation.	Sialkot

39	*Cymbopogon citratus*	*Poaceae*	Shrub	*Lemon Grass*	Lemon Grass	Whole plant	For Viral Fever	Sambarial
40	*Cyperus rotundus L.*	*Cyperaceae*	Herb	*Deela*	Nut Grass	Rhizome	For Diarrhea, dysentery and Febrifuge	Sialkot
41	*Cyrilla racemiflora*	*Cyrillaceae*	Shrub	*Teeti*	Leather wood	Whole plant	For Jaundice	Sambarial
42	Daucus carota L.	*Apiaceae*	Herb	*Gajar*	Carrot	Seeds	As male sexual tonic	Pasrur
43	*Datusa Metel L.*	*Solanaceae*	Herb	*Dhattora*	Thorn Apple	Leaves, Seed	For Lice Infestation	Daska
44	*Elettaria Cardamon*	*Zingiberaceae*	Herb	*Ela Powder*	Cardamon	Seed	For Anti-peristaltic movements	Daska
45	*Eleocharis dulcis*	*Cyperaceae*	Herb	*Khushk Sangara*	Water chestnut	Leaves	For Stomach acidity and sexual dysfunction	Sialkot
46	*Embelia ribes*	*Myrsinaceae*	Shrub	*Bao Paring*	False Black Pepper	Seed	*For removal of Intestinal Parasites, Herpetological problems.*	Sialkot
47	*Euphorbia hirta L.*	*Euphorbiaceae*	Herb	*Aam dodak*	Doddak	Whole plant	As Expectorant, for Asthma and Cough	Sialkot
48	*Euphorbia hypericifolia*	*Euphorbiaceae*	Herb	*Pui Booti*	Graceful *Spurge*	Whole plant	To relieve warts	Sialkot
49	*Ficus Benghalensis L.*	*Moraceae*	Tree	*Borh*	Bayan	Latex, Stem, Fruit	For Muscular Strength	Sambarial
50	*Foeniculum vulgare*	*Apiaceae /Umbelliferae*	Herb	*Kamon-e-Aswad, Sonf*	Fennel	Seed	As Carminative, for Constipation and Stomach Disorders	Sambarial, Daska
51	*Fumaria officinail L.*	*Fumariaceae*	Shrub	*Shahtara*	Earth-Smoke	Whole plant	For Blood filtration	Sambarial
52	*Glycyrrhiza glabra*	*Fabaceae*	Shrub	*Mulathy*	Liquorice	Root	For Stomach ulcers, heartburn	Sialkot, Daska
53	*Holarrhena Pubescens*	*Apocynaceae*	Tree	*Kutaja*	Tellicherry Bark /Kurchi	Stem	For Diarrhea	Daska

54	*Heliotropium strigosum*	*Boraginaceae*	Herb	*Gorakh Pan Booti*	Bristly Heliotrope.	Leaves	As Anti-allergic and Blood Purifier	Sialkot
55	*Hyoscyamus niger*	*Solanaceae*	Herb	*Ajwaien Kharasani*	Black Henbane	Seed	For Insomnia, Hysteria, Belly Ache, Chesty Coughs Treatment	Sialkot
56	*Ipomoea Eriocarpa*	*Convolvulaceae*	Herb	*Lagaco cozinho*	Morning glory	Root, Leaves	For Headache, ulcers, fevers	Sialkot
57	*Indigofera tinctoria*	*Fabaceae*	Shrub	*Neel Kubthe*	True Indigo	Flower, Leaves	As Blood purifier, syphilis, Mosaic disease, Typhoid fever.	Sialkot
58	*Lavandula Officinalis Chaix*	*Lamiaceae*	Shrub	*Asto Khodos*	French Lavender	Leaves, Flower	For Hemicranias, Psychiatric issues, Asthma, Digestion, Flu	Sialkot
59	*Leucas aspera (Jacq.) Ait.*	*Lamiaceae*	Herb	*Jhumka booti*	Tunble weed	Leaves	For Gastritis	Sialkot
60	*Lolium perenne L.*	*Poaceae*	Weed	*Gaus Vail*	Reygrass	Stem	For Paralysis, Pain	Sambrial
61	*Malva sylvestris L.*	*Malvaceae*		*Khabazi, Khatm-e-khapazi*	*Mallow*	Seed	For Inflammatory diseases of mucous, Flu, Rheum, Cough, Urinary tract infection and Intestinal inflammation	Sialkot, Sambrial
62	*Mentha pulegium*	*Lamiaceae*	Herb	*Podeena*	Mint	Leaves	For stomach disorders and healthy digestion	Sialkot
63	*Mentha viridis L.*	*Lamiaceae*	Herb	*Podeena*	Mint	Leaves	For Stomach ache and Heartburn.	Sialkot
64	Mesua ferrea *L.*	Calophyllaceae	Tree	*Nagseer*	Medusa	Flower	As Astringent, Cardiac, Hepatic and Gastric Tonics and for Hemorrhoids.	Sialkot

65	*Murdannia pauciflora*	*Commelinaceae*	Herb	*Khosli*	Few Flowered Dewflower	Roots	For Sexual Dysfunction.	Sialkot
66	*Murraya exotica*	*Rutaceae*	Shrub	*Jasmine orange*	Jasmine orange	Leaves	As Analgesic	Sialkot
67	*Myristica fragrans Houtt*	*Myristicaceae*	Tree	*Jawatri*	Mace	Peels	As Cardiac and Gastric Tonic, Carminative.	Sialkot
68	*Myristica fragrans*	Myristica	Tree	*Javatri, Jaifal*	Nutmeg	Fruit, Seed	For Dyspepsia, Numbness of skin, Headache, Luxation , Premature Ejaculation Treatment, ,Stomach spasms and pain	Sialkot, Daska
69	*Nagar Bail*	*Caprifoliaceae*	Shrub	*Tunj*		Seed	For Male sexual tonic.	Pasrur
70	*Nigella sativa L.*	*Ranunculaceae*	Herb	*Kalvanji*	Klotrgi	Seed	For Gastric Tonic	Pasrur
71	*Nigella sativa L.*	*Ranunculaceae*	Herb	*Kalvanji*	Klotrgi	Seed	For Gastric Tonic	Pasrur
72	Nymphaea ***L.***	Nymphaeaceae	Herb	*Nelofar*	water lily	Flower	For Cardiovascular and nervous system	Sambrial
73	*Onosma bracteatum*	*Boraginaaceae*	Herb	*Gao Zuban*	Bee Plant	Leaves	For relieve of functional palpitation of heart	Sambrial
74	*Ochroma pyramidale*	Malvaceae	Tree	*Beera*	Balsa Tree	Fruit	For Gastric Tonic	Pasrur
75	Ocimum basilicum	Lamiaceae	Tree	*Rehan*	Basil Seeds	Seed	For male sexual tonic	Pasrur
76	*Papaver somniferum L.*	*Papaveraceae*	Tree	*Koknar*	Opium poppy	Seed, Fruit	For Conjunctivitis, Headache, Brain Tonic, Flu and Rheum	Sialkot
77	*Persicaria bistorta L.*	Polygonaceae	Tree	*Inj Bar*	Marsh pepper	Root		Pasrur
78	*Peganum harmala*	*Nitrariaceae*	Tree	*Harmel*	Aspand	Seed	As Carminative and diuretic	Daska
79	*Phyllanthus emblica L.*	*Phyllanthaceae*	Herb	*Amla*	Indian goose berry	Fruit	As Gastric Tonic	Sialkot

80	*Picrorhiza kurrooa*	*Scrophulariaceae*	Herb	*Kutaka*	Picrohiza	Rhizomes with Roots	For Jaundice	Daska
81	*Piper nigrum L.*	Piperaceae	Herb	*Mirch Siyah*	Black Pepper	Seed	For Gastrointestinal Improvements, As Gastric and Hepatic Tonics, Expectorant.	Sialkot, Sambrial, Daska
82	*Pistacia Lentiscus*	*Cactaceae*	Tree	*Mustalgi*	Lentisk	Gum	As Gastric and Hepatic Tonics, as solvent for drug, for Relieve of Menstrual Pains	Sialkot
83	*Plantago Ovata L.*	*Plantaginaceae*	Herb	*Isbaghol*	Ispaghula Husk	Seed	For Spermatorrhoea, Belly Ache, sore throat, Urinary tract infection	Sialkot
84	*Polygonum bistorta L.*	*Polygonaceae*	Herb	*Anj Bar*	Meadow Bistort.	Shoot	As Anti-allergic	Pasrur
85	*Polygonum Viviparum*	*Polygonaceae*	Herb	*Anjbar*	Bird Weed	Root	For Hemorrhage healer, Purgation treatment	Sialkot
86	*Psoralea corylifolia L.*	Fabaceae	Herb	*Babchi*	Bavanchi Seeds	Seed	For Leucoderma.	Sialkot
87	*Punica granatum L.*	Lythraceae	Small Tree	*Anar Dana*	Pomegranate	Seed	As Gastric Tonic	Sialkot
88	*Pyrus communis*	*Rosaceae*	Tree	*Nashpati*	Pear	Fruit	As Laxative, For obesity, Biliary obstruction	Sialkot
89	*Quercus infectoria*	*Fagaceae*	Shrub	*Maju*	Gallnut	Fruit	As Gastric Tonic	Pasrur
90	*Rhyncosia minima*	*Fabaceae*	Herb	*Jungli moath*	*Jumby-bean*	Whole plant	For Gyne care.	Sialkot
87	*Ribes nigrum*	Grossulariaceae	Shrub	*Manka*	Currant	Fruit	For Common Cold and as Pain killer	Pasrur

88	*Ricinus communis L.*	*Euphorbiaceae*	Small Tree	*Hernoli*	Castor oil	Seed	For Gastric problem and Constipation.	Sialkot
89	*Senna alexandrina*	Fabaceae	Herb	*Tanamki*	Senna	Leaves	As Purgative	Pasrur
90	*Santalum album L.*	*Santalaceae*	Tree	*Sandal*	Sandal wood	Stem	As Heart relaxant	Sambrial
91	*Senna Alexandria*	*Caesalpiniaceae*	Tree	*Barg-e-sarna*	Seena Plant	Leaves	Used for Gastric Problems	Sambrial
92	*Shpaerathus Indicus*	*Asteraceae*	Herb	*Mundi Booti, Gorak Mundi*	Sphaerathus	Flower, Fruit	For Somatic Pain	Sambrial
93	*Solanum Nigrum*	*Solanaceae*	Herb	*Makoh*	European *blac k nightshade*	Whole plant	For Internal Injury	Sambrial
94	*Solanum Pseudocapsicum*	*Solanaceae*	Shrub	*Aksan/ Asgandh*	Winter Cherry	Roots	As Brain tonic, for pain relieving	Sambrial
95	*Syzygium Aromaticum*	*Myrtaceae*	Tree	*Long*	Clove	Fruit, Flower, buds	For Hypertension and Toothache	Sambrial, Daska
96	*Strychnos Nux-vomica L.*	*Loganiaceae*	Tree	*Azraki*	Kuchla	Seed	As poison, Brain Tonic and Pain killer	Sialkot
97	Syzygium cumini	*Myrtaceae*	Tree	*Jaman*	Black plum	Fruit	As Anti-diabetic, Anti- jubilance	Sambrial
98	*Terminalia arjuna*	*Combretaceae*	Tree	*Arjan*	Arjun Tree	Leaves	For Cough, Cardiovascular disorders and mucus	Sambrial
99	*Terminalia chebula*	*Combretaceae*	Tree	*Har Har*	Black Myrobalan	Fruit	For Antibacterial and anti-inflammatory applications	Daska
100	*Trachyspermum ammi*	*Apiaceae*	Herb	*Ajwaien Desi*	Ajwaien	Fruit	For Atonic dyspepsia, diarrhea, abdominal tumors	Daska
101	*Tribulus terristia*	*Zygophyllaceae*	Shrub	*Gokshura*	Land Caltrops	Fruit	For Sexual disorders	Daska
102	*Trigonella foenumgraecum*	*Fabxaceae*	Tree	*Maithray*	Fenugreek	Seed	For Anorexia nervosa	Daska

103	*Vachellia nilotica*	Fabaceae	Tree	*Gond Babol*	Kekar	Gum	As Gastric Tonic	Daska, Sialkot, Sambrial
104	*Withania somnifera*	*Solanaceae*	Herb	*Ashvagandha*	Winter Cherry	Root	For Malaise	Daska
105	*Xanthium strumarium L.*	*Asteraceae*	Herb	*Chhota Dhatura*	Cocklebur	Seed, Fruit, Leaves	As Gastric Tonics	Sambrial
106	*Zingiber officinale*	*Zingiberaceae*	Herb	*Adrak*	Ginger	Stem	For Hypertension	Sambrial
107	*Ziziphus jujuba*	*Rhamnaceae*	Tree	*Anab*	Jujubes	Fruit	For Hyperthermia, Blood Clarification, Neuron Tonic.	Sambrial
108	*Zingibir Officinale*	*Zingiberaceae*	Herb	*Sunth*	Dry Ginger	Rhizomes	As Stomach settler	Daska
109				*Taram Hindi*		Seed		Pasrur
110				*Indian Mosli*		Stem	For male sexual tonic	Pasrur
111				*Sundash*		Leaves, Stem, Flower	As Brain Tonic	Pasrur
112				*Sumandri Suk*		Seed	For Leucorrhea and Sun Stroke.	Pasrur

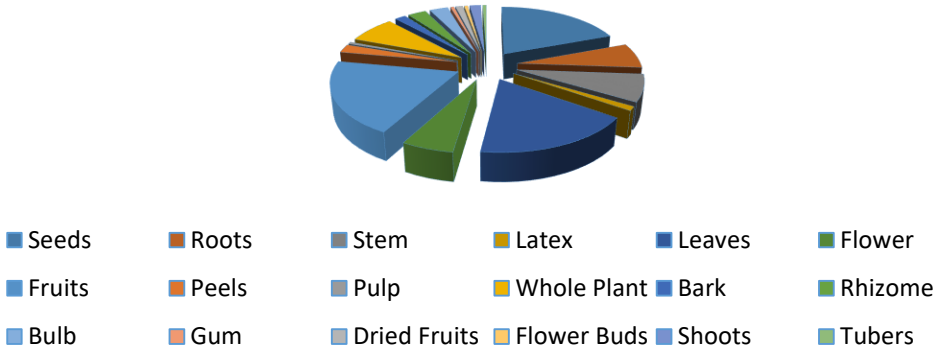

Figure 4: Comparison of various parts of Plants used for preparation of local herbal medicines.

Figure 4 shows that Seeds, roots, stems, latex, leaves, flowers, fruits, peels, pulp, bark, rhizomes, bulbs, gums, dried fruits, flower buds, shoots, tubers and whole plants of all these species are effective in gastric, hepatic, cardiovascular, respiratory, inflammatory, dermatological, neurological, sexual dysfunctions and water borne diseases.

Statistical data of frequencies of all the 61 botanical families in all the subdivisions of district represents *Fabaceae* familyas the most abundant family with a frequency of 12 in whole data, alongwith *Solanaceae, Lythraceae, Lamiaceae, Apiaceae, Asteraceae and Rutaceae*in considerable fraction.
Individual dominance of various families in individual subdivision is given in Figure 5(a-d).

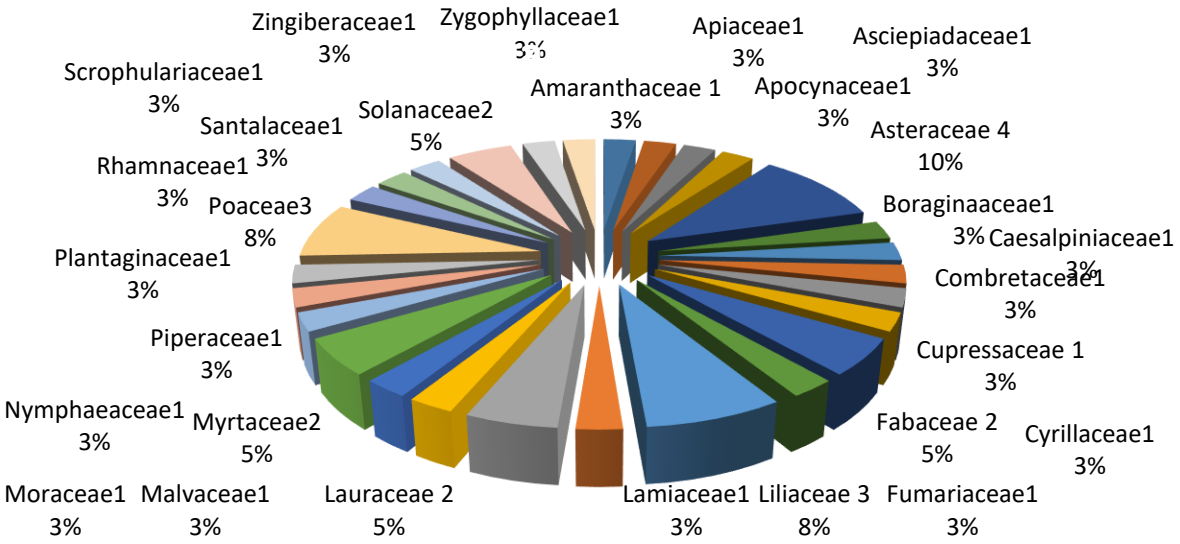

Figure 5(a): Population of botanical families in Sialkot Subdivision.

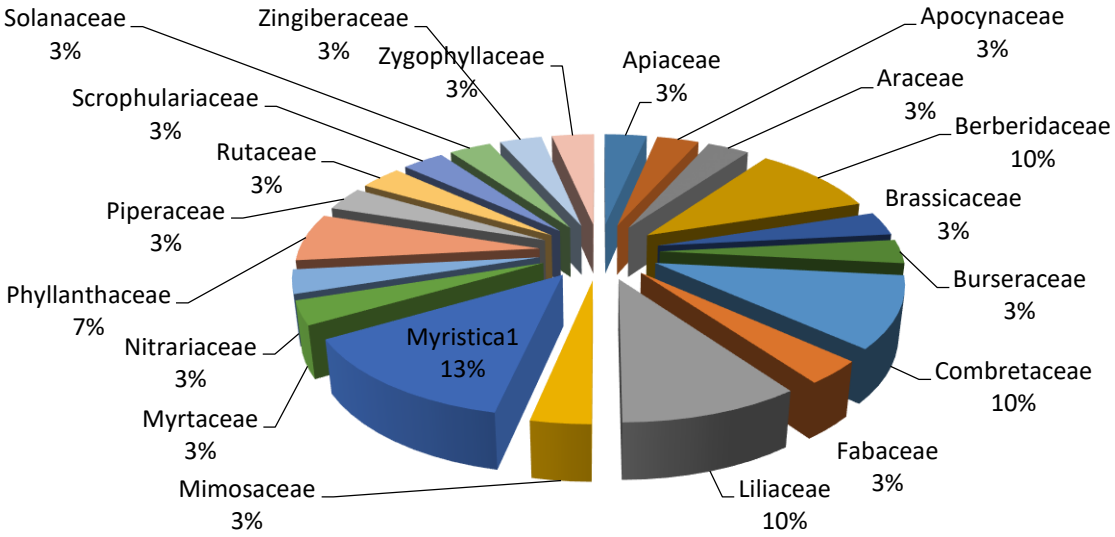

Figure 5(b): Population of botanical families in Sambrial Subdivision.

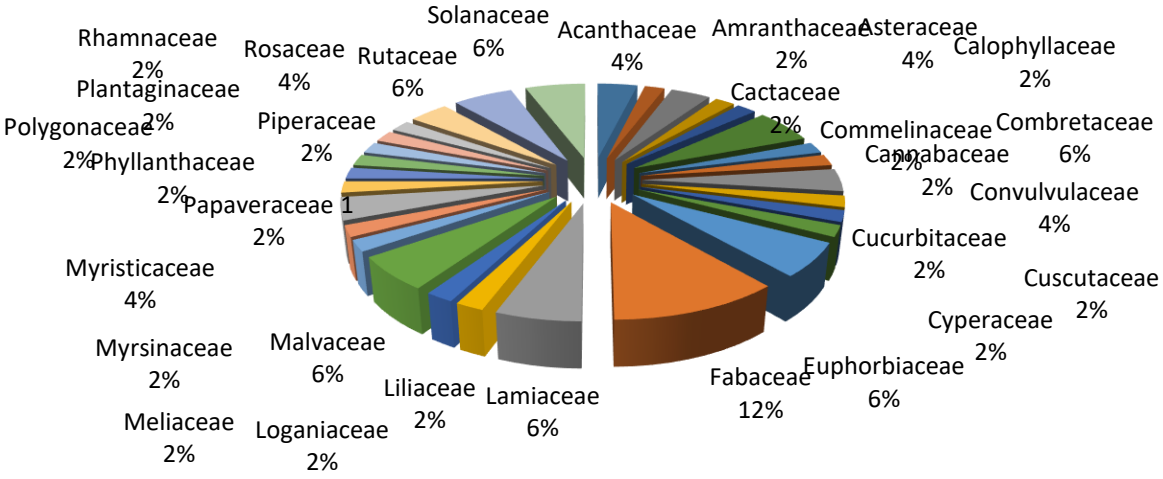

Figure 5(c): Population of botanical families in Daska Subdivision.

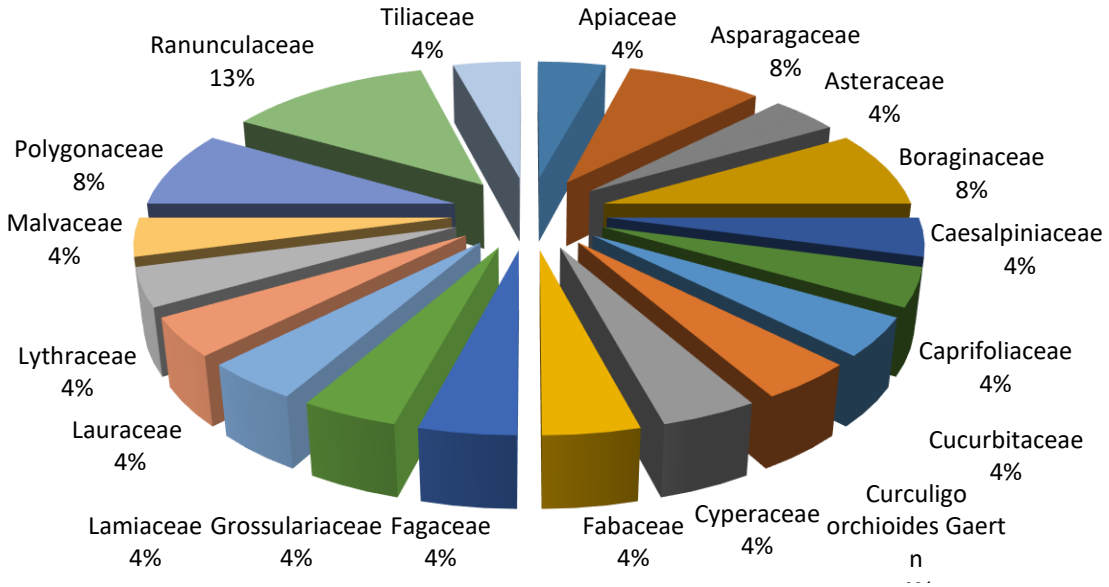

Figure 5(d): Population of botanical families in Pasrur Subdivision. Population density of different botanical species and families is shown in Table 2.

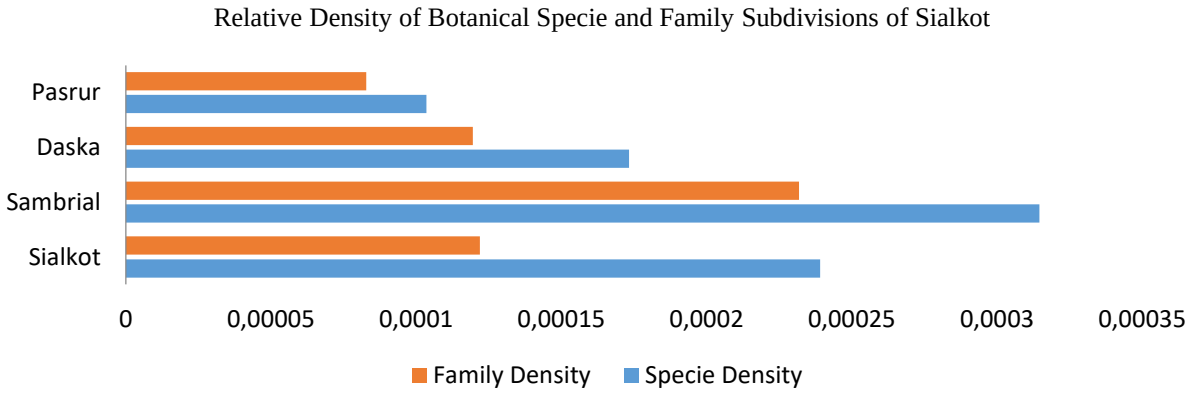

Figure 6: Comparative ethnomedicinal data of district Sialkot.
Figure 6 shows highest botanical density of specie as well as family in subdivision Sambrial in comparison with all others.

Table 3: Relative average density of various botanical species and and families in Dist. Sialkot

S. No	Name of Subdivision	Area (sq.acres^2)	Species density/ sq.acres^2	Family density/ sq.acres^2
1	Sialkot	213.255	2.39×10^{-4}	1.21×10^{-4}
2	Sambrial	120.791	3.24×10^{-4}	2.31×10^{-4}
3	Daska	167.288	1.73×10^{-4}	1.19×10^{-4}
4	Pasrur	241.531	1.03×10^{-4}	8.28051×10^{-5}
5	Sialkot District	742.885	1.57×10^{-4}	8.21123×10^{-5}

4. Discussion

A wider survey of medicinal men and local flora in order to construct a systematic data sheet of district Sialkot exploded the treasures of highly dense racks of natural resources hidden from the world eye. Now world can have a look at this ethnomedicinal heaven to diversify their market with green medicines to highlight the fertility of green pharmaceutical industry. The leaves, stem, bark and fruits of Aegle marmelos (L.) Correa (A. marmelos) has medicinal value accepted by researchers (19). These leaves are widely used to treat diarrhoea, dysentery, skin and eye diseases (20). They contain terpenoids which act as antifungal agent. Allium cepa has been used as an efficient model organism in genetic tests for chromosome aberration assays. Genotoxicity of many food dyes have been evaluated using Allum cepa as indicator. Aloe Vera is found primarily in the arid regions of Americas, Africa,

Europe, and Asia that is used for medicinal purposes (21). In India, Andhra Pradesh, Rajasthan, Maharashtra, Gujarat, and Tamil Nadu are the main Aloe vera cultivating states. For centuries, the gel of Aloe vera has been used for healing and therapeutic purposes, and more than 75 biologically active constituents have been discovered in the inner gel. Aloe vera is a rich source of bioactive compounds (22). It has been widely used in alternative medicine as health and nutritional supplements in addition to its cosmetic applications. Polyphenol-rich A. vera extracts possess various pharmacological activities. The plant has about 99-99.5% water and only 0.5-1.0% solid matter which contains more than 75 diverse compounds. Cassia fistula seeds are well defined for producing activated carbon through physical and chemical treatment for the extrusion of Ni(II) ion contaminated aqueous solution (23). The readily prepared sorbents were characterized using SEM-EDX and FTIR and explored for further studies. Solanum nigrum is a species in Solanum genus, characterized by its white flowers and purple-black berries. It contains many steroidal glycosides, steroidal alkaloids, steroidal oligoglycosides, including solamargine, solasonine, solavilline, solasdamine and solanine, steroidal saponins and glycoprotein, many polyphenolic compounds such as gallic acid, protocatechuic acid, catechin, caffeic acid, epicatechin, rutin, and naringenin (24), which possess strong anticancer and antioxidant activity with IC50 value of isolated compounds ranging from 0.25-4.49 micro metre. Each part of Terminalia arjuna, i.e. stem bark, fruit, leaves and roots is bestowed with healing properties. Particularly, Terminalia arjuna bark extract has a long antiquity of its role as a cardiac stimulant for its beneficial effects in angina.

It was identified that 74% of the 119 plant derived drugs were discovered as a result of isolation of active substances from medicinal plants (25).

5. Conclusions

Sialkot is found a densely loaded area with heave population density of ethnomedicinal herbarium. About 112 species of 61 families are found to be accommodated in fertile land of the all of the four subdivisions on behalf of its surrounding and geographical location. These species are found effective in herbal medicines of about 170 categories of gastric, hepatic, sexual, urinary, respiratory, and inflammatory and water borne diseases including analgesic and anti-pyretic activities. This data explores the unique and fertile territory of District Sialkot, executing its dynamic biological resources and promoting its pharmaceutical market in international grounds. Sialkot can be an economic company of raw materials of each and every type of pharmaceutical stuff. Any proposal of setup of safe and healthy herbal resource center would be appreciably successful here to harvest big deals of national and international business shares. It could be a ready source of green medicines introduced at least cost pharmaceutical open ground worldwide.

Conflict of interest statement

None

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