JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Medicinal Plants and Their Medicinal Utility Found in Bijnor District (U.P)

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Abstract: The plant species observed in the area have immense potential for the management and treatment of various ailments. The present paper reports to the documentation and conservation of ethnomedicinal plants of Bijnor district and their socio-economic relationship with the forest and its resources. This data was collected through a series of interview of old men and women and traditional healer with the help of a semi-structured questionnaire. The analysis of the data revealed that the 40 plant species belonging to 29 families are used for treating the routine maladies. Important medicinal plants belonging to different families are documented in the present ethnobotanical study. The plants were significantly useful in the treatment of diabetes, antispasmodic respiratory, kidney disorder, dysentery, leprosy, dyspepsia, eye disorders, fever, cold, cough, rheumatism, pain, asthma, piles, indigestion, skin diseases, asthma and urinary tract infection etc.

***IndexTerms* – Medicinal plants, Bijnor region, Traditional knowledge**

INTRODUCTION

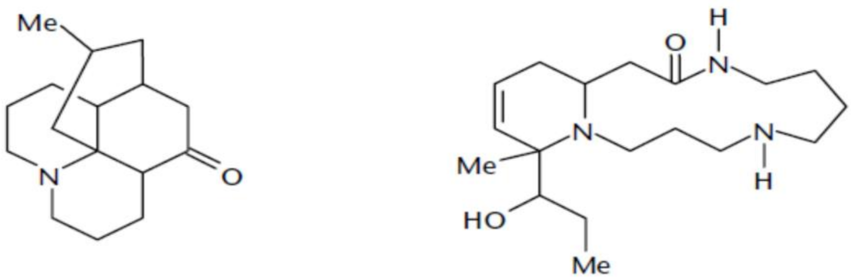
The man has dependent on nature particularly on the plants for its substances and survival since his existence on earth. In ancient times, he knew how to relieve his sufferings by using the plants growing around him. The civilizations records show that a number of drugs today were already in use during ancient time. Its credit goes to Indian Rishies and physicians who were acquainted with a large number of medicinal plants compared to other countries (Brahman and Saxena 1989, Jain 1981, Kathikeyani 2003, Malkhuri et al 1998, Singh and Khan 1989, Yadav and Patel, 2001, Yadav et al., 2003). Plants have been used in traditional medicine for thousands of years. During last few years there has been of medicinal utility for the development of new drugs. The knowledge of medicinal plants has accumulated over the course of many centuries and has been documents in different medicinal system such as Ayurveda and Unani. All the medicinal plants have very important chemical constituents. Physiologically active plant constituents are usually classified by their chemical structure rather than specific actions. The list here will assume a certain degree of chemical knowledge:

- Alkaloids
- Anthocyanins
- Anthraquinones
- Coumarins
- Cyanogenic Glycosides
- Flavonoids
- Glucosilinates
- Phenols
- Saponins
- Tannins

Alkaloids

Alkaloids are basic (alkali-like), nitrogen-containing organic constituents found in some plants. Alkaloids are organic bases. Many alkaloids are poisonous, others are addictive (e.g., cocaine), and some are used clinically (e.g., morphine). More than 10,000 alkaloids are now known, the first discovered being narcotine isolated from opium by Derosne in 1803. Alkaloids exist as salts in the cell sap. They may be extracted from the cell with acidified water or alcohol, or alternatively they are soluble in organic solvents (e.g., chloroform) when the plant is rendered alkaline.

Chemistry: Alkaloids are normally classified according to the heterocyclic ring system they possess, but some authors prefer a classification based on their biosynthetic origins from amino acids, e.g., phenylalanine, tyrosine or tryptophan. Occurrence in the plant kingdom alkaloids is common in the Angiosperms (Mono- and Dicotyledons), but rare in lower plants, although there are exceptions, for example pacletaxel from yew (a Gymnosperm), lycopodine from Lycopodium and palustrine from Equisetum (both Pteridophytes), and even fungi, e.g., ergometrine (Claviceps).These structures are shown in Figure 1 (Jack J wooly, 2001.)



Lycopodine Palustrine

Figure 1: Structure of Lycopodine and Palustrine

Anthocyanins

Anthocyanins are the most abundant and widespread of the flavonoid pigments. They absorb light at the longest wavelengths, and are the basis for most orange, pink, red, magenta, purple, blue and blue-black floral colors. Key to providing such color diversity is the degree of oxygenation of the anthocyanidins (the central chromophores of the anthocyanins) and the nature and number of substituents (e.g., sugar moieties) added to these chromophores (JI Yubin; Yu Miao; Wang Bing and Zhang Yao, 2014).

Chemistry: At a primary level, the degree of oxygenation of the B-ring has the greatest impact on the colour of anthocyanin pigments. Most anthocyanins are derived from just three basic anthocyanidin types: Pelargonidin, Cyanidin and Delphinidin. The difference between them is in the number of hydroxyl groups on the B-ring.

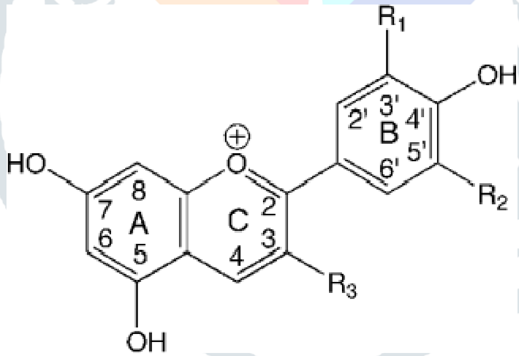


Figure 2: Basic structure of a main anthocyanidins. R1, R2 and R3 substitutions determine the various common anthocyanidins. The common 3-hydroxyanthocyanidins (R3= OH) are Pelargonidin (R1=H and R2=H), Cyanidin (R1 =OH and R2=H), Delphinidin (R1 =OH and R2 = OH)

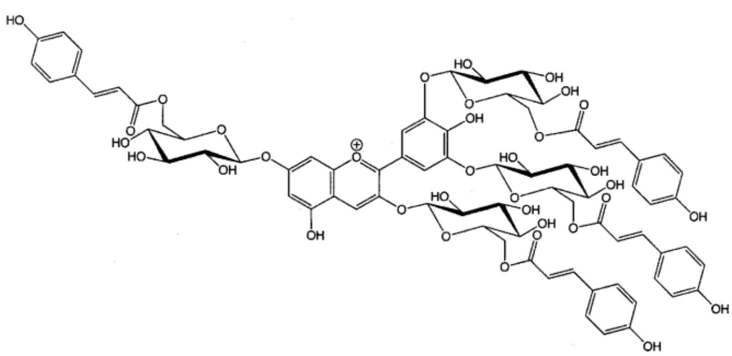


Figure 3: Example of a complex anthocyanin structure; delphinidin3,7,30, 50 -tetra-(6-O-p-coumaroyl-b-glucoside)

An increased number of hydroxyl groups on this ring have a bluing effect on the colour manifested by the anthocyanin. In general, there is a strong correlation between the flower colour and the predominant type of anthocyanin that accumulates. Orange and pink colours tend to be based on pelargonidin derivatives, magenta colours on cyanidin derivatives and purple and blue colours on delphinidin derivatives. Flowers can also accumulate mixtures of anthocyanin types, providing further variation in colour. Anthocyanin pigments have been administered to remedy vision disorders, enhance visual acuity, and increase capillary resistance and improving eyesight, including night vision. Retinopathy and cataracts, serious consequences of diabetes mellitus, can be combated using plant-derived anthocyanin pigments. Anthocyanins were found to confer significant protection from oxidative stress and to be highly bioavailable in endothelial cells, which has direct relevance to atherosclerosis and neurodegenerative disorders. Anthocyanins (and the aglyconecyanidin) were noted to inhibit cycloxygenase enzymes, which can be one marker for the initiation stage of carcinogenesis. Recently, both the anthocyanins and cyanidinaglycone from tart cherries reduced cell growth of human colon cancer cell lines (JI Yubin; Yu Miao; Wang Bing and Zhang Yao, 2014).

Anthraquinones

Anthraquinones are commonly found as glycosides in the living plant and several groups are distinguished based on the degree of oxidation of the nucleus and whether one or two units make up the core of the molecule. These are derivatives of phenolic and glycosidic compounds. They are solely derived from anthracene giving variable oxidized derivatives such as anthrones and anthranols. The anthrones and less oxygenated than the anthraquinones and the dianthrones are formed from two anthrone units (Xianliwu, Gary r. Beecher; Joanne M. Holden et al, 2006).

Anthraquinone occurs naturally in certain plants, fungi and insects and it contributes to the coloring pigment of such organisms. Due to this property, the compound is used commercially to manufacture dyes. In powdered form, anthraquinone exhibits a color that ranges from gray to yellow and green. However, it produces a variety of different colored dyes, including alizarin (red), oil blue A and oil blue 35, quinizarine green SS and solvent violet. Anthraquinone is a derivative of anthracene, a coal-tar byproduct characterized by a chemical structure consisting of a polycyclic aromatic hydrocarbon and three fused rings of benzene.

Chemistry: Anthraquinone, also called anthracenedione or dioxoanthracene is an aromatic (a hydrocarbon characterized by general alternating double and single bonds between carbons) organic compound. This compound is an important member of the quinone family. Quinone is a class of organic compounds that are formally derived from aromatic compounds. The term is also used in the more general sense of any compound that can be viewed asan anthraquinone with some hydrogen atoms replaced by other atoms or functional groups. These derivatives include many substances that are technically useful or play important roles in living beings. Anthraquinone is identified by many other names, such as anthrachinon, dioxoanthracene, and several different trade names, including Hoelite and Corbit.

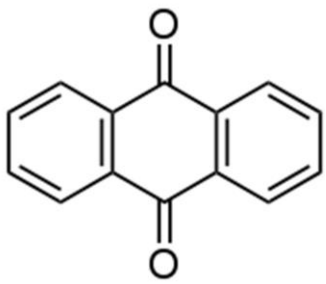


Figure 4: Structure of 9,10–Anthraquinone

Coumarins

Coumarin was isolated from the seed of D. odorata. Coumarins are secondary metabolites of higher plants, few microorganisms (bacteria and fungi), and sponges. Coumarins are found free or as heterosides in many dicotyledonous families, including the Apiaceae, Asteraceae, Fabiaceae, Moraceae, Rosaceae, Rubiaceae, Rutaceae and Solanaceae. Many monocotyledonous plants, especially the Gramineae and orchids, also contain large amounts of coumarins. Although mainly synthesized in the leaves, coumarins occur at the highest levels in the fruits, followed by the roots and stems. In addition, seasonal changes and environmental conditions may affect the occurrence in various parts of the plant. The distribution of biologically active coumarins in a wide range of plants seems to correlate with their ability to act as phytoalexins, i.e., they are formed as a response to traumatic injury, during the wilting process, by plant diseases or through drying, they accumulate on the surface of the leaves, fruits and seeds and they inhibit the growth and sporulation of fungal plant pathogens and act as repellents against beetles and other terrestrial invertebrates.

Furanocoumarins

These compounds consist of a five-membered furan ring attached to the coumarin nucleus, divided to linear and angular types with substituents at one or both of the remaining benzenoid positions.

Pyranocoumarins

Members of this group are analogous to the furanocoumarins, but contain a six-membered ring coumarins substituted in the pyrone ring. Like other phenylpropanoids, coumarins arise from the metabolism of phenylalanine via a cinnamic acid, p-coumaric acid (Mohammad Asif, 2015).

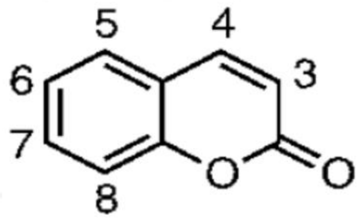


Figure 5: Structure of Coumarin

Cyanogenic Glycosides

Cyanogenic glycosides are widely distributed among 100 families of flowering plants. They are also found in some species of ferns, fungi and bacteria. There are manyeconomical important plants highly cyanogenic, including white clover, linum, almond, sorghum, the rubber tree and cassava (Ilza A Francisco and Maria Helena, 2006).

Chemistry: Cyanogenic glycosides have a chemical structure that contains one carbon with a cyanide group linked to a sugar (“glyco” means sugar). During digestion, the cyanide group is released and forms hydrocyanic acid (HCN) known as prussic acid. Cyanogenesis is the ability of some plants to synthesize cyanogenic glycosides, which when enzymically hydrolyzed, release cyanohydric acid (HCN), known as prussic acid. There is strong evidence that cyanogenesis is one of the mechanisms that can serve to the plant as a protective device against predators such as the herbivores. The level of cyanogenic glycosides produced is dependent upon the age and variety of the plant, as well as environmental factors. It is usual to find cyanogenic and acyanogenic plants within the same species, where the function of cyanogenesis is revealed through their phenotypic characteristics. Cyanogenesis may not necessarily be used for plant survival; it may take part in metabolic and excretory processes but there certainly is a characteristic of value for these species.

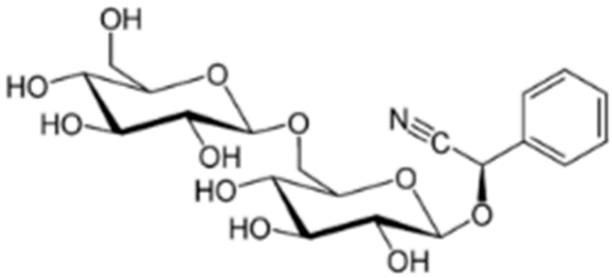


Figure 6: Amygdalin structure

Natural Phenolics: Phenolics acids and Flavonoids

Phenolics are compounds possessing one or more aromatic rings with one or more hydroxyl groups. They are broadly distributed in the plant kingdom and are the most abundant secondary metabolites of plants, with more than 8,000 phenolic structures currently known, ranging from simple molecules such as phenolic acids to highly polymerized substances such as tannins. Plant phenolics are generally involved in defense against ultraviolet radiation or aggression by pathogens, parasites and predators, as well as contributing to plants’ colors.
Phenolic compounds are a large class of plant secondary metabolites, showing a diversity of structures, from rather simple structures, e.g., phenolic acids, through polyphenols such as flavonoids, that comprise several groups, to polymeric compounds based on these different classes. Phenolic compounds are important for the quality of plant-based foods: they are responsible for the color of red fruits, juices and wines and substrates for enzymatic browning, and are also involved in flavor properties. In particular, astringency is ascribed to precipitation of salivary proteins by polyphenols, a mechanism possibly involved in defense against their anti-nutritional effects.

Chemistry: Phenolic acids can be divided into two classes: Derivatives of benzoic acid such as gallic acid, and Derivatives of cinnamic acid such as coumaric, caffeic and ferulic acid.

Caffeic acid is the most abundant phenolic acid in many fruits and vegetables, most often esterified with quinic acid as in chlorogenic acid, which is the major phenolic compound in coffee. Another common phenolic acid is ferulic acid, which is present in cereals and is esterified to hemicelluloses in the cell wall (Ioannis Prassas; Eleftherios P, Diamandis. Novel, 2008).

Flavonoids are the most abundant polyphenols in our diets. The basic flavonoid structure is the flavan nucleus, containing 15 carbon atoms arranged in three rings (C6-C3-C6), which are labeled as A, B and C. Flavonoid are
themselves divided into six subgroups: flavones, flavonols, flavanols, flavanones, isoflavones, and anthocyanins, according to the oxidation state of the central C ring. Their structural variation in each subgroup is partly due to the degree and pattern of hydroxylation, methoxylation, prenylation, or glycosylation.

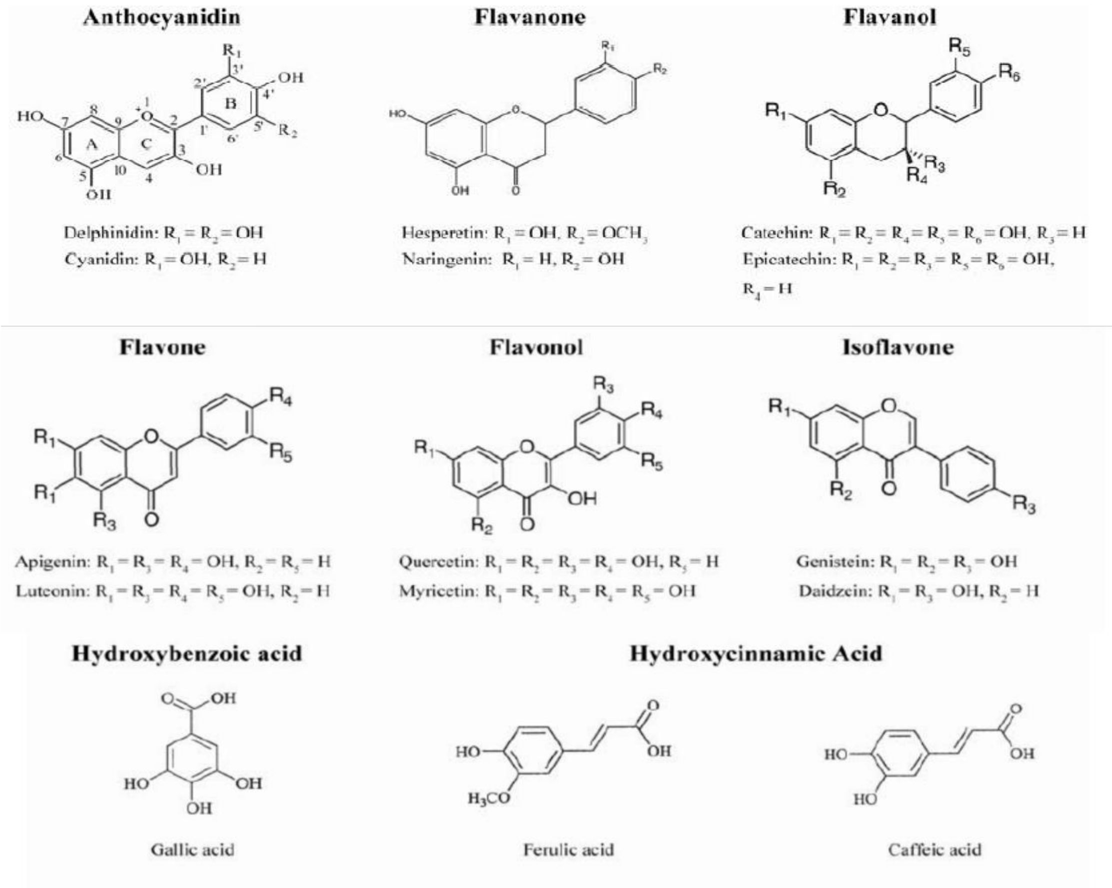


Figure 8: Structure of phenolics acids (flavonoids)

Saponins

Saponins are natural high-molecular-weight glycosides of triterpene or steroids with a very wide distribution in the plant kingdom, as well as in lower marine animals, such as starfish. In the past, saponins were characterized according to their surface-active properties and ability to form persistent foams. There are two types of this constituent, namely steroidal saponins and triterpenoidsaponins. The latter are strong expectorants. Expectorants are agents that increase bronchial secretions and facilitate their expulsion through coughing, spitting or sneezing. These agents can also aid in nutrient absorption. Steroidal saponins have a marked effect on hormonal activity. Plants like Liquorice contain saponins ((Veena Sharma and Ritu Paliwal, 2013).

Chemistry: Saponins are glucosides with foaming characteristics. Saponins consist of a polycyclic aglycones attached to one or more sugar side chains. The aglycone part, which is also called sapogenin, is either steroid (C27) or a triterpene (C30). The foaming ability of saponins is caused by the combination of a hydrophobic (fat-soluble) sapogenin and a hydrophilic (water-soluble) sugar part. Saponins have a bitter taste. Some saponins are toxic and are known as sapotoxin..

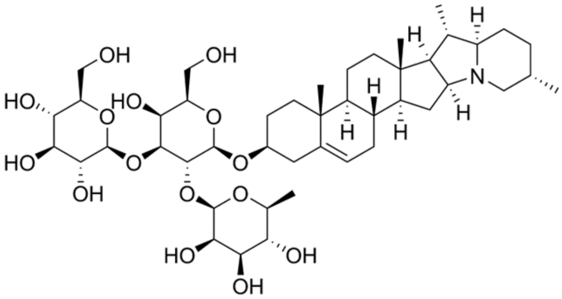


Figure 9: Chemical structure of the saponin- Solanine

Tannins: According to their chemical structure and properties, tannins are divided into two main groups: Hydrolysable (HT) and Condensed tannins (CT). The characteristics of the two groups are different in molecular weight, structure and produce a different effect on the herbivorous animals especially on ruminant when ingested. According to the chemical structure of HTs (gallotannins and ellagitannins) are molecules which contain a carbohydrate, generally D-glucose, as a central core. The hydrolysable groups of these carbohydrates are esterified with phenolic groups, such as ellagic acid or gallic acid. Hydrolysable tannins are usually found in lower concentrations in plants than CTs. Hydrolysable tannins are subdivided into taragallotannins (gallic and quinic acid) and caffetannins (caffeic and quinic acid). They are hydrolyzed by tanninase enzymes which engage in ester bond hydrolysis. HTs can form compounds such as pyrogallol which is toxic to ruminants. Toxic compounds from more than 20% HT in the diet can cause liver necrosis, kidney damage with proximal tuberal necrosis, lesions associated with hemorrhagic gastroenteritis and high mortality, which were observed in sheep and cattle. Hydrolysable tannins can also affect monogastrics by reducing growth rates, protein utilization and causing damage to the mucosa of the digestive tract and increasing the excretion of protein and amino acids.

Condensed tannins (CT or proanthocyanidins), are the most common type of tannins found in forage legumes, trees and stems. These types of tannins are widely distributed in legume pasture species such asLotus corniculatus and in several kinds of acacia and other plant species. Condensed tannins have a varietyof chemical structures affecting their physical and biological properties. They are consisting of flavonoid units (flavan-3-osl) linked by carbon-carbon bonds. The complexity of CT depends on the flavonoid units which vary among constituents and within sites for interflavan bond formation. The term proanthocyanidins (PAs) is derived from the acid-catalyzed oxidation reaction producing red anthocyanidins upon heating PAs in acidic alcoholsolutions. Anthocyanidin pigment is responsible for the colors observed in flowers, leaves, fruits juices and wines. The astringent taste of some leaves, fruits and wines is due to the presence of tannin (Shahin Hassanpour; Naser Maheri-Sis; Behrad Eshratkhah and Farhad Baghbani Mehmandar 2011).

The world Health Organization (WHO) estimated that about 70% of the population of most developing countries relies on medicinal value for their primary health care (Azaizehet etal, 2003). The development of new products from natural sources is also encouraged because it is estimated that of the 300,000 plant species that exists in the world, only 15% have been evaluated to determine their pharmacological potential (De Luca, V Salim, V, Atsumi SM, YuF 2012).
Documenting the in indigenous knowledge through ethnobotanical studies is important for the conserving and utilization and biological recourses. The medicinal value of Bijnor region is very important and acknowledgeable all over the Uttar Pradesh. This science showed healthy relationship between human and nature provides possibilities of finding user for medicinal plants and can be used to discover new medicines derived from plant origin. (Henrich, 2000).
Bijnor district is more studied region of India for its ethnobotanical tree and other plants resources found in this area. These are the principal sources of medicine for the treatment of various diseases. But due to overgrazing and industrialization many plants become rare in this area. Present study report shows that the area needs conservative and regeneration strategies of the rare medicinal plants and their pharmacological importance in modern medicine system

RESEARCH METHODOLOGY

Materials and Methods

Present study was conducted to identify ethnomedicinal plants. The area under investigation for ethnomedicinal studies falls under largest district -Bijnor (U.P), India. The work was undertaken through field study carried out throughout the season of January 2020 to January 2022 in various area of Bijnor.

Firsthand information about the medicinal uses of plants was collected from the traditional healers, vaidhyas, hakims, tribes and older rural people. Most of the informants were reluctant to reveal any information but a few consented for collection from the forest and for the interviews. The cultivator of village Agri, Vivek College of Bijnor, Jhalu, Haldaur, Najibabad area, kiratpur, Chandpur village area, pipli, jalilpur etc.

Bijnor occupies the north-west corner of the Moradabad division. The western boundary is formed throughout by the deep stream of River ganges beyond which lie the four districrs of Dehradun, Saharanpur, Muzaffarnagar, Meerut. The district lies between $29^0$2`- $29^0$58` latitude and $78^0$0`- $78^0$ 59`E longitude. It covers an area of 4561 Km. Major part of district forms a part of Indo-gangetic alluvium. Climatically the area is dry tropical type. The summer temperature ranges between 20 ^{0}C to 42 ^{0}C and winter between 8 ^{0}C to 17 ^{0}C. The temperature in winter below 5 ^{0}C. The average rainfall is 1065 mm. The forest is of tropical dry deciduous type covering an area of 2447 cm^2.

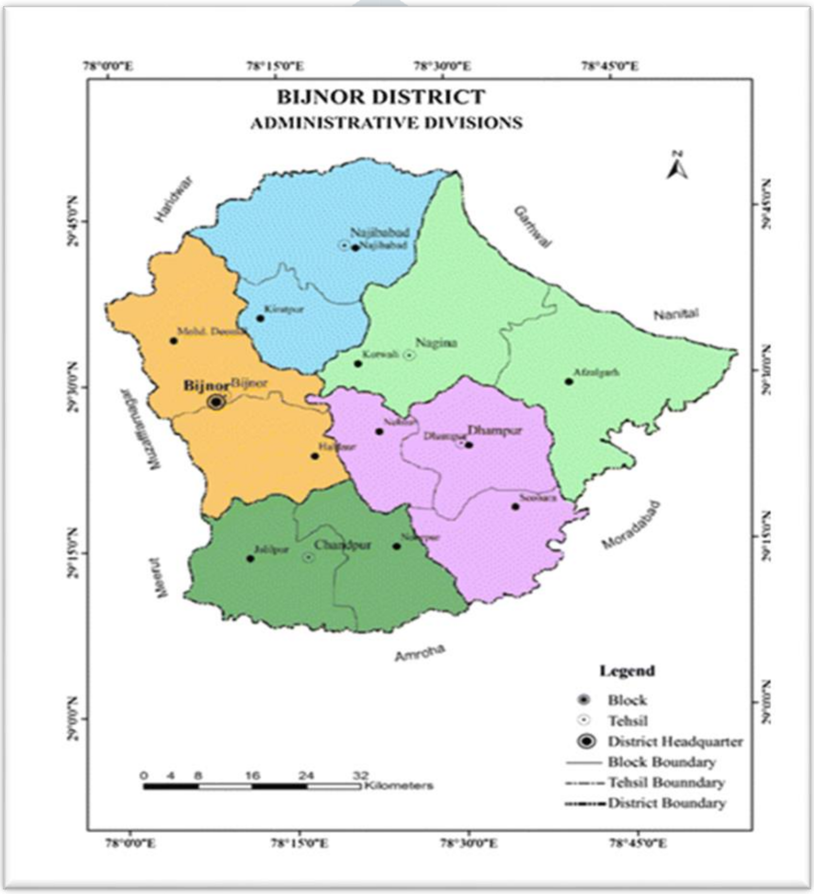


Figure 10: Map of District Bijnor

The methods used for ethnobotanical data collection were semi-structured interviews with the questionnaire based upon health problems, diagnosis and treatment methods, local names of medicinal plants, plants parts used methods of application, treats to medicinal plants and conservation practices were carefully recorded. During field survey, observation on the habit, habitat, flowering time, fruiting time, fragrance and colour of bark was recorded. It has also noticed that which part of plant is useful for medicine. The medicinal plants were identified, photographed and sample specimen was collected for the preparation of herbarium. The status of all the medicinal plants was recorded as abandoned and rare as per healer's perception during the semi structure interview.

RESULT AND DISCUSSION

The increasing demand of medicinal plants has resulted in the dwelling of the natural resources mainly for deforestation and other anthropogenic influence. The local uses of plants as a cure are common particularly in those areas which have little or no access to modern health services. The indigenous traditional knowledge of medicinal plants of various ethnic communities, where it has been transmitted orally for centuries is fast disappearing due to the advent of modern technology and transformation of traditional culture. Therefore, the collection of information about natural flora classification, management and use of plants by the people holds importance among the ethnobotanists. Plant chemistry includes the miracle of photosynthesis, plant respiration, structure, growth, development, and reproduction. Much of the chemical basis of life is common to both plants and animals. From a holistic perspective the whole of the plant must be respected as an integrated biologically evolved unit that is beyond the analytical comprehension of science [Venketeshwer Rao (Ed.), Marisa Marciano].

The ethnomedicinal data on 40 plants species belonging to 29 families, during summer, rainy and winter seasons. The most commonly represented families are Papillionacea, solanacea, Euphorbiacea, Combretacea, Acanthacea etc. For each species the following ethnomedicinal information was provided: botanical name, local name, plant parts and their ethnomedicinal use in the treatment of disease. The details are given in Table 1.

Table 1: Medicinal plants & their medicinal utility found in Bijnor District (U.P.)

S. N	Ayurvedic Name	Botanical Name & Family	Local Name	Flowering & Fruiting	Part used	Medicinal Uses
1.	Aamlaki Tree	Emblica officinalis Euphorbiaceae	Amla	Flower=February- may Fruit= October-April	Fruit	Good Vitamin – C source, Anoraxia, Cough, Diabetes, constipation, hyper acidity, heart tonic.
2.	Ashok Tree	Saraca asoca (Roxb.) Fabaceae (Papilionaceae)	Ashok	March-September	Bark, Flower	Menstrual Pain, uterine, disorder, Diabetes.
3.	Vasa Herb	Adhatoda vasica Nees Acanthaceae	Adusa	December-April	Whole Plant	Antispasmodic, respiratory, Stimulant.
4.	Aswagandha Herb	Withania Somnifera Fam: Solanaceae	Asgandh	October-february	Root, Leaves	Restorative Tonic, stress, neurological disorder, aphrodisiac.
5.	Bilva Tree	Aegle marmelous Fam: Rutaceae	Bael	May-June	Fruit, Bark	Diarrrhoea, Dysentry, Constipation.
6.	BhumiAmlaki Tree	Phyllanthous amarus Fam : Euphorbiaccac	Bhuiavala a	October-february	Whole Plant	Anemia, jaundice, Dropsy.
7.	Patha Climber	Cissampelos pareira/ Stephania japonica Linn. Menispermaceae	Nemuk/Birbsi	August – November	Root	Diarrhoea, Burning sensation, wound healer,
8.	Aprajita Climber	Clitoria ternatea Linn. Fabaceae (Papilionaceae)	Gokarni	November-February	Root	Chronic Bronchitis
9.	Amarbel Climber	Cuscuta reflexa Roxb. Cuscutaceae	Akashbel	October-February	Whole plant	Belching and Stomachache
10.	Tilaparni Herb	Cleome gynandra Linn. Capparidaceae	Hulhul	August-November	Seed, Leaves, Root	Earache (otalgia), convulsions, Osteoarthritis, Elephantiasis
11.	Shleshmatak Tree	Cordia dichotoma Boraginaceae	Lassora	March-June	Bark, Fruit	Bitter tonic, Intrinsic haemorrhage, Ulcers, Wound, Cough.
12.	Kaasamarda Herb	Cassia occidentalis Linn. Caesalpiniaceae	Kasondi	June-November	Leaves, Seed, Moola	Whooping cough, Epilepsy, Leprosy
13.	Parijaat Tree	Nyctanthes arbortristis Linn. Oleaceae	Harsingar	August-January	Leaves, flowers	Malarial fever, Sciatica pain.
14	Vanya Tulsi Herb	Ocimum canum Sims. Lamiaceae	Vantulsi	November-February	Whole plant	Migraine, Cough, Cold, bronchitis, expectorant.
15	Changeri Herb	Oxalis corniculata Linn. Oxalidaceae	Khatti-Meethi	throughout the year	Whole plant	Skin eruptions, alopecia and wounds
16	Til Herb	Sesamum indicum Linn. Pedaliaceae	Til	August-November	Seed	Bruises
17	Kantakari Thorny herb	Solanum surattense Burm.	Neeli Kateli	December – June	Root, fruit	Cough-cold, Amenorrhoea,

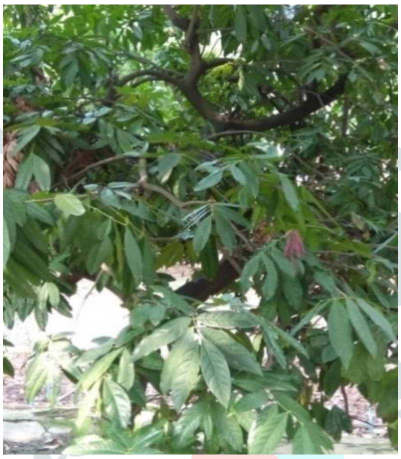
		Solanaceae				Rhinitis, Bodyache.
18	Sarpunkha Herb	Tephrosia purpurea (Linn.) Papilionaceae	Sarphonka	September-October	Whole plant	Earache (otalgia) and Spermatorrhoea:
19	Madyantika Tree	Lowsonia inermis Linn. Lythraceae	Mehndi	June- October	Leaves	Jaundice, Headache, Bloody diarrhoea, urinary tract infection
20	Kokilaksha Spiny herb	Astercantha longifolia Nees. Fam: Acanthaceae	Talmakhanna	October-December	Seeds, Root	Aphrodisiac, Oligospermia, liver ailments,Gallbladder stone.
21	Brahmi Herb	Bacopa monnieri Fam: Scrophulariaceae	Barmi	June-november	Whole plant	Brain tonic, Memory enhancer,
22	Madhunasini Climber	Gymnema Sylvestre Fam: Asclepiadaceae	Gudmaar	August-March	Leaves	Diabetes, hydrocoel, Asthma.
23	Guduchi Climber	Tinospora Cordifolia Fam:Menispermaceae	Giloe	September-February	Stem, Leaves	Gout, general debility, fever, Jaundice.
24	Langali Climber	Gloriosa superba Fam: Liliaccac	Calihari	September-February	tuber	Skin Disease, Labour pain, Abortion,
25	Kaakamaachi Herb	Solanum nigrum Fam: Solanaceae	Makoi	Throughout year	Fruit/whole plant	Dropsy, General debility,Diuretic, anti dysenteric.
26	Chitrak Herb	Plumbago Zeylanica Fam: Plumbaginaceae	Chita	September-November	Root, Rootbark	Loss of appetite, bacterial infestation, Abdominal pain, piles, liver dysfunction.
27	Haritaki Tree	Terminalia Chebula Fam: Combretaceae	Harad	Flower=April – May Fruit=January-April	fruit	Trifala, wound ulcer, leprosy, inflammation, Cough
28	Nimba Tree	Azadirachta indica Fam: Meliaceae	Neem	July - september	Flower, root, rootbark, seedoil, leaves	Itching, Baldness, greying of hair, Conjunctivitis
29	Arjuna Tree	Terminalia arjuna Fam: Combretaceae	Arjun	Flower=July-September Fruit= January - march	Stem bark	Bleeding disorders, fracture, hyperacidity, menorrhagia, leucorrhoea
30	Gokshur Prostrate herb	Tribulus Terrestris Fam: Zygophyllaceae	Gokhru	September-February	Whole Plant	Renal stone, Urinary tract infection, infertility, Dashmoola preparation
31	Vibhitaki Tree	Terminalia bellerica Fam:Comretaceae	Bahada	Flower=March -May Fruit=Jan-Feb	Fruit	Cough, Insomnia, Dropsy, Vomiting, Ulcer, Trifala.
32	Vacha Nodular herb	Acorus Calamus Fam : araceae	Bach	Non-flowering	Rhizome	Tremors, hemiplegia, epilepsy, hypertension, obesity.
33	Shigru Tree	Moringa oleifera Lam. Fam: Moringaceae	Sahajan	January-June	Rootbark, Seeds	Headache, Osteoarthritis, Dysmenorrhoea, Acidosis,
34	Shirisha Tree	Albizzia lebbeck, Fam: Mimosoidae	Siras	April-June	Bark, Flowers, Leaves,Seeds	Insect bites, Erysipelas, Obesity, Blood impurities.
35	Varuna Tree	Crataeva nurvala Fam: Capparidaceae	Barna	January-March	Stem bark	Renal calculus, Abnormal micturition, Gout, Urinary tract infection.
36	Shaalmali Tree	Salmalia malabarica. Fam: Bombacaceae	Seymal	December-March	Flower, Bark, Root	Menorrhagia, Seminal weakness,Epistaxis, Bleding piles,
37	Bhrungaraj Herb	Eclipta alba Fam: Compositae	Bhanagra	July-December	Whole plant	Jaundice, Fever, Hair tonic, Hepatomagely, Promote hair growth.
38	Mustaka Herb	Cyperus rotundus Fam: Cyperaceae	Motha	July-December	Root	Fever, Chronic dysentery, colitis, Excess thirst, Burning sensation.

39	Kampillak Tree	Mallotus philippinensis Fam: Euphorbiaceae	Kabila	February-March	Fruithairs, Flowers	Worm infestation, Abdominal discomfort, Traditionally it is used for expelling worms in childerns.
40	Trivrut Tree	Operculina turpethum Fam: Convolvulaceae	Nishoth	March-December	Rootbark	Ideal Laxative, Spleenomagely,Gas trouble, hyperacidity,Jaundice, Piles.

Plate no.1

Most valuable Medicinal Plants Picture


1. Aamlaki Emblica officinalis


2. Ashok Saraca asoca


3. Vasa Adhatoda vasica


4. Patha
Cissampelos pareira/ Stephania japonica


5. Langali Gloriosa superba


6. Changeri Oxalis corniculata


7. Kantakari Solanum surattense


8. Sarpunkha Tephrosia purpurea


9. Kokilaksha Astercantha longifolia

Plate no.2

Most Valuable Medicinal Plants Picture


10. Chitrak Plumbago Zeylanica


11. Vacha Acorus Calamus


12. Trivrut Operculina turpethum


13. Kampillak Mallotus philippinensis


14. Varuna Crataeva nurvala


15. Parijaat Nyctanthes arbortristis


16. Shigru Moringa oleifera


17. Bhrungaraj Eclipta alba


18. Shaalmali Salmalia malabarica

The present report on medicinal plants showed that made up the highest proportion being represented with herbs (16), shrubs (2), Tress (15) and Climber (7). The plant parts used widely to treat human and livestock, health problems include roots, stem, bark and other parts. The plant parts used by tribes to treat the various ailments in the area were leaves.

The people of Bijnor district uses the indigenous knowledge to the treatment of various kinds of disease like diabetes, diarrhea, osteoarthritis, chronic bronchitis, jaundice, asthma and other disease.

CONCLUSION

The study indicates that traditional health care system is an age-old practice in this area. This system of ethnic communities is conservation oriented and has great potential. This system needs to be thoroughly studied and documented. Traditional knowledge is transmitted from one generation to another. Study suggests an effective coordination for strengthening medicinal plant sector in Bijnor. This could only be achieved by pooling conservation, biodiversity and health care system together by involving the government, NGO's and research organizations. Collaborative research and integrated efforts are required to preserve the knowledge of indigenous people of traditional healthcare and medicinal plants.

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