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Some medicinally important plants with their uses from Yamuna River, Agra Uttar Pradesh (India)

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Abstract

Medicinal plants play major role in living from all over the world as Ayurveda medicine. India is the largest producer of medicinal plant, also rich in medicinal flora. This study was conducted in 2022 with the survey of medicinal plants at Agra district, UP (India). Today, in the high-tech world, the lifestyle and food style have changed tremendously. Humans are trying to return towards traditional medicines and therapy and prefer herbal medicines instead of allopathic treatment. In this paper new mirror medicinal plant has been brought into the light occurred nearby river bank of Yamuna, Agra. Previous studies on traditional medicine as scientific outputs having traditional claims of effectiveness which are helpful to manage various ailments. Many native medicinal plants listed in this article are significantly utilized by the local people. We try to document of some medicinal plants with their families, medicinal properties and bioactive compounds.

Keywords: Ethnobotanical study, medicinal plants, Yamuna, Agra

Introduction

However there is a long list of medicinally important plants occurred adjacent to river bank of Yamuna but in this paper individual certain important plants have been described with their medicinal uses. Human beings are using various parts of the plants to generate phytomedicine and could not be fully treated by conventional pharmaceutical are numerous (Redzič, 2007) [59]. For this reason, there is an increasing tendency in use of herbal preparations. Almost 80% of the world's population depends on medicinal plants with different remedies for its primary health care needs and modern cultures, civilizations and humanities (Ullah, *et al.*, 2010) [81]. The local Indian peoples of the rural areas have good knowledge about the uses of medicinal plants from prehistoric period (Singh, 2010) [70] and they prefer these plants due to their easy availability and cheap therapy as compared to costly pharmaceuticals. Plants are the main basis of our daily life and wild edible plants are extensively used in medicine (Mondal, 2022) [48]. 80,000 plants are used for medicine, like as treat diabetes, skin treatment, diabetes, Stomach disease, Asthma, cough, Breast pain, jaundice etc. According to an estimate of WHO, approximately 80% people of developing countries rely essentially on traditional medicine for primary healthcare (Mondal, 2022) [48]. It means medicinal plants are the backbone of traditional or folkloric medicines. In the primary healthcare system medicinal plants are the main components for human beings that depend upon the availability, acceptability, compatibility and affordability (Hossain, *et al.*, 2014) [46]. Medicinal and aromatic plants are the vital and valuable resources of primary and secondary metabolites which are used as templates for lead optimization programs and are considered to make safe and effective herbal formulations (Nidavani *et al.*, 2014) [57]. In India approximately 2000 species are used for medicinal product and vegetables. Number of studies have been reported from the world on medicinal uses of plants among various indigenous communities (Kargoglu, *et al.*, 2008; Ratnam and Raju, 2008; Jamila and Mostafa, 2014) [33, 58, 31].

As reported by the World Health Organization (WHO), approximately 80% of the human population relies on traditional botanical medicines worldwide. Around 40,000 to 70,000 medicinal plant species are utilised across the world as traditional medicines (Anand, *et al.*, 2022) [10]. Currently, the world trade in medicinal plants and derived products is evaluated at 100 billion US dollar with an annual growth rate of 15% Khan and Ahmad, (2018) [44].

Some studies were carried out by researchers previously, (Purkayastha. *et al.*, 2005) ^[55] they have reported that the ethnopharmacological use of the rhizome of *L. spinosa* for the treatment of piles (decoction) and the use of *D. thalictrifolia* for the treatment of diarrhoea (decoction). The phytochemistry of both of these species is poorly known and identifying new bioactive compounds deserves further study. Similar with the research of (Dwivedi, *et al.*, 2019) ^[122] reported that the manuscript and underlines the importance of traditional knowledge used for the treatment of different diseases in the Himalayan state Uttarakhand, India. Medicinal plants of U.K on this basis authors focused on some important highlights of native medicinal plants which need to conservation and cultivation because these plants are naturally grown in abundance and fast depleting can help the natives to earn their livelihood to some extent. For future perspectives this study, will be helpful to pharmacologist, phytochemist and researcher of this field. Also similar (Bibi *et al.*, 2014) ^[16] provides basis for the conservation of the local flora, its use as food and medicine. It also provides various socio-economic dimensions associated with the common people. (Manzoor, *et al.*, 2013) ^[45] reported the uses of fruits, vegetables and herbs for the treatment of diabetes by the people of Quetta city, but in all these studies no quantitative ethnobotanical work has been undertaken in this province generally and District Mastung particularly. Findings showed that (Kareti, and Rajpoot 2022) ^[32] to identify and record the medicinal plants used by the indigenous tribal communities living in the Amarkantak region of central India. A descriptive statistical analysis was applied to describe the data. More than 100 practitioners were interviewed in this research, and a total of 118 plant species from 63 families and 108 genera were identified. (Sharma, *et al.*, 2022) ^[65] reported that the study areas have present rich diversity of medicinal plants species with extensive ethno medicinal properties used in curing various diseases. (Prabhu *et al.*, 2022) ^[52] to identify plants used by tribal people in the Pachamalai hills located in Tiruchirappalli district of Tamil Nadu, India and to document the local names, medicinal uses, methods of preparation and other applications of the collected plants. Similarly (Revathi *et al.*, 2013) ^[60] reported that the fabaceae family had the highest number of plant species from a study carried out in Tami Nadu, Western Ghats. The Fabaceae family is also

known to comprise the highest number of plant species in the world.

In this regard, the present investigation was considered as the first one that focuses with an ethnobotanical study on medicinal plants in this area since the study area has never been studied ethnobotanically before. District Agra has also got importance for its topography as well, desert and forest habitats and having rich diversity of medicinal plants. The rural areas of the district still depend on these wild plants for the cure of diseases and having a good ethnobotanical knowledge about medicinal plants. But currently the ethnobotanical knowledge is disappearing very fast from the urban areas of the district because of being closer to and bounded with the capital city of province 'Quetta' having health and other facilities. Due to this, it was felt worthwhile to record the folk knowledge of medicinal plants used by the inhabitants of District Agra the aim of this study was to document medicinal uses, bioactive compound of plants.

Collection and identification of medicinal plants

The plants were collected during (2022) adjacent to the river bank covering nearly all medicinal plants in this area. The collected of medicinal plants specimens were dried and preserved processed as per routine herbarium techniques (Bibi *et al.*, 2014) ^[16].









Socio-economic conditions of the area










Agra region is located in the western Uttar Pradesh state, northern India. The district has been blessed with diverse flora including a great number of medicinal plants. The rural areas of the district are still dependent on medicinal plants for their health care because of lack of health centres in the area. Agriculture is the major earning means of the people in the region. Nearly 50% of the population of Agra depends on agriculture. The local inhabitants collect medicinal plants from forests, deserts, mountains and plains and sell them to the local traditional herb sellers in very cheap prices. Local traditional herb sellers then supply these plants to the pharmaceutical companies in good prices. If the sustainable use of wild flora and cultivation of medicinal plants are promoted in the area, this will strongly effect on the socio economic condition of the local inhabitants.












Fig 3: Map of Yamuna River along Agra city










Table 1: 1 List of medicinal plants with their bioactive compounds and medicinal values







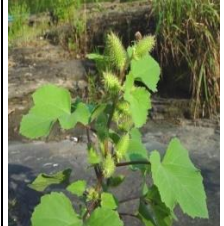
S. No	Scientific names	Families	Common names	Bioactive components	Medicinal values	Images
1.	<i>Acalypha Lanceolata Hook</i>	Euphorbiaceae	Toothed bract Indian copperleaf	Tannins, flavonoids, phenolics, saponins, alkaloids, terpenoids, coumarins, anthocyanins (Seebaluck, <i>et al.</i> , 2015) ^[62] .	Diabetes, hypertension, liver inflammation, schistosomiasis, dysentery, respiratory problems including bronchitis, and pneumonia (Seebaluck, <i>et al.</i> , 2015) ^[62] .	
2.	<i>Ageratum Conyzoides Linn.</i>	Asteraceae	Billy goat weed	Phytochemical substances; terpenoid, sterol, flavonoid, chromene, pyrrolizidine alkaloid, coumarin, pyrrolone, and lignan. (Kotta, <i>et al.</i> , 2020) ^[39] .	Antimicrobe, arthrosis, headache, dyspnea and as antipneumonia, pain killer, anti-inflammatory agent, antiasthma, antispasmodic, haemostatic, gastrointestinal (Kotta, <i>et al.</i> , 2020) ^[39] .	
3.	<i>Alternanthera sessilis (L) DC</i>	Amaranthaceae	Sessile joyweed	Epigallocatechin, catechin, chlorogenic acid, 4-hydroxybenzoic, apigenin, vanillic acid, ferulic acid, ethyl gallate, and daidzein. (Muniandy, <i>et al.</i> , 2018) ^[49] .	Antibacterial, antioxidant, and antiallergic properties, other uses headaches, heal burns, wash eyes, and deal with snakebites. Also (Muniandy, <i>et al.</i> , 2018) ^[49] .	
4.	<i>Amaranthus viridis Hook.f.</i>	Amaranthaceae	Slender amaranth	β -cyanin, β -xanthin, betalain, and other pigments, carotenoids, anthocyanin, chlorophylls, antioxidant phytochemicals, β -carotene, vitamin C, and flavonoids. (Sarker, and Oba, 2019) ^[61] .	Antioxidant, antimicrobial, hepatoprotective, anti-nociceptive, anti-inflammatory, hypolipidemic, antihyperglycemic, anthelmintic, anti-phytopathogenic, and antidiabetic activity (Sarker, and Oba, 2019) ^[61] .	
5.	<i>Ammania baccifera Linn.</i>	Lythraceae	Monarch redstem	Phenolic compounds flavonoids, phenolic acid, and tannins possess diverse biological activities (Loganayaki, <i>et al.</i> , 2012) ^[43] .	It possesses anti-typhoid, anti-tubercular and anti-tumor properties (Loganayaki, <i>et al.</i> , 2012) ^[43] .	
6.	<i>Anagallis arvensis Linn.</i>	Primulaceae	Scarlet pimpernel	Active constituents; glycosides, saponin, flavonoid, alkaloids, aempferol, oleanane triterpenoids, anagalligenin, anagalligenone, stigmasterol, arvenin I, arvenin II, cucurbitacin B, hexosamine, β -amyrin, sterols carbohydrates, lacceric acid. (Yasmeen, <i>et al.</i> , 2020) ^[83] .	Anti-mycotic, antimicrobial, molluscicidal, antioxidant, anti-inflammatory, anti-leishmania, antiviral, cytotoxic, and spermatogenesis (Yasmeen, <i>et al.</i> , 2020) ^[83] .	
7.	<i>Arenaria serpyllifolia Linn.</i>	Caryophyllaceae	Thyme-leaf sandwort	Caryophyllaceae are saponins, Phytoecdysteroids, benzenoids, phenylpropanoids, and nitrogen compounds. (Chandra, and Rawat, 2015) ^[21] .	Used as ailments as cold, cough, fever, diarrhea, throat infection, and gastrointestinal infection etc. (Chandra, and Rawat, 2015) ^[21] .	
8.	<i>Argemone Mexicana</i>	papaveraceae	Mexican prickly poppy	Several alkaloids, viz., protopine, berberine, sanguinarine, optisine, chelerythrine etc. While, the seed oil has fatty acids, viz., palmitic, myristic, oleic, linoleic acids, etc. (Alam, and Khan, 2020) ^[5] .	Antimalarial, antibacterial, antiplasmodial, antiasthmatic, antiallergic, anti-HIV Properties. (Alam, and Khan, 2020) ^[5] .	

9.	<i>Calotropis procera</i>	Asclepiadaceae	Apple of Sodom	Metabolites; flavonoids, tannins, terpenoids, saponins, alkaloids, steroids, and cardiac glycosides (Kaur, <i>et al.</i> , 2021) [34, 35].	Used as cold, fever, leprosy, asthma, rheumatism, eczema, indigestion, diarrhea, elephantiasis, skin diseases, and dysentery (Kaur, <i>et al.</i> , 2021) [34, 35].	
10.	<i>Cannabis</i>	Cannabaceae	Ganja	Flavonoids, phenolics, glucosinolates, terpenoids, and alkaloids (Braich, <i>et al.</i> , 2019) [19].	Antibacterial, anti-inflammatory, analgesic, anti-anxiety, anxiolytic and sedative effects (Braich, <i>et al.</i> , 2019) [19].	
11.	<i>Chenopodium ambrosioides</i> Linn	Chenopodiaceae	Mexican tea	α -terpinene, ascaridole, <i>p</i> -cymene, neral, geraniol, iso ascaridole and 2-carene (Brahim, <i>et al.</i> , 2015) [18].	Folk medicine as analgesic, antipyretic, antioxidant and cure gastrointestinal disease, typhoid and dysentery (Brahim, <i>et al.</i> , 2015) [18].	
12.	<i>Cleome viscosa</i> Linn	Capparidaceae	Asian spiderflower	Phenols, flavonoids, alkaloids and terpenoids (Lakshmanan, <i>et al.</i> , 2018) [42].	The treatment of jaundice in the Indian folklore medicines (Lakshmanan, <i>et al.</i> , 2018) [42].	
13.	<i>Commelina benghalensis</i> Linn.	Commelinaceae	Wandering jew	Polyphenols, salicylic acid, <i>p</i> -coumaric acid, 8-hydroxyquinoline, caffeic acid, quinolones, catechol, resorcinol, tannic acid, chlorogenic acid, flavonoids, astringents, saponins (Ghosh, <i>et al.</i> , 2019) [26].	Anti-microbial, anticancer, anti-inflammatory, anti-oxidant, anti-diarrheal, anthelmintic, fertility inducing, anti-viral, anxiolytic, hepato-protective, anti-urolithiasis, analgesic, thrombolytic, sedative and larvicidal properties (Ghosh, <i>et al.</i> , 2019) [26].	
14.	<i>Corchorus depressus</i> (L.) Stocks	Tiliaceae	Cham ghans	Alkaloids, anthraquinones, cardiac glycosides, tannins, and saponins (Afzal, <i>et al.</i> , 2017) [2].	Traditional medicine for the ailment of aches, dysentery, enteritis, fever, and tumors (Afzal, <i>et al.</i> , 2017) [2].	
15.	<i>Croton bonplandianum</i> Bail.	Euphorbiaceae	Ban tulsi	Alkaloids, Flavonoids, Glycosides, Steroids, Phenols, Tannins, Saponins (Ghosh, <i>et al.</i> , 2018) [27].	Treatment of cancer, constipation, diabetes, digestive problems, dysentery, fever, hypercholesterolemia, hypertension, inflammation, and ulcers (Ghosh, <i>et al.</i> , 2018) [27].	
16.	<i>Cyondom dactylon</i> (L.) Pwrs.	Poaceae	Bermuda grass	Glycerin, 9,12-Octadecadienoyl chloride, hexadecanoic acid, ethyl -d-glucopyranoside, linoleic acid, and phytol (Shendye, and Gurav, 2014) [68].	Antipyretic, analgesic, Anthelmintic, Anticatalytic, Anti-inflammatory, Anticonvulsant, Cardio-protective Antidiarrheal activity (Shendye, and Gurav, 2014) [68].	
17.	<i>Cyperus niveus</i> Retz.	Cyperaceae	Snowwhite sedge	Flavonoids, phenols, alkaloids, tannins, saponins and glycosides (Aleem, and Janbaz, 2018) [6].	Used as an anti-diarrheal, antiemetic, anti-cancer and also decrease inflammation (Aleem, and Janbaz, 2018) [6].	

18.	<i>Cyperus rotundus</i> Linn.	Cyperaceae	Coco grass	Alkaloids, flavonoids, tannins, starch, glycosides, furochromones, monoterpenes, sesquiterpenes, sitosterol, fatty oil containing a neutral waxy substance, glycerol, linolenic, myristic and stearic acids (Sivapalan, 2013) ^[73] .	Considered astringent, diaphoretic, diuretic, analgesic, antispasmodic, aromatic, carminative, antitussive, emmenagogue, litholytic, sedative, stimulant, stomachic, vermifuge, tonic and antibacterial (Sivapalan, 2013) ^[73] .	
19.	<i>Dactyloctenium aegyptium</i> Linn. (Beau)	Poaceae	Egyptian crowfoot grass	Amino acids, terpenoids, alkaloids, saponins, tannins, flavonoids, steroids, and phenols (Ahmed, <i>et al.</i> , 2020) ^[31] .	Antioxidant, anti-inflammatory, anticancer, anti-diabetic and antipyretic properties (Ahmed, <i>et al.</i> , 2020) ^[31] .	
20.	<i>Dichanthium annulatum</i> Stapf	Poaceae	Marvel grass	Tricin 4'-O-(threo-β-guaiacylglyceryl) ether (Salcolin A) and tricin 4'-O-(erythro-β-guaiacylglyceryl) ether (Salcolin B) and an epimer of tricin 4'-O-[threo-β-guaiacyl-(7''-O-methyl-9''-O-acetyl)-glyceryl] ether and tricin 4'-O-[erythro-β-guaiacyl-(7''-O-methyl-9''-O-acetyl)-glyceryl] ether, one flavone; tricin, two flavone glycosides; tricin 7-O-β-D-glucopyranoside and tricin 7-O-neohesperidoside, one flavone C-glucoside; isoorientin, one phenolic acid; p-coumaric acid, one lignan; 4-ketopinoresinol and two sterols; stigmasterol and β-sitosterol-3-O-β-D-glucoside (Awad, <i>et al.</i> , 2015) ^[12] .	It has antiviral, antimicrobial and cytotoxic activities (Awad, <i>et al.</i> , 2015) ^[12] .	
21.	<i>Eclipta alba</i> Hassk.	Asteraceae	Trailing Eclipta plant	Coumestan terpenoids and their glycosides, Sterol, Alkaloids Flavonoids, Sesquiterpene lactones, terthienyl agelate, (Jahan, <i>et al.</i> , 2014) ^[30] .	Used for treatment of urinary problems, jaundice, asthma, and coughs (Jahan, <i>et al.</i> , 2014) ^[30] .	
22.	<i>Gnaphalium indicum</i> Linn.	Asteraceae	Cudweeds	Flavonoids, sesquiterpenes, diterpenes, triterpenes, phytosterols, anthraquinones, caffeoylquinic acid derivatives, and other compounds (Sharmila, <i>et al.</i> , 2014) ^[67] .	Used as jaundice, ulcer, fever and antiseptic (Sharmila, <i>et al.</i> , 2014) ^[67] .	
23.	<i>Gnaphalium leutoalbum</i> Linn.	Asteraceae	Jersey cudweeds	Alkaloids, carbohydrates, phenols, flavonoids, saponins, tannins, glucoside resins, phytosterins, terpenoids and fixed oils (Khan, <i>et al.</i> , 2009) ^[36] .	<i>Gnaphalium leutoalbum</i> possessed antibacterial, antifungal, antioxidant anti-inflammatory and cytotoxic effects (Khan, <i>et al.</i> , 2009) ^[36] .	
24.	<i>Grangea maderaspatana</i> Linn.	Asteraceae	Madras carpet	Mixture of monoterpenes and sesquiterpenes hydrocarbons represented by myrcene, α-humulene, and germacrene D. (Hoi, <i>et al.</i> , 2021) ^[29] .	Anti-inflammatory and antiarthritic activities, Estrogenicity, anti-fertility, antioxidant, antimicrobial, hepatoprotective and diuretic activities (Hoi, <i>et al.</i> , 2021) ^[29] .	
25.	<i>Heliotropium aichwaldi</i> Dc.	Boraginaceae	Heliotropes	Pyrrolizidine alkaloids, flavonoids, and terpenoids (Fayed, 2021) ^[25] .	Antimicrobial, antiviral, antitumor, anti-inflammatory, cytotoxicity, phytotoxicity, and biochemically active constituents of various species of the <i>Heliotropium</i> genus (Fayed, 2021) ^[25] .	
26.	<i>Heliotropium supinum</i> Linn.	Boraginaceae	Dwarf heliotrope	Pyrrolizidine alkaloids, flavonoids, and terpenoids (Fayed, 2021) ^[25] .	Inflammation, skin disorders, menstrual dysfunction, rheumatism, and noxious bites (Fayed, 2021) ^[25] .	

27.	<i>Leucas aspera</i> Willd.n	Asteraceae	Thumbai	Triterpenoids, oleanolic acid, α -sitosterol and β -sitosterol, nicotine, ursolic acid, glucoside, novel phenolic compounds (4-(24-hydroxy-1-oxo-5-n-propyltetracosanyl)-phenol) and diterpenes (Kurian, <i>et al.</i> , 2021) ^[41] .	Anti-inflammatory, analgesic, antipyretic, antioxidant, antibacterial and fungicidal properties (Kurian, <i>et al.</i> , 2021) ^[41] .	
28.	<i>Maerua arenaria</i> Hook. F. & Thoms	Capparaceae	Desert caper	Phytochemical: phytosterols, alkaloids, saponins, glycosides, carbohydrates and aminoacids (Thirupathi, <i>et al.</i> , 2019) ^[78]	Used for bleeding piles, as alternative in fevers; as a tonic in muscular debility (Khare, 2007) ^[37] .	
29.	<i>Melothria maderaspatensis</i> (L.) Cogn.	Cucurbitaceae	Madras pea pumpkin	Caffeic, vanillic, ferulic, p-coumaric, coumarin, and gallic acid (Kumar, and Sivasudha, 2012) ^[85] .	Antibacterial, antioxidant, larvicidal, antiulcerogenic, antidiabetic, hypolipidemic, antihypertensive, immunomodulatory and antihepatotoxic (Paramasivam, <i>et al.</i> , 2017) ^[50] .	
30.	<i>Mollugo nudicaulis</i> Lamk.	Molluginaceae	Naked-stem carpetweed	Alkaloid, steroids, flavonoids and reducing sugar (Kumar, and Sivasudha, 2012) ^[85] .	Used to treat whooping cough and jaundice (Kumar and Sivasudha, 2012) ^[85] .	
31.	<i>Nicotiana glauca</i> L.	Solanaceae	Curl-leaved tobacco	Flavonoids, alkaloids, terpenoids, steroids, saponins, etc. (Kumari, <i>et al.</i> , 2017) ^[40] .	Treatment of cuts, wounds, toothache, and rheumatic swelling (Shajib, <i>et al.</i> , 2018) ^[64] .	
32.	<i>Notholaena brachiata</i> Linn. Wight	Amaranthaceae	Minute amaranth	Active compounds; alkaloids, saponins, terpenoids, and various phenolic compounds (Pieczykolan, <i>et al.</i> , 2021) ^[51]	Treatment of urinary calculi (Sutar, <i>et al.</i> , 2021) ^[76] .	
33.	<i>Pergularia daemia</i> (Forsk.) Blatt & Mc C	Asclepiadaceae	Trellis vine	various pharmacological activities like hepatoprotective, antifertility, anti-diabetic, analgesic, antipyretic and anti-inflammatory Phytochemically cardenolides, alkaloid and saponins (Chandak, <i>et al.</i> , 2019) ^[20] .	Anti-inflammation, analgesic, antipyretic, antioxidant, anticancer, antidiabetic, hepatoprotective, antibacterial, antifungal and central nervous system depressant activity (Chandak, <i>et al.</i> , 2019) ^[20] .	
34.	<i>Peristrophe bicalyculata</i> (Ritz.) Nees	Acanthaceae	Panicled foldwing	Gallic acid, dipeptides, diterpenoids and flavones (Abdulazeez, <i>et al.</i> , 2022) ^[11] .	Anticancer therapies for a variety of human cancers, including cervical cancer (Abdulazeez, <i>et al.</i> , 2022) ^[11] .	
35.	<i>Phyla nodiflora</i> (L.) Greene	Verbenaceae	Frog fruit	Anodyne, antibacterial, diuretic, parasiticide, refrigerant, febrifuge and cooling. P. nodiflora has plenty of bioactive compounds (Suky, <i>et al.</i> , 2019) ^[73]	Treat urinary disorder, lithiasis, knee joint pain, diuresis and swelling (Sharma, <i>et al.</i> , 2020) ^[66] .	

36.	<i>Pluchea lanceolata</i> Cl.	Asteraceae	Rasna	Anti-inflammatory activity, antigonadotrophic, immune osuppressive, analgesic, anti-neoplastic, anti-malarial and antioxidant (Singh, <i>et al.</i> , 2021) ^[72] .	Anti-inflammatory, antiarthritic, and analgesic properties and is extensively employed in treating rheumatoid arthritis, cough, neurological diseases, edema, sciatica, psoriasis, bronchitis, dyspepsia, and piles (Singh, <i>et al.</i> , 2021) ^[72] .	
37.	<i>Polygonum plebium</i> R. Br.	Polygonaceae	Small knotweed	Anti-inflammatory, essential oils, alkaloids tannins, and flavonoids (Ahsan, <i>et al.</i> , 2021) ^[4] .	Liver disease, inflammation, dysentery, eczema and ringworms (Ahsan, <i>et al.</i> , 2021) ^[4] .	
38.	<i>Ploypogon monspleniensis</i> Desf.	Poaceae	Annual beard grass	Anti-inflammatory, 'Withanolides, antibiotics and antitumor and anxiolytic antidepressant activities (Fatima, <i>et al.</i> , 2019) ^[24] .	Used to treat hypertension, anti-inflammatory, anthelmintic, \ diuretic and antioxidant (Fatima, <i>et al.</i> , 2019) ^[24] .	
39.	<i>Potentilla supine</i> Linn.	Rosaceae	Spreading cinquefoil	Flavonoids, tannins, triterpenes and phenolic compounds (Augustynowicz, <i>et al.</i> , 2021) ^[11] .	Anti-anthelmintic effects on the cardiovascular system (Augustynowicz, <i>et al.</i> , 2021) ^[11] .	
40.	<i>Pulicaria crispa</i> She. Bip	Asteraceae	False fleabane	Monoterpenes, sesquiterpene acetylenes, flavonoids, isocomene, alkaloids, glycosides, comarins, and tannins (Mohamed, <i>et al.</i> , 2020) ^[47]	Conventional medicine for the cure of heart diseases, inflammation, antimicrobial agent, as an insect repellent, for the treatment of colds, coughs, colic, excessive sweating, and as carminative (Mohamed, <i>et al.</i> , 2020) ^[47]	
41.	<i>Ranunculus scleratus</i> Linn.	Ranunculaceae	Celery leaved buttercup	Therapeutic effect on cholestasis, higher efficiency and anti-inflammatory cytokines (Zhang, <i>et al.</i> , 2020) ^[84]	Treat a variety of cholestasis related liver diseases including primary biliary cirrhosis, primary sclerosing cholangitis, intrahepatic cholestasis of pregnancy, drug induced liver injury, and cystic fibrosis (Zhang, <i>et al.</i> , 2020) ^[84] .	
42.	<i>Rumex dentatus</i> L. (Roth)	Polygonaceae	Toothed dock and Aegean dock	Flavonoids and anthraquinones as major chemical constituents of this genus (Batoool, <i>et al.</i> , 2017) ^[14]	It has anticancer properties (Batoool, <i>et al.</i> , 2017) ^[14]	
43.	<i>Solanum surattense</i> Burm. F	Solanaceae	Wild eggplant yellow berried nightshade	Alkaloids, flavonoids, phenols, and steroids (Tekuri, <i>et al.</i> , 2019) ^[77] .	Antimicrobial, anihelmenthic, antihyperglycemic, hypolipidemic, cardiovascular protective effect, antiulcer, wound healing, uriolithiatic, and antifertility (Tekuri, <i>et al.</i> , 2019) ^[77] .	
44.	<i>Sonchus arvensis</i> Linn	Asteraceae	Sow thistle	Flavonoids, coumarin, taraxasterol, phenolic acids, ascorbic acid, and terpenoids are detected in this plant (Wahyuni, <i>et al.</i> , 2021) ^[82] .	Antioxidant, uric acid-lowering, anti-inflammatory, immuno modulatory and antibacterial activity. In addition, callus has antimalarial activity (Wahyuni, <i>et al.</i> , 2021) ^[82] .	

45.	<i>Sueda maritime</i> Linn. Dumort	Chenopodiaceae	Herbaceous seepweed	Tetradecanyl dihydro caffeate, n-nonanyl-n-octadec-9-enoate and n-hexadecanyl dihydrocaffeate. (Bilal, and Hossain, 2019) ^[17] .	Antimicrobial activity, antiviral, hepatoprotective and antioxidant activity (Bilal, and Hossain, 2019) ^[17] .	
46.	<i>Tamarix dioca</i> Roxb.	Tamaricaceae	Red tamarix	Phenolic acids, flavonoids, and tannins constitute the main phytochemicals of these plants. (Bahramsoltani, <i>et al.</i> , 2020) ^[13] .	It is used for gastrointestinal disorders, wounds, diabetes, and dental problems (Bahramsoltani, <i>et al.</i> , 2020) ^[13] .	
47.	<i>Tribulus terrestris</i> Linn.	Zygophyllaceae	Land-caltrops	Chemical constituents, such as flavonoids, flavonol glycosides, steroidal saponins, and alkaloids. (Tkachenko, <i>et al.</i> , 2020) ^[79] .	Used as a diuretic, aphrodisiac, antiurolithic, immunomodulatory, antihypertensive, antihyperlipidemic, antidiabetic, hepatoprotective, anticancer, anthelmintic, antibacterial, analgesic, and anti-inflammatory (Tkachenko, <i>et al.</i> , 2020) ^[79] .	
48.	<i>Tridax procumbens</i> Linn.	Asteraceae	Tridax daisy	Bioactive compounds glycosides, nitrogenous organic compounds, fat-soluble compounds, polyphenolic compounds, and minerals. (Beck, <i>et al.</i> , 2018) ^[15] .	Treat anemia, inflammation, and hepatopathies also an antibacterial, antifungal, and antiviral treatment as well as for vaginitis, stomach pain, diarrhea, mucosal inflammations, respiratory infections, high blood pressure, and diabetes, (Beck, <i>et al.</i> , 2018) ^[15] .	
49.	<i>Verbascum Thapsus</i> Linn.	Scrophulariaceae	Great mullein	Saponins, monoterpene glycosides, iridoids, phenylethanoid glycosides, neolignan glycosides, flavonoids, steroids, spermine alkaloids, phenolic acids, and fatty acids (Prakash, <i>et al.</i> , 2016) ^[54] .	Used to treat various respiratory problems such as bronchitis, dry coughs, whooping cough, tuberculosis, asthma and hoarseness (Prakash, <i>et al.</i> , 2016) ^[54] .	
50.	<i>Withania somnifera</i> (L.) Dunal	Solanaceae	Winter cherry	14 such elements are considered to influence the state of health and diseases of animals, plants and human beings. These elements are Fe, Cu, Co, Ni, Zn, Mg, Mn, Mo, Cr, V, Li, Se, F and I (Shirin, <i>et al.</i> , 2016) ^[69] .	Useful in vitiated conditions of vata, leucoderma, constipation, insomnia, tissue building and nervous breakdown (Shirin, <i>et al.</i> , 2016) ^[69] .	
51.	<i>Xanthium Strumarium</i> Linn.	Asteraceae	Rough cocklebur	<i>X. strumarium</i> contain Phenylpropanoids, lignanoids and coumarins, Sesquiterpenoids and Triterpenoids, Steroids, Glycosides, Flavonoids, Thiazides (Fan, <i>et al.</i> , 2019) ^[23] .	Treatment of nasal diseases itching diseases, and painful diseases (Fan, <i>et al.</i> , 2019) ^[23] .	

Result and Discussion

The information of medicinal plants was collected through personal observations by the experts. In total no. of 51 plant species belonging to 34 families were reported for the uses of medicinal purposes. Asteraceae was found to be dominant family in terms of species in the river bank area with 14 species, other families were also found in this area poaceae 5, Chenopodiaceae 3, Euphorbiaceae 3, Polygonaceae 3, Cyperaceae 3, Solanaceae 3, Euphorbiaceae 1, Papilionaceae

1, Amaranthaceae 2, Lythraceae 1, Primulaceae 1, Caryophyllaceae 1, papaveraceae 1, Elatinaceae 1, Asclepiadaceae 2, Cannabaceae 1, Vitaceae 1, Capparidaceae 1, Commelinaceae 1, Tiliaceae 1, Boraginaceae 2, Capparaceae 1, Scrophulariaceae 2, Cucurbitaceae 1, Convolvulaceae 1, Molluginaceae 1, Acanthaceae 1, Verbenaceae 1, Rosaceae 1, Ranunculaceae 1, Tamaricaceae 1, Araceae 1 and Zygophyllaceae 1 were showed in fig: 1.

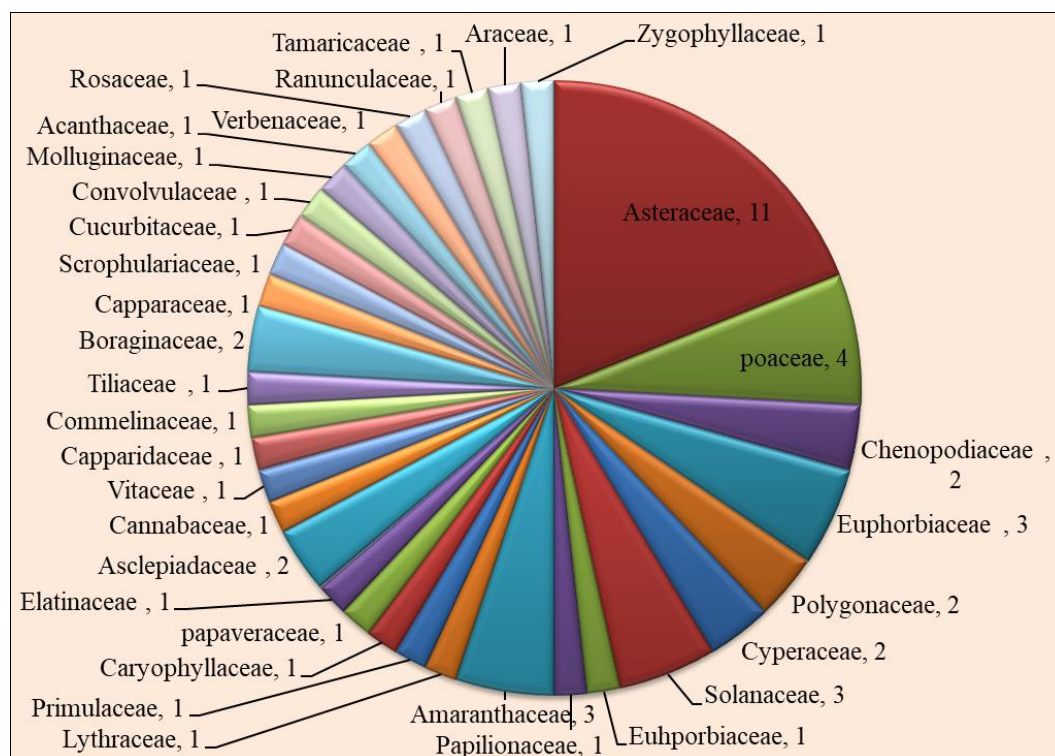


Fig 1: The total number of medicinal plant species was found in this Agra region

In this study a total of 52 plant species of medicinal plants and 34 families were collected from near Yamuna river. The most frequently utilized plant parts for the preparation of remedies were leaves (17%), followed by fruit (9%), seed (11%), root (2%) stem (1%), bark (4%), flower (2%) bulb (2%) and whole plant (7%). Familial groups global are using the leaves for the preparation of herbal medicine (Amri and Kisangau, 2012;

Ullah *et al.*, 2013; Morvin *et al.*, 2015) ^[9, 80] because they are very easy to collect when compared to other plant parts (Giday *et al.*, 2009) ^[28] The scientific purpose is that the photosynthetic reaction and secondary metabolite production tends to be higher in leaves than other parts of the medicinal plant (Prabhu *et al.*, 2021) ^[52] showed in fig: 1

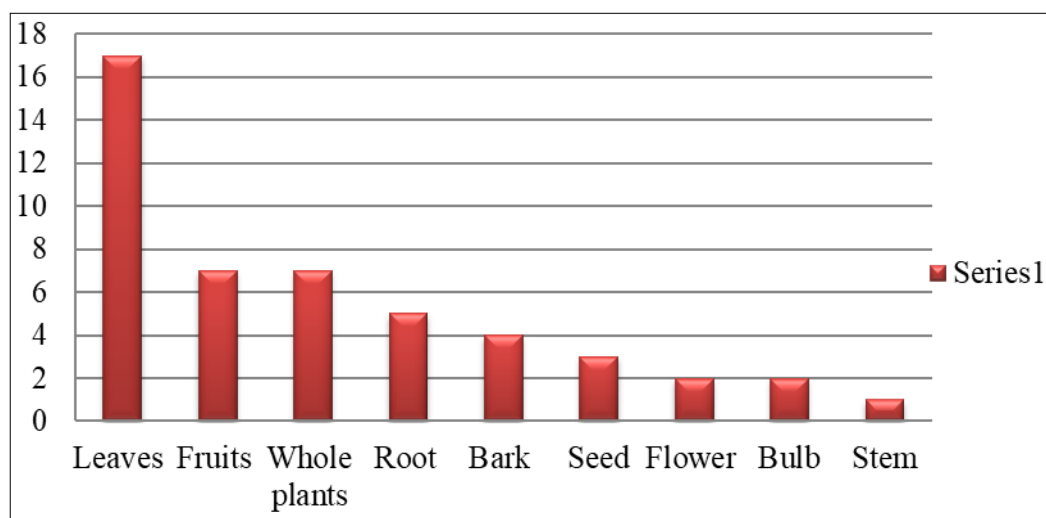


Fig 2: The total plant parts used in treatment of different disease (Singh *et al.*, 2022) ^[71]

Conclusion

Medicinal plants are the natural strength care to the people. Their major therapy of diseases is based upon deep observation of nature and their understanding of traditional knowledge of medical practices. Native persons of Uttar Pradesh greatly use these habitually effortlessly available medicinal plants for health which are less expensive without side effects. The zone is rich in medicinal plants and these plants are still commonly used for medicinal purposes among the people in their daily lives. However, there is a gradual loss of traditional knowledge about these plants in new generation.

This study provides basis for the conservation of the local flora, its use as food and medicine. It also provides various socio-economic dimensions associated with the common people.

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