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Medicinal flora of Srinagar, Kashmir, India

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Abstract
The Kashmir Himalaya, known for its indigenous and endemic flora, also provides home to a large number of medicinal plants, which exhibit a wide taxonomical and distributional stretch. Although, some preliminary studies have been carried out in the region with respect to ethno medicinal uses of some plants, complete inventorization and documentation of medicinal flora has received a little or negligible attention. It is in this backdrop that the present floristic study was carried out to identify, inventorize, document, and characterize the Medicinal Flora of Srinagar. The present study has revealed that Srinagar has 51 medicinal plant species, belonging to 46 genera distributed over 26 families. Asteraceae is the most speciose family with 7 species.

Keywords: Srinagar, Kashmir, medicinal, flora

Introduction
Conservation, phytochemical extractions, pharmacological studies require floristic studies and its taxonomical evaluation and as such last decade of 20th century witnessed a renewed interest of biologists towards floristic studies. Floristic inventories, provide quality information to the end user in a lucid and comprehensive manner. Besides the overall biology of the specimens, these studies should reflect medicinal uses, phenology, distribution, uses, conservation status, etc. Such studies facilitate the conservation efforts so as to prevent the unbridled loss of biodiversity. Keeping this perspective in hindsight, present study is an endeavor to supplement the traditional floristic details with other useful data. Hopefully, the present study would add to the value of plant collections and information provided would prove of immense use to researchers in other allied fields.

The Valley of Kashmir is ranked as paradise on earth. It provides home to a large number of plant and animal species Although, some preliminary studies with regard to ethnomedicinal uses of some plants has been carried out by earlier workers but complete and exhaustive inventorization of Srinagar was still lacking. It is in this backdrop, the present study of exploration, authentic identification, inventorisation, and documentation of medicinal flora of Srinagar was carried out.

Area of Study
Srinagar, the summer capital of the J & K State, was established by the King Paravarasen II in the beginning of the sixth century. The city is flanked on the southeast and northeast by the lofty Himalayan ranges, towards the northeast are the conspicuous peaks-Mahadev (4500m) and Harmukh (5635m) in the southeast with the ridge of Takht-i-Sulaiman (Shankracharya Hill), separated from the Shalimar Range by the Aita Guj gap. On the base of these ranges, on the eastern outskirts of Srinagar is the famous Dal Lake. Out of the total acreage, 1890 acres consist of 'demb' or fixed cultivation. Towards northwest is the Anchar Lake. Towards the west is the gently sloping alluvial soil terrain of Jhelum, extending upto Baramulla. Jhelum River passes through the centre of the city, entering in the south and leaving in the northwest. Srinagar thus occupies a unique position between the alluvial basin of the city and the Rocky Mountains. The city of Srinagar stretches along both the banks of the Jhelum River, between 34.050N and 74.500E at an elevation of 1600m above the sea level. With the expansions in the city limits, the total area is 345,000 acres, out of which 70,000 acres are under forests and non -agricultural uses and 275,000 acres under cultivation. The greatest length and breadth being 20 km and 16 km respectively.

Materials and Methods
During the course of present study, extensive collection trips were carried out in every nook and corner of Srinagar. During each trip, field studies were conducted and medicinal plants were collected from various habitats and altitudes. For each plant species 4-5 specimens were collected from a particular locality and their detailed field information noted under a specific collection number. The specimens were carefully examined in the laboratory and 3-4 specimens were dried and preserved as herbarium specimens. *Flora of British India* [49]. and *Flora of Pakistan* [74]. were mainly used for identification purposes, and the description drawn by studying the specimens in the laboratory and by adding field notes. The morphological study of the specimens has been made with the help of magnifying lenses, light microscope and dissection microscope. The identified specimens stand deposited in Department of Pharmaceutical Sciences (Kashmir University).

Field observations on various plant communities, existing in the area, were also noted during the collection trips. Extensive survey of literature was carried out for the present compilation of medicinal plants. A thorough survey of literature on the pharmacological profile of these plants was undertaken to collect the updated published data by using "Pubmed" and "Google Scholar" search engines. Study is summarized in tabulated form (Table 1). The information

about 51 medicinal plants includes their botanical name, family, common name, local name/Kashmiri name, therapeutic properties alongwith respective bibliographic references.

Table 1: Medicinal Plants of Srinagar, Kashmir with Family name, Common name, Kashmiri name (Local name), therapeutic properties and references.

S. No	Plant (Family)	Common Name	Kashmiri Name	Therapeutic Properties	References
1.	Abutilon theophrastii Malvaceae	Abutilon/ Indian Mallow/ American Jute.	Dodh Konduj/ Yechkar	Hepatoprotective, Demulcent; Astringent Diuretic; Antipyretic; Laxative; Anti-Inflammatory, Expectorant, Aphrodisiac, Tonic; Anti-Tuberculosis, Antihemorrhoidal, Anti-Haematuria.	Saravanan S *et al*. 2013, Chopra *et al.* 1956; Ellingwood 1983, Felter 1992; Harborne *et al.* 1989
2.	Adiantum capillus veneris Adiantaceae	Maiden Hair Fern/ Lady Fern/ Avenca/ Venus Hair Fern	Geowthir	Demulcent, Hair Tonic, Expectorant, Febrifuge, Anti Tumorogenic, Anticold; Emmenagogue; Antimicrobial; Hypoglycaemic; Anti-Inflammatory, Antiodontalgic, Anti-Viral	Kaul 1977; Naqshi *et al*. 1992; Chopra *et al*. 1956; Neef *et al.* 1995, Mahmoud *et al*. 1989; Anonymous 1986; Husson, *et al*.1986
3.	Aesculus indica Hippocastanaceae	Chestnut/ Indian Horse Chestnut	Handoon	Leucorrhoea, Dislocated Joints, Rheumatism, Frostbite, Promoting Hair Growth, Constipation	Kaul 1997, Naqshi *et al*. 1992
4.	Artemisia absinthium Asteraceae	Absinth/ Worm Wood	Tethwan/ Damer.	Chronic Fever, Swellings, Inflammation Of Liver, Rheumatism, Intestinal Parasites, Hepatoprotective	Saxena M *et al*. 2012, Amat N *et al*. 2010, Gilani AH *et al.* 1995, Grieve 1931
5.	Artemesia maritima Asteraceae	Drooping Sea Worm Wood/ Wormseed	Tethwan/ Moorni.	Anthelminthic, Stomachic And Laxative , Febrifuge	Naqshi *et al.* 1992, Kaul 1997
6.	Asparagus filicinus Liliaceae	Fern Asparagus	Huleoon/Allipalli	Hepatoprotective, Demulcent, Diuretic, Laxative, Cardiac, Sedative, Aphrodisiac, Chronic Gout, Antilithic, Antidropsy, Antiodontalgic, Anti Convulsions, Sciatica, Immunostimulant, Anticlastogenic, Molluscucidal	Liu W *et al*. 2016, Chopra *et al*. 1956, Anonymous 1992, Grieve 1992 ,Ye 1994,
7.	Berberis lycium Berberidaceae	Barberry	Kawdach	Hepatoprotective, Tonic, Purgative, Antiseptic, Jaundice, Dyspepsia, General Debility , Biliousness, Opthalmia, Bleeding Piles, Antipyretic, Laxative, Coagulant, Sedative, Anti-Amoebic, Spasmolytic, Anticholinergic, Anti-Inflammatory, Hypotensive and Tachycardiac, Blood Purifier, Antimalarial, Anti–Arthritic, Hypotensive, Antimicrobial, Cytotoxic	Chand N *et al*. 2011, Kaul 1997, Naqshi *et al* 1992, Rastogi and Mehrotra 1991, Anonymous 1986, Sheng 1997, Khan 1969, Gentry 1998, Iwasa 1998
8.	Cannabis sativa Cannabinaceae	Truce Hemp/Soft Hemp/ Marijauna/ Marihuana	Charas/ Bhangh.	Antispermatogenic, Bradycardiac, Hypothermia, Analgesic, Antipyretic Anti-Inflammatory Depression Of Intestinal Motilily, Neuralgia, Gout, Rheumatism, Delirium Tremens, Insanity, Infantile Convulsions, Insomnia, Antiprolapsus Uterine	Grieve 1992
9.	Centaurea iberica Asteraceae	Iberian Starthistle	Cress	Anti-Eczema, Anti-Ringworm	Dar *et al*. 1984, Anonymous 1984 -85
10.	Chenopodium album Chenopodiaceae	Pigweed/ Mutton Tops/Frost Blite	Wanmeth	Laxative, Anthelminthic, Tonic, Rheumatic Pains Hepatic Disorders	Chopra *et al.* 1956, Naqshi *et al.* 1992, Anonymous 1984-85
11.	Conium maculatum Apiaceae	Poison Hemlock/ Poison Parsley/ Snake Weed.	Moher- Katch	Neurotic, Aphrodisiac, Analgesic, Inhibits Estrous Cycle Bradycardia, Miosis, Hyperventilation	Chopra *et al.* 1956, Font Quer 1979, Deb *et al*. 1977, Lampe *et al.* 1985, Geehr 1984, Gosselin 1976, Dreisbach *et al*.1987
12.	Conyza canadensis Asteraceae	Horsebane/ Fleabane/ Fleawort/ Coltstail/ Prideweed	Shaliloth/ Zarkash	Astringent, Stimulant, Haemostatic, Diuretic, Anti-diarrhoea, Antihaemorrhagic, Anti Bronchitis Catarrh, Cystitis, Antilithic, Anti-Diabetic, Tonsils	Chopra *et al.* 1956, Font Quer 1979, Grieve 1992
13.	Cuscuta reflexa Cuscutaceae	Dodder	Kuklipoth	Tonsillitis, Chest Disorder, Purgative Antihelminthic, Anti-Rheumatic	Naqshi *et al.* 1992, Anonymous 1986
14.	Datura stramonium Solanaceae	Devil's Apple/ Jimson Weed/ Thorn Apple	Datur	Antiseptic, Anodyne, Narcotic, Sedative, Bronchitis, Epilepsy, Stenocardia, Anti-Rheumatism, Anti-Hemorrhoidal	Kaul 1997, Grieve 1931, Felter 1922
15.	Daucus carota Apiaceae	Wild Carrot	Jangil Gazir	Stimulant, Carminative, Aphrodisiac, Antilithic, Antizygotic Anti-Conception, Smooth Muscle Relaxant, Anti Diabetic	Chopra *et al*. 1956, Anonymous 1996, Neef *et al.* 1995
16.	Descurainia sophia Brassicaceae	Flixweed/ Tansy Mustard	Charilasij	Astringent, Antiscorbutic, Expectorant, Bronchitis Febrifuge	Chopra *et al.*, 1956
17.	Digitalis lanata Scrophulariaceae	Grecian Foxglove/ Wooly Foxglove	Digitalis	Hepatoprotective, Cardioprotective, Cytotoxic, Antidiabetic, Antioxidant, Hepatoprotective	Ali Esmail Al-Sanafi 2017, Durmaz I *et al*. 2016
18.	Euphorbia hispida Euphorbiaceae	Sanpanth	Not available	Tonic, Antidermatotic, Antileprosy, Lenitive, Antiseptic, Eczemas, Vesicatory	Naqshi *et al.* 1992, Teresa *et al*. 2001
19.	Ficus carica Moraceae	Fig	Anjoor	Hepatoprotective, Demulcent, Aperient, Emollient, Nutritive, Antitussive, Anticatarrhal, Resolvent, Keratolytic	Stephen Irudayaraj S *et al*. 2017, Turan A *et al*. 2016, Aghel N *et al*.2011 Chopra *et al.* 1956, Teresa *et al*. 2001
20.	Fumaria indica Fumariaceae	American Fumitory	Shahtar	Hepatoprotective, Anthelminthic, Diuretic, Diaphoretic, Blood Purifier, Antipyretic, Liver Tonic,Sedative, Antidepressant, Analgesic, Anti Syphilis, Anti Gonnorrhoeal	Rao KS, Mishra SH. 1998, Kaul 1997, Aysha Raza 1998

21.	Gentiana carinata Gentianaceae	Gentian.	Maidan Kalveoth	For Stomach Ache, Antipertusis	Naqshi 1992, Anonymous 1984 -85
22.	Hernaria hirsuta Illecebraceae	Rupture Wort.	Tcheri Saban	For Throat Sore , Diuretic And Against Cardiac Or Nephritic Dropsy	Naqshi *et al.* 1992, Grieve 1992
23.	Hypericum perforatum Hypericaceae	St. John's Wort	Basant	Hepatoprotective, Stringent, Expectorant, Diuretic, Pulmonary, Urinary Disorders, Rheumatism, Lumbago, Anticytotoxic, Antiviral, Antitumor, Antibacterial, Antivitiligo, Anitcolitic, Piles Uterine Troubles.	Hohmann MS *et al*. 2015, Lavie *et al*. 2000, Prince *et al*. 2000; Lavie *et al.* 1995, Fehr *et al.* 1995, Degar *et al.*1992, Puchner *et al.* 2000, Kolesnikova *et al.* 1988, Nowak *et al.* 1974, Chakurski *et al.*1981
24.	Iris decora Iridaceae	Himalayan Iris	Sosan	Bilious Obstructions, Sores , Pimples, Anti-Rheumatic	Chopra *et al.* 1956, Kaul 1997
25.	Iris kashmiriana Iridaceae.	Himalayan Iris	Mazar Mund	Anti- Rheumatic	Naqshi *et al.* 1992
26.	Iris lactea Iridaceae	Japanese Iris/ Japanese Roof	Krashim	Alterative, Blood Purifier, Veneral Affections, Liver Complaints ,Dropsy, Anti Allergic	Chopra *et al.* 1956, Kaul 1997
27.	Juglans regia Juglandaceae	Walnut	Doon	Hepatoprotective, Anthelminthic, Astringent, Anti Rheumatic, Antiodontalgic, Lenitive, Antiseptic, Anti-Haemorrhoidal , Increases Glucose Tolerance, Anti Dandruff, Anti Eczema, Antiviral, Anti-Fungal Anti-Tumor	Edie A *et al*. 2013, Shimmed H *et al*. 2009, Chopra *et al*. 1956, Kaul 1997, Teresa *et al.* 2001, Neef *et al.* 1995, Brunet on 1995, Grieve 1979, Harborne and Baxter 1993,Heisey and Gorham 1992,Meyer-Buchtela 1999, Roth 1993,Okada *et al.* 1967
28.	Maleva neglect Malvaceae	Mallow	Kashmir Satchel	Laxative, Anti Cough, Colds, Stanger And Gravel	Naqshi *et al.* 1992, Grieve 1992
29.	Maleva Silvestre's Malvaceae	Common Mallow /Zebrine.	Aurum Satchel	Demulcent, Emollient, Anti Pulmonary and Anti Urinary Affections, Anti Inflammatory, Anti Abscesses Cough And Colds, Muscle Stimulant	Anonymous 1986, Grieve 1992, Chopra *et al*. 1956
30.	Marrubium vulgare Lamiaceae	White Horehound	Troper	Hepatoprotective, Expectorant, Diuretic, Carminative, Laxative,Hypotensive, Anti Tuberculosis, Anti Chronic Bronchitis, Dyspepsia, Flatulence, Liver And Gall Bladder Disorders	Ettaya A *et al*. 2016, Elberry AA *et al.* 2010, Ahmed B *et al*. 2010, Bown 1995, Kaul 1997 Tyler 1993, Karnick 1994, Nadkarni 1976, BaNZ 1998
31.	Morus nigra Moraceae	Black Mulberry	Shahtul	Nutritive, Refrigerant, Laxative, Purgative, Vermifuge, Cure Sores And Wounds , Hypoglycaemic, Hypotensive	Chopra *et al.* 1956, Naqshi *et al.* 1992, Anonymous 1986
32.	Narcissus tazetta Amaryllidaceae	Narcissus	Yemberzal	Emetic, Relieve Headache, Cure Anemia, Purgative And Diuretic, Antiviral	Chopra *et al.* 1956,Naqshi *et al.* 1992, Anonymous 1986
33.	Nepeta cataria Lamiaceae.	Catnip	Gandh Sooi.	Carminative, Tonic, Diaphoretic, Refrigerant, Emmenagogue, Antiseptic, Stimulant, Antihelminthic, Antibacterial, Antispasmodic, Mild Sedative, Cures Insomnia, Nervousness, Hiccups, Menstural Cramps, Sexual Stimulant	Chopra *et al.* 1956, Kaul 1997 Naqshi *et al*. 1992, Swester 1991, Tyler 1993
34.	Ocimum sanctum Lamiaceae	Sacred Basil	Baber-i-Booil.	Expectorant, Diaphoretic, Antiperiodic, Earache, Genitourinary System, Anthelminthic Antipyretic, Insecticidal, Hypoglycaemic	Chopra *et al.* 1956, Nadkarni 1976, Asha *et al.* 2001, Chatopadhya 1933,
35.	Oxalis corniculata Oxalidaceae.	Shamrock Stickwort Stubwort Wood Sour	Jangil Chokchin	Analgesic, Antiemetic, Anti-Inflammatory, Antipyretic, Antiscorbutic, Antiseptic, Antihelmintic, Diaphoretic, Refrigerant And Stomachic	Chopra *et al.* 1965, Kaul 1997, Grieve 1933
36.	Polygonum amplexicaule Polygonaceae	Knotweed	Machren	Antibacterial, Antifungal And Antimalarial	Naqshi *et al.* 1992
37.	Ricinus communis Euphorbiaceae	Castor	Arandi	Constipation, Colic, Diarrhoea, Dysentery, Enteritis, Pregnancy, Puerperal Sate, Tape And Lumbricoid Worms, Traumatic Fever, Renal Calculi, Night Sweats, Amenorrhea, Enlarged Liver, Hemorrhoids, Cystitis And Gonnorhoea.	Font Quer 1979, Budavari 1989 Kopferschmitt 1983, Wedin 1986, Hardin 1974
38.	Robinia pseudoacacia Paplionaceae	Black Locust	Tikar/ Kikar	Astringent, Cholagogue, Diuretic, Emetic, Emollient, Laxative, Poison, Protisticidal, Purgative, Sedative, Tonic And Viricidal.	Duke and Wain 1981, Grieve 1931, Shah 1972
39.	Rosa damascena Rosaceae	Rose	Kashur Gulab	Astringent, Aperient, Cardiacal, Tonic, Cephalic; Removing Bile And Cold Humours, Hepatoprotective, Cardiotonic, Anti-Inflammatory And Cooling Agent, Antidepressant	Chopra *et al.* 1956 Aysha Raza 1998
40.	Rumex dentatus Polygonaceae	Indian Sorrel	Obug	Diuretic, Antipyretic, Antiseptic, Astringent, Anti-Inflammatory, Antihypertensive, Anti-Arthritic Antiacid, Laxative, Sore Throat, Skin Diseases And Furuncles	Braun *et al.* 1997, Chopra *et al.* 1956
41.	Sagittaria trifolia Alismataceae	Wapatoo	Keow	Diuretic, Antiscorbutic, Discutient; Cutaneous Troubles, Sore Throat And Inflammation Of Breast	Grieve 1992 Anonymous 1986, 1992
42.	Salix alba Salicaceae.	White Willow/ European Willow	Vier	Tonic, Astringent , Antiperiodic, Anti Rheumatic, Antipyretic, Analgesic, Anti-Inflammatory, Removes Fatigue	Chopra *et al.* 1956, Kaul 1997 Bradley 1992, Bruneton 1995 Schilcher 1997, Albrecht *et al.*1990, Meier and Liebi 1990,

					Mayer and Mayer 1949, Anonymous 1984-85
43.	Salix babylonica Salicaceae	Weeping Willow	Vir/ Guir Biasa	Antipyretic, Anthelminthic, Antirheumatic, Anti-Implantation	Anonymous 1992, Gupta *et al*.1962
44.	Salvia moorcroftiana Lamiaceae	Sage	Sholar	Emetic, Antihemorrhoidal, Relieves Cough, Antipyretic, Antiodontalgic	Kirtikar 1933, Bakshi *et al*. 1986, Nadkarni 1976, Anonymous 1986, Anonymous 1984-85
45.	Senecio vulgaris Asteraceae	Common Groundsel	Not available	Diaphoretic, Diuretic, Tonic, Chronic Mastitis, Anti Haemorrhoidal, Purgative, Emetic	Anonymous 1986, 1992
46.	Siegesbeckia orientalis Asteraceae	Siegesbeckia	Not available	Depurative, Sialogogue, Cardiotonic, Heals Gangrenous Ulcers And Sores , Anti-Bacterial Anti-Inflammatory, Analgesic, Anti -Rheumatoid Arthritis, Renal Colic, Antiviral Hypoglycaemic,	Chopra *et al.* 1956, Khan *et al.* 2001, Perry 1980 Kosuge *et al.* 1985, Duke and Ayensu 1985 Anonymous 1986, 1992
47.	Sisymbrium irio Brassicaceae	London Rocket	Danda Haak	Expectorant, Stimulant, Restorative, Febrifuge Anti-Asthmatic,	Chopra *et al.* 1956, Anonymous 1992
48.	Solanum nigrum Solanaceae	Black Nightshade	Kambai.	Hydragogue, Cathartic, Diuretic, Alterative, Anti-hemmorhidal, Ring Worm Infections, Anti-Odontalgic, Anti-Dermatitis, Analgesic, Anti-Edematic, Antispastic, Teratogenic	Chopra *et al.* 1956, Jain 1985 Teresa *et al.* 2001, Duke *et al*.1985,
49.	Stachys floccosa Lamiaceae	Wooly Wound Wort	Not available	Tonic, Emmenagogue And Diuretic	Naqshi *et al.* 1992
50.	Taraxacum officinale Asteraceae	Bitterwort/ Blowball/ Ganker	Haandh	Diuretic, Tonic, Aperient, Against Kidney, Liver And Gallstones, Piles, Body Aches, Chronic Fevers, Dyspepsia, Anti-Rheumatic, Antitumour, Immunostimulatory, Antiviral	Kaul 1997, Chopra *et al.* 1956,Naqshi *et al* 1992, Bradley 1992, Baba *et al.*1981, Jeong *et al.*1991 Grasses *et al.* 1994, Zheng 1990
51.	Verbascum thapsus Scrophulariaceae	Mullein	Jangil Tamok	Febrifuge, Aphrodisiac, Anti-Inflammatory, Demulcent, Astringent, Anti-ringworm, Bactericide, Antiviral	Chopra *et al.* 1956, Kaul 1997 Slagowska *et al*.1987, McCutcheon *et al.*1995 Zgorniak-Nowosielka *et al*.1991

Conclusions

Medicinal plants are potential renewable natural resources and are generally considered to play a beneficial role in human health care. In view of adverse effects associated with the synthetic drugs, plants are safer, cheaper and much effective alternatives. The medicinal value of these plants lies in phytochemicals that produce a definite physiological action on the human body. Exploration of Srinagar and its vicinities possesses immense wealth of medicinal plants. Further investigation is needed to translate it into the formulation of modern drugs after proper scientific evaluation of biomolecules, their mechanism of action, toxicity and appropriate standardization.

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