

# On the diversity of some medicinal plants of Allahabad District

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## ABSTRACT

The present paper deals with the diversity and conservation of some medicinal plants of Allahabad District, Uttar Pradesh, India. The plants have been collected from various parts of Allahabad district growing in different ecological conditions. Their taxonomy, ecology and conservation strategies have been discussed in detail.

**Key-words:** Biodiversity, Medicinal Plants, Allahabad District, Ecology, Conservation.

## INTRODUCTION

India represents one of the twelve centers of mega biodiversity in the world (Cox & Moore 1993). The country occupies a geographical area of about 7500 km along with its rich natural resources like flora and fauna, minerals, water and fertile land etc. The total number of species of flowering plants in India known so far are about 17,527 (Singh et al. 2013). According to the report of World Health Organization, about 80% population of world has a rural background inclusive of tribal and ethnic communities (Jain 1968). The history of uses of medicinal plants in India is pretty old. Great Indian sages like Athreya, Agnivesha, Bhela, Agasthya, Kashyap, Bhriugu, Bhardwaj and Chwyan immensely contributed to the use of medicinal plants in the vedic period (as quoted in Charak Biography, 2016). In the 6<sup>th</sup> Century BC, Jeevak was the court physician of King Bimbsar. He was also contemporary to Lord Buddha and he was a Professor of medicine at Takshashila University (now in Pakistan). Others who have

contributed to Indian medicinal plant are Sushruta (in 6<sup>th</sup> Century BC), Chanakya (in 4<sup>th</sup> Century BC) and Charak (in 1<sup>st</sup> Century AD). Sushruta described in his book '*Sushruta Samhita*' about 184 chapters dealing with 1120 types of illness that includes 7000 medicinal plants and surgical tools. Chanakya also mentioned (Tundi - *Cocciniacordifolia* L. Cogn.) and (*Vach-Acoruscalamus* L.) in his book '*Neeti Shastra*' and discussed their medicinal properties. Subsequently, Charak wrote his treatise '*Charak Samhita*' and provided a list of 341 plants, 177 animals and 64 minerals. Others who made significant contributions on medicinal plants are Nagarjuna (4<sup>th</sup> Century AD). He is regarded as the '*Father of Chemotherapy*'. In recent years, the medicinal plants attracted a large number of researchers who are using a combination of traditional and modern techniques on these plants (Kirtikar & Basu 1918; Chopra & Nayer 1956; Chatterjee & Pakrashi 1997; Mishra et al. 2016).

## Physiographic Overview of The Study Area

Topographically, Allahabad district is situated at 24°47'2" and 25°47'2" N latitude and 81°9'2" and 82°21'2" E longitude and altitude above 95 m from mean sea level. The district covers an area of 7254 sq. km. The maximum length from east to west is 117 km and breadth from north to south is 101 km. The boundary of the district is surrounded by districts of Pratapgarh and Jaunpur in the north; Bhadohi and Varanasi in the east; Mirzapur in the south east; Rewa (M.P) in the south; Banda in the southwest and newly formed Kaushambi District in the west. The district is divided into 3 physical boundries (i) Trans-Ganga (Gangapar) (ii) Trans-Yamuna (Yamunapar) and (iii) Doab tract. The Trans-Ganga tract comprises 3 tahsils - Soraon, Phulpur and Handia. Trans-Yamuna tract includes Meja, Karchchna and Baratahsils. The Doab tract comprises 3 tahsils - Chail, Sirathu and Manjhanpur and these have been included now into the newly formed Kaushambi District.

The district shows three climatic seasons i.e., hot dry summer, cool dry winter and warm humid monsoon. Summer begins from mid March to June with maximum temperature goes up to the 40°C-45°C and during summers Allahabad becomes one of the hottest stations in northern India. Monsoon begins in late June or early July and it ends in September. The winter season begins from early November till February and January becomes the coolest month in the winter season (Sharma 1959).

## Study Materials

In the present study, nearly thirty species of angiospermic medicinal plants have been taken into consideration (Table 1). These plants have been collected from various localities of Allahabad District namely Sahson, Singramau, Malawakhurd, Jhunsi, Saraiinayat, Karchhna and Allahabad city. Identified specimens have been deposited in Duthie Herbarium, Department of Botany, University of Allahabad, Allahabad.

## RESULTS

Some of the significant medicinal plants are described below and represented in Plates 1 & 2. Their chemical constituents, pharmacological uses and results of soil profile analysis are also provided.

*Adhatoda vasica* Nees. (Acanthaceae)

**Description:** A diffuse, branched, ever green shrub; internodes short, leaves up to 20x6 cm, ovate or elliptic-lanceolate, acuminate. Flowers white, with pink or purple stripes, arranged in dense, axillary, spikes at the ends of branches, bracts conspicuous, capsules 2.6-3 cm long, clavate, seeds sub-orbicular, rugose.

**Soil Profile:** Plants growing near wastelands, soil clayish and loam, pH 7.30, electrical conductivity 0.14 mmho/sec, organic carbon 0.78%, Available Phosphorus 14kg/hect, Potash 260 kg/hect, Copper 1.72 PPM, Iron 9.76 PPM, Manganese 5.72 PPM and Zinc 1.26 PPM.

**Chemical constituents:** Vasicol, vasicinolone, vasicine, vasicinone, 1-vasicinone, deoxyvasicine, maiontone and vasicinol.

**Pharmacological uses:** Whole plant is used for cure of cold cough, chronic bronchitis and asthma.

*Ammania buccifera* L. (Lythraceae)

**Description:** An erect, glabrous herb, stem and branches anguler, purplish, leaves opposite, narrowed towards the base. Flowers are arranged in condensed axillary racemes or cluster. Capsules are red when ripe, glabrous.

**Soil Profile:** Common in moist places and along canal shore, soil alluvial, pH 8.00, electrical conductivity 0.19 mmho/sec, organic carbon 0.75%, Available Phosphorus 16 kg/hect, Potash 207 kg/hect, Copper 1.32 PPM, Iron 11.4 PPM, Manganese 5.20 PPM and Zinc 1.36 PPM.

**Chemical constituents:** Rutin, quercetin, kaempferol, b-sitosterol, betulinic acid, ambacinin and 4-hydroxy-2-tetralone.

**Pharmacological uses:** Leaves are generally used in kapha, swelling, hemorrhoids, itching and rheumatic pain.

**Table 1.** Medicinal plants of Allahabad district and their uses in pharmacology.

S. N.	Name of the Plant & Family	Common name	Flowering & Fruiting	Part used	Pharmacological uses
1.	<i>Adhatoda vasica</i> Nees. (Acanthaceae)	Adusa (H)	Sept.-Mar.	Whole Plant	Leaves are used as hypotensive, bronchodilator, respiratory, stimulant and in hypoglycemic activities. Root is used to cure asthma, rheumatism and constipation.
2.	<i>Ammannia buccifera</i> L. (Lythraceae)	Jangli Mehdi (H)	July-Feb.	Leaves	Plants are used as bitter, acrid, appetizer, diuretic, aphrodisiac and lithontriptic.
3.	<i>Argyreia nervosa</i> (L.) Sweet. (Convolvulaceae)	Vidhara (H)	Oct.-Feb.	Seeds, Leaves and roots	Leaves and roots are used in treatment of ulcers, boils and carbuncle. Roots are used as cardiotoxic, intumours, anorexia, diuretic respectively.
4.	<i>Asparagus racemosus</i> Willd. (Asparagaceae)	Satavar (H)	Oct.-Mar.	Roots	Roots are used to cure epilepsy, kidney disorders, chronic fever, liver cancer and to regulate sexual behavior.
5.	<i>Bixa orellana</i> L. (Bixaceae)	Latkan(H)	Jan.-Apr.	Whole Plant	Root and bark are antiperiodic and antipyretic. Leaves are used in Jaundice and snakebite.
6.	<i>Butea monosperma</i> (Lamk.) Taub. (Fabaceae)	Dhak (H)	Mar.-May.	Whole Plant	Leaves are astringent, tonic, diuretic, depurative used in piles, leucorrhoea and dropsy.
7.	<i>Calotropis procera</i> R.Br. (Asclepiadaceae)	Madaar (H)	Feb.-Nov.	Whole Plant	Root and bark are useful in dyspepsia, flatulence, constipation, Indigestion and asthma.
8.	<i>Cassia occidentalis</i> L. (Fabaceae)	Chakwa (H)	June-Nov.	Seeds	Plant is used in balancing nervous system, reducing blood pressure, malaria and wound healing.
9.	<i>Cynodon dactylon</i> (L.) Pers. (Poaceae)	Doob (H)	Feb.-Sept.	Whole Plant	Plant is used to cure of enlargement of spleen, leucoderma, bronchitis, piles, asthma and brain tonic.
10.	<i>Dellinia indica</i> L. (Dilleniaceae)	Elephant apple (H)	Feb.-June	Leaves, bark and seeds	Bark extract is used for food poisoning, body pain, diarrhea and dysentery.
11.	<i>Euphorbia hirta</i> L. (Euphorbiaceae)	Badidudhi (H)	Throughout year	Whole Plant	Plant is used in cure of breast pain, leucorrhoea, gonorrhea and asthma.
12.	<i>Evolvulus nummularius</i> (L.) L. (Convolvulaceae)	Safedsankhp ushpi (H)	July-Nov.	Whole Plant	Plant is used in cure of insanity, epilepsy, nerve complaints gastric and duodenal ulcers.
13.	<i>Grewia asiatica</i> L. (Tiliaceae)	Falsa (H)	Mar.-July.	Fruit	Fruit is cooling and astringent. Bark is used to heal wounds, kapha,vata, burning sensation, ulcer, hypertension and diarrhea.
14.	<i>Jatropha gossypifolia</i> L. (Euphorbiaceae)	LalArand(H)	July-Oct.	Whole Plant	Root bark is applied externally in rheumatism and sores. Leaves are used in neuralgia, dropsy, anasarca and pneumonia.
15.	<i>Kingelia pinnata</i> DC. (Bignoniaceae)	Balamkheera (H)	Mar.-Jun.	Fruit and Bark	Bark is used in syphilis and gonorrhea. Fruit is used in dysentery, ringworm, tapeworm malaria and pneumonia.
16.	<i>Moringa olefera</i> Lamk. (Moringaceae)	Sahjan(H)	Dec.- Feb.	Whole Plant	Plant is antispasmodic, stimulant, expectorant and diuretic. Fruit is used in disease of liver and spleens.
17.	<i>Murraya koenigii</i> (L.) Spreng. (Rutaceae)	Kadi-patta (H)	Apr.-July	Root and leaves	Root is stimulant, purgative and stomachic and used in treatment of eruptions and bites of poisonous animals. Leaves are used in dysentery and skin disease.
18.	<i>Oxalis corniculata</i> L. (Oxalidaceae)	Khat-mitthi(H)	Oct.-Jan.	Whole Plant	It is remedy for indigestion and diarrhea in children's. Juice of plant is used in dyspepsia, piles, anemia and dysentery.
19.	<i>Phyla nodiflora</i> (L.) Greene. (Verbinaceae)	Lippy (H)	Feb.-Oct.	Whole Plant	It is used in treatment of skin disorders, diabetes, neural disorders, inflammations and urinary disorders.
20.	<i>Pithecolobium dulce</i> (Roxb.) Benth. (Mimosaceae)	Jangaljalebi (H)	Mar.-Aug.	Whole Plant	Bark is used as astringent in dysentery and febrifuge. Leaves have abortifacient, antidiabetic, emollient, anticonvulcent and antiulcer activity.
21.	<i>Plumbago zeylanica</i> L. (Plumbaginaceae)	Chitrak (H)	July-Dec.	Whole Plant	It is used in treatment of muscular pain, rheumatic disease, inflammations, malaria, sore and swellings.
22.	<i>Rauwolfia serpentine</i> Benth. ex. Kurz. (Apocynaceae)	Sarpagandha (H)	May-Nov.	Root and Leaves	Root is bitter, tonic, hypnotic, sedative and febrifuge reduces blood pressure. Leaves are bitter, stimulant and used for treatment of hypertension.
23.	<i>Tamarindus indica</i> L. (Caesalpinaceae)	Imli (H)	April-Oct.	Whole Plant	Plant is used wound healing, abdominal pain, diarrhea, malaria and respiratory disorder.
24.	<i>Terminalia arjuna</i> (Roxb.) Benth. (Combretaceae)	Arjun(H)	Mar.-May	Bark	Bark is astringent, antidiabetic, Cardiotoxic, styptic and wholesome of heart. It cures wounds and urinary diseases.
25.	<i>Terminalia bellirica</i> (Gaertn.) Roxb. (Combretaceae)	Bahera (H)	Feb.-May	Fruit	Fruit is bitter, astringent, tonic, laxative, antipyretic, used in leprosy, piles, dropsy, diarrhea and eye disease.
26.	<i>Tinospora cordifolia</i> (Willd)Miers. (Menispermaceae)	Giloy (H)	Feb.-June	Whole plant	Plant is used in bleeding piles, urticarial, diarrhea, jaundice, diabetes and chronic dysentery.

27.	<i>Tephrosia purpurea</i> (L.) Pers. (Fabaceae)	Sarapunkha (H)	Aug.-Mar.	Whole plant	Plant is bitter, astringent, acrid, diuretic, laxative, anthelmintic and used as purifier of blood. Root is bitter and given in tympanitis, dyspepsia and in chronic diarrhea.
28.	<i>Thunbergia grandiflora</i> (Roxb. ex Rottb.) Roxb. (Acanthaceae)	Neel-lata (H)	Sept.-Jan.	Whole Plant	Plant is used as antimicrobial, anti-inflammatory and in anti diabetic activities.
29.	<i>Tribulus terrestris</i> L. (Zygophyllaceae)	Gokhru (H)	July-Nov.	Whole Plant	Plant is used kidney stones, cardiovascular disorders, heart disease, sexual impotency and urinary infections.
30.	<i>Tridax procumbens</i> L. (Asteraceae)	Gujrati (H)	Throughout year	Whole Plant	Plant is used in wound healing, diabetes, dysentery, diarrhea and cancer.

*Bixa orellana* L. (Bixaceae).

**Description:** Small evergreen tree 6-12 m in height, leaves glossy, ovate, evergreen with reddish to pink flowers, 3-6 cm in diameter, fruit in clusters, reddish brown in colour, seed-pods covered with soft spines.

**Soil Profile:** Cultivated in gardens, soil clayish, pH 7.90, electrical conductivity 0.16 mmho/sec, organic carbon 0.54 %, Available Phosphorus 10 kg/hect, Potash 156 kg/hect, Copper 2.0 PPM, Iron 5.60 PPM, Manganese 1.46 PPM and Zinc 1.50 PPM.

**Chemical constituents:** Isobixine, beta carotene, cryptoxanthin, norbixin, crocetin, orellin, bixol and ellagic acid.

**Pharmacological uses:** Plant is used as laxative, cadiotonic, hypotensive, expectorant and antidiabetic activities.

*Butea monosperma* (Lamk.) Taub. (Fabaceae)

**Description:** A small or moderate sized tree, leaflets 3, coriaceous, broadly obovate from a cuneate or deltoid base, flowers bright red, leaves 5-8 cm long, pods pendulous, silky-tomentose, fruit pod like and broad.

**Soil Profile:** Commonly growing in forests and grass lands as a wild plant, soil sandy, pH 8.50, electrical conductivity 0.24 mmho/sec, organic carbon 0.48 %, Available Phosphorus 14 kg/hect, Potash 120 kg/hect, Copper 1.64 PPM, Iron 11.04 PPM, Manganese 1.42 PPM and Zinc 8.14 PPM.

**Chemical constituents:** Butin, butein, butrin, isobutrin, palasitrin, coreopsin and isocoreopsin.

**Pharmacological uses:** Plant is used in cure of wound healing, burns, hysteria and memory increasing.

*Calotropis procera* R.Br. (Asclepiadaceae)

**Description:** An erect or decumbent shrub, leaves sessile, opposite, ovate, cordate at the base, flowers

purplish-red, pale silvery outside, terminal, axillary, corymbose cymes.

**Soil Profile:** Common in waste lands and grasslands, soil alluvial, pH 7.20, electrical conductivity 0.10 mmho/sec, organic carbon 0.57 %, Available Phosphorus 16 kg/hect, Potash 219 kg/hect, Copper 11.0 PPM, Iron 7.32 PPM, Manganese 1.52 PPM and Zinc 1.56 PPM.

**Chemical constituents:** Beta sitosterol, digitoxigenin, digitoxin, calotropenol, calotoxin and cyclosadol.

**Pharmacological uses:** Plant is used in treatment of leprosy, ulcer, piles, spleen and liver disorders.

*Dillenia indica* L. (Dilleniaceae)

**Description:** Small sized tree, bark reddish brown, leaves fasciculate, veins close, petiole winged like, flower white, solitary 10-20 cm in diameter. Fruits aggregate, globose, fleshy, indehiscent, seeds 5, compressed with hairy margins.

**Soil Profile:** Grown as cultivated in garden, soil alluvial, pH 7.60, electrical conductivity 0.15 mmho/sec, organic carbon 0.72 %, Available Phosphorus 10kg/hect, Potash 260 kg/hect, Copper 1.26 PPM, Iron 10.6 PPM, Manganese 6.92 PPM and Zinc 1.58 PPM.

**Chemical constituents:** Tannin, lupeol, myricetin, dellenetin, kaempferol and quercetin.

**Pharmacological uses:** Leaves are used in bleeding in piles, skin diseases and breast cancer. Seed oil is used as antifungal, antimicrobial and antiulcer activities.

*Euphorbia hirta* L. (Euphorbiaceae)

**Description:** An annual, prostrate, hispid herb, leaves dark green or reddish, white-villous beneath elliptic or ovate-oblong with oblique bases. Cyathia

axillary and terminal, clustered in dense, crowded cymes. Involucres stalked, cup shaped, capsule breaking in to 3 cocci, seeds reddish-brown, trigonous.

**Soil Profile:** Common in grasslands, soil clayish, pH 8.90, electrical conductivity 0.20 mmho/sec, organic carbon 0.63 %, Available Phosphorus 16kg/hect, Potash 105 kg/hect, Copper 1.40 PPM, Iron 8.32 PPM, Manganese 5.04 PPM and Zinc 1.24 PPM.

**Chemical constituents:** Beta-sitosterol, choline, taraxerol, euphorbol, b-amyrin and quercetin.

**Pharmacological uses:** Whole plant is used in cure of diarrhoea, amoebic dysentery, asthma and urogenital disorders.

*Evolvulus nummularis* (L.) L. (Convolvulaceae)

**Description:** Slender, prostrate herbs, rooting at nodes, leaves glabrous, except the hairy nerves beneath. Pedicels erect, first decurved after anthesis, calyx segments oblong-lanceolate, ciliate, corolla deeply lobed, capsule 1-4 seeded.

**Soil Profile:** Grows in gardens, fields and unused places, soil alluvial, pH 8.00, electrical conductivity 0.19 mmho/sec, organic carbon 0.75 %, Available Phosphorus 16 kg/hect, Potash 207 kg/hect, Copper 1.64 PPM, Iron 11.32 PPM, Manganese 6.24 PPM and Zinc 1.42 PPM.

**Chemical constituents:** Beta-sitosterol, glucosides, d-mannitol, ursolic acid, oleanolic acid, 3 $\alpha$ -hydroxy-12-en-29 b-oic acid.

**Pharmacological uses:** Plant is used in treatment of insanity, epilepsy, nervine complaints and bleeding. Roots are used in intermittent fever.

*Grewia asiatica* L.Mant. (Tiliaceae)

**Description:** A middle-sized, crooked tree with a spreading crown, bark greyish-white, leaves 8-20x 8-12 cm, variable, peduncle in fascicles of 2-8, usually 3 flowered, drupes dark purple, more or less globose, pilose. Nuts 1-2, ripe pulp sweet and acidic.

**Soil Profile:** Cultivated in gardens, soil clayish, pH 7.70, electrical conductivity 0.67 mmho/sec, organic carbon 0.97 %, Available Phosphorus 20kg/hect, Potash 260 kg/hect, Copper 0.54 PPM, Iron

8.05 PPM, Manganese 1.10 PPM and Zinc 2.40 PPM.

**Chemical constituents:** Cynadin 3-glucoside, quercetin, beta-sitosterol, grewinol and naringenin.

**Pharmacological uses:** Fruit is used in treatment of respiratory, cardiac and blood disorders. Bark is used in diarrhoea and fevers.

*Jatropha gossypifolia* L. (Euphorbiaceae)

**Description:** A much branched shrub, stems grey-white to ash coloured, with brown lenticels throughout. Young parts pale or deep purple, petioles, leaf margins and young parts with numerous, fascicled and branched, glandular bristles. Flower purplish reddish, monoecious, capsule oblong, 3 lobed, brownish.

**Soil Profile:** Cultivated in gardens, soil clayish, pH 6.90, electrical conductivity 0.12 mmho/sec, organic carbon 0.69 %, Available Phosphorus 18kg/hect, Potash 260 kg/hect, Copper 1.96 PPM, Iron 8.05 PPM, Manganese 10.28 PPM and Zinc 1.32 PPM.

**Chemical constituents:** Lanosterol, globulol, phytol, cyclogossine B, jatrophenols A & B.

**Pharmacological uses:** Plant is used in cure of diarrhoea, anemia, diabetes and cancer.

*Kingelia pinnata* DC. (Bignoniaceae)

**Description:** A medium-sized, spreading tree, leaves ternate, imparipinnate, leaflets 7-9, oblong, coriaceous, dark green, flower claret-coloured in lax hanging racemes. Fruits are woody, gourd like, hanging on cord like long stalks.

**Soil Profile:** Cultivated in gardens, soil clayish, pH 7.60, electrical conductivity 0.12 mmho/sec, organic carbon 0.72 %, Available Phosphorus 20 kg/hect, Potash 225 kg/hect, Copper 1.96 PPM, Iron 10.28 PPM, Manganese 4.96 PPM and Zinc 1.32 PPM.

**Chemical constituents:** Beta-sitosterol, Jioglutolide, iridoid, kigelin, ferulic acid and 3-dimethyl kigelin.

**Pharmacological uses:** Fruit is used in dysentery, ringworm, malaria, diabetes, pneumonia and digestive disorders. Bark is used to treat gonorrhoea and rheumatism.

*Moringa oleifera* Lamk. (Moringaceae)

**Description:** A medium sized tree, trunk grey-white with longitudinal wrinkles. Leaves polypinnate, leaflets obovate. Flowers pale-white, fragrant, pods long, pendulous.

**Soil Profile:** Cultivated in gardens, soil clayish, pH 8.00, electrical conductivity 0.50 mmho/sec, organic carbon 0.41 %, Available Phosphorus 16 kg/hect, Potash 187 kg/hect, Copper 0.20 PPM, Iron 7.15 PPM, Manganese 1.97 PPM and Zinc 2.5 PPM.

**Chemical constituents:** Oleic acid, 9-octadecenoic acid, methyl ester hexadecanoic acid and 9-octadecenamamide.

**Pharmacological uses:** Plant is used in treatment of dyspepsia, heart disease, ulcer and diabetes.

*Pithecellobium dulce* (Roxb.) Benth. (Mimosaceae)

**Description:** A large, thorny tree, bark grey-white or slate coloured, leaves twice pinnate, leaflets 2, obovate or elliptic-oblong. Flower white, in globose, axillary heads. Pods spirally twisted, reddish brown.

**Soil Profile:** Commonly occurs in gardens and waste places, soil clayish, pH 7.90, electrical conductivity 0.48 mmho/sec, organic carbon 0.46 %, Available Phosphorus 18kg/hect, Potash 187 kg/hect, Copper 0.20 PPM, Iron 1.15 PPM, Manganese 1.97 PPM and Zinc 1.65 PPM.

**Chemical constituents:** Saponins, glucoside A, asparagines, sterols, quercetin, valine, leucine and flavone.

**Pharmacological uses:** Plant is used in cure of dysentery, intestinal disorders, ulcers and fungal disorders.

*Terminalia arjuna* (Roxb. Ex DC.) Wt. & Arn. (Combretaceae)

**Description:** Medium to large sized tree, up to 40 cm tall; bark smooth, whitish or pinkish-grey. Leaves oblong or elliptic, hard, coriaceous, glabrescent, flowers pale yellow, calyx glabrous, fruit ovoid-oblong toughly 4-5 winged.

**Soil Profile:** Commonly cultivated as gardens and near road side, soil clayish, pH 7.80, electrical

conductivity 0.37 mmho/sec, organic carbon 0.62 %, Available Phosphorus 13 kg/hect, Potash 246 kg/hect, Copper 2.67 PPM, Iron 5.65 PPM, Manganese 7.40 PPM and Zinc 1.60 PPM.

**Chemical constituents:** Arjunolic acid, beta-sitosterol, elagic acid, arjugenin, arjunolone, baicalein and terminoside.

**Pharmacological uses:** Bark is used as astringent, cooling, cardiogenic, fractures, ulcers, leucorrhoea and diabetes.

*Terminalia bellirica* (Gaertn.) Roxb. (Combretaceae)

**Description:** Medium or large sized trees, up to 20 m in height, leaves thick, broadly elliptic, long-petioled, flowers in greenish-yellow spikes, calyx with brown hairs within; teeth pubescent, fruit ovoid or obovoid, grey-velvety.

**Soil Profile:** Commonly cultivated in gardens, soil sandy, pH 8.00, electrical conductivity 0.77 mmho/sec, organic carbon 0.62 %, Available Phosphorus 17 kg/hect, Potash 231 kg/hect, Copper 2.96 PPM, Iron 7.14 PPM, Manganese 1.40 PPM and Zinc 2.00 PPM.

**Chemical constituents:** Caumarin, flavone, termilignan, anolignan B, gallicacid, ellagic acid and glycosides.

**Pharmacological uses:** Fruit is laxative, astringent, acrid, digestive and used in treatment of common cold, pharyngitis and constipation.

## CONCLUSION

In the present study, medicinal properties of thirty angiosperms growing in various ecological habitats of Allahabad District, Uttar Pradesh have been provided. Their taxonomical characters and medicinal properties have been incorporated. Detailed study on the soil profile and chemical analyses of the significant fifteen taxa has been carried out in detail. In the present scenario there is urgent need to conserve these medicinal plants and in view of this, suitable measures for their *ex situ* and *in situ* conservation should be taken. Production of large scale germplasm using biotechnological techniques possibly can meet the required demand of pharmaceutical industries.

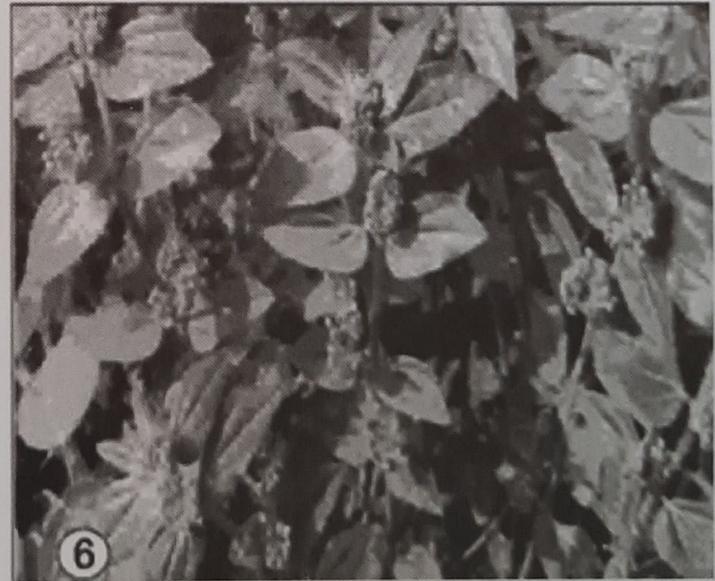
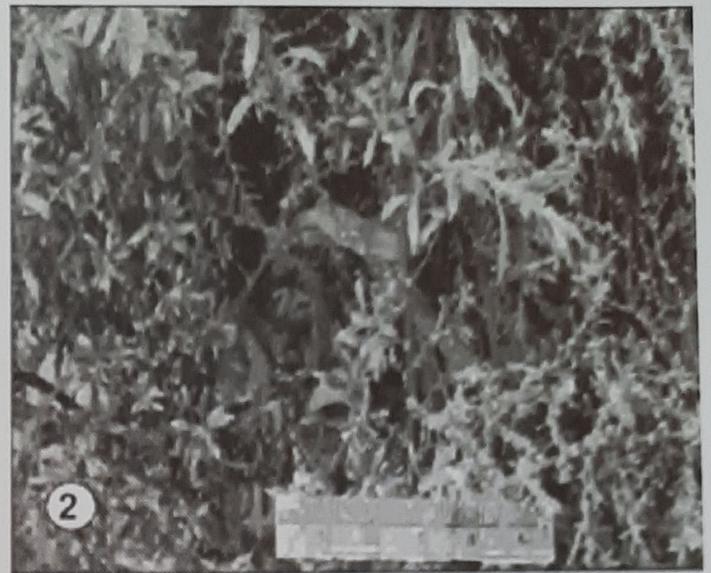
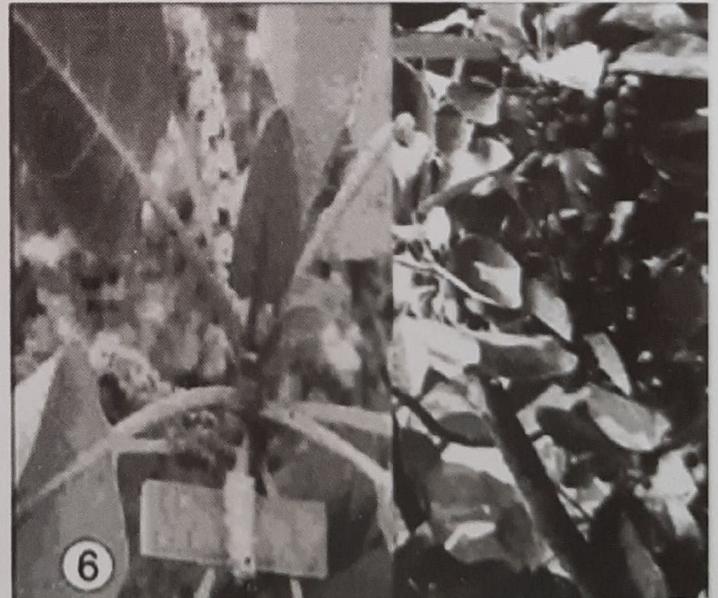
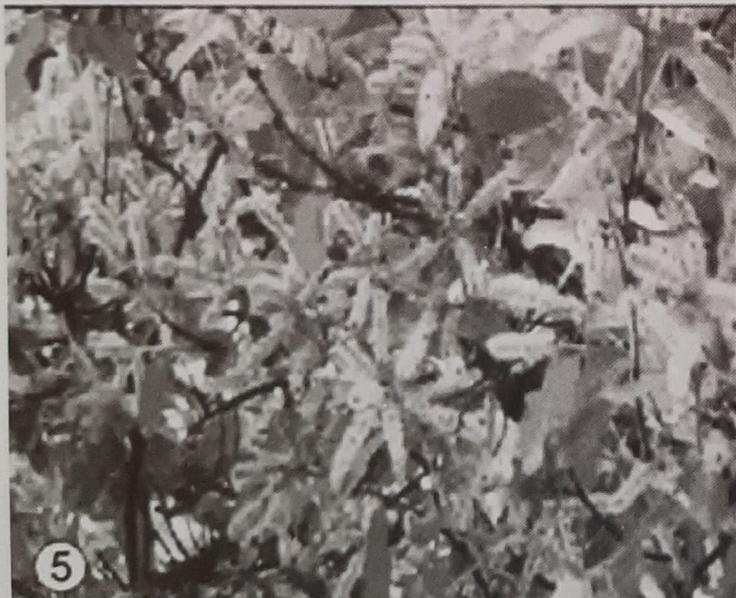
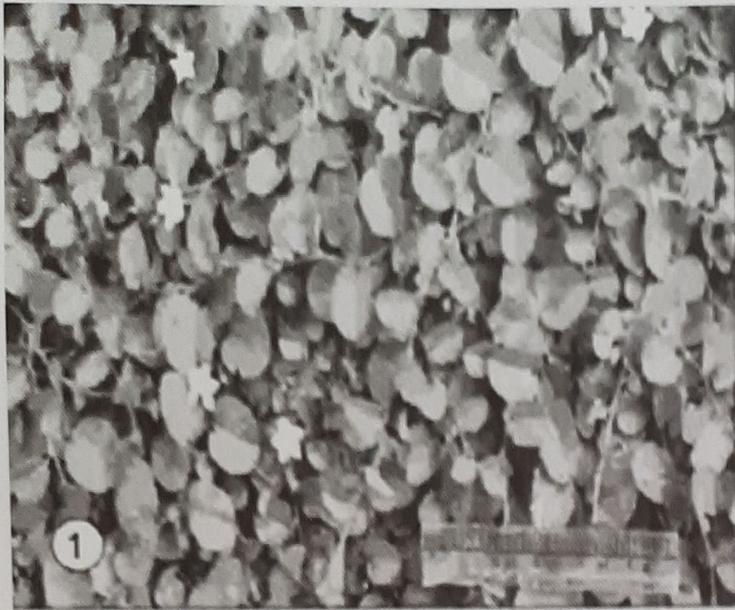


Plate 1

1. *Adhatoda vasica* Nees., 2. *Ammania buccifera* L., 3. *Bixa orellana* L., 4. *Butea monosperma* (Lamk.) Taub., 5. *Dillenia indica* L., 6. *Euphorbia hirta* L.



**Plate 2**

1. *Evolvulus nummularis* (L.) L., 2. *Grewia asiatica* L. Mant., 3. *Jatropha gossypifolia* L., 4. *Kingelia pinnata* DC., 5. *Terminalia arjuna* (Roxb. Ex DC.) Wt. & Arn., 6. *Terminalia bellirica* (Gaertn.) Roxb.

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