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Qualitative Analyses of soil of some Medicinal plants growing near Carpet Industries

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Abstract

The present paper describes for the first time an account of some important medicinal plants growing near carpet factories from Bhadohi district. A total of 20 species belonging to 20 genera under 16 families have been documented with brief notes on salient features of ecology, therapeutic uses and soil profile of each species and conservation. This is an effort to conserve the diminishing wealth of traditional knowledge of Bhadohi.

Key words: Bhadohi, Factory, paedological, soil, carpet, medicinal plants, aniline

Introduction

Since the beginning of time, plants have been one of the most significant sources of medicines. Due to its diverse geographical, physiological, and ecological diversity, India is regarded as one of the mega-biodiversity centers. The demand for herbal plants is rising as a result of the flourishing traditional medicine sector. Moreover, the use of high levels of chemical fertilizers decreases the medicinal plant nutrients uptake and induces either stagnation, or decrease inn yields and environmental pollution. Accurately identifying suitable medicinal plant species based on specific soil conditions is crucial for agriculture, horticulture and environmental studies. Sustainable management of the natural habitat is an environmental issue concerning biodiversity protection and the welfare of local communities because of the diminishing availability of such herbal plants and the vanishing local traditional knowledge. The availability of nutrients and organic matter in the soil affects the medicinal plant growth. The soil exhibits spatial variation owing to anthropogenic land use patterns and physical, chemical and biological activity.

STUDY SITES

Bhadohi a "Hub of Carpet Industries" is one of the eastern districts of the Uttar Pradesh (26°32' -27°01' north latitudes, 78°46' -79°45' east longitudes) lies in Indo-Gangetic plains at an average elevation of 133 m above the mean sea level. This district is drained by Ganges, Varuna and Morva rivers. Climate of the area is humid sub-tropical, temperature ranges from 12°C to 47°C and annual rainfall is about 800 mm. It is surrounded by Jaunpur district to the north, Varanasi district to the east, Mirzapur district to the south, and Prayagraj district to the west with an area of 1055.99 km.^{2} This district is divided into three tehsils *viz.*: Aurai, Bhadohi and Gyanpur tehsil with six blocks, Bhadohi, Suriyawan, Gyanpur, Deegh, Abholi and Aurai (Figure -1). Over exploitation of medicinal plants by anthropogenic activities, over grazing and habitat loss leads to depletion of vegetation cover of the area. Authors have tried to study medicinal plants with their soils, of the remote areas of district that would be beneficial in their systematic utilization along with making conservation strategy in the future.

MATERIALS AND METHODS

The study was carried out in rural areas of Bhadohi district near carpet factories which includes Milkiya, kashipur, Bhadohi, Suriyawan, Gyanpur, Deegh, Abholi and Aurai. Local experienced persons and herbal practictoners were consulted to know about the use of various medicinal plants growing in their localities.

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Frequent field trips were made to the sites by one of the author (Saumya Mishra) and voucher specimens of plants identified as medicinally important were collected.Species identification was achieved by comparison with specimens of Indian herbarium, digital herbaria (e-Floras 2008, WCSP 2012, The Plant List 2013, POWO 2019,) and perusal of relevant literature. Medicinal values of these plants were compared with various studies especially from among the rural and tribal communities (Tiwari et al. 2012, Mishra et al. 2016, 2017, 2019, ; Mishra & Mishra 2017, 2018a,b, 2019. The voucher specimens have been deposited in the herbarium of Department of Botany, KN Govt. PG College, Gyanpur, Bhadohi, Uttar Pradesh. Soil solution was prepared and tested for various parameters using modern instruments & standard protocols.

RESULTS AND DISCUSSION

In the present investigation, 20 medicinal plant species belonging to 20 genera under 16 families were described from Bhadohi District, which have been enumerated here, along with their botanical name, vernacular name, family, habit, habitat and pharmacological uses. Paedological qualitative and quantitative analyses of soil was also provided such as -soil colour, soil type, soil PH, electrical conductivity of soil, available organic carbon, phosphorous, potash, copper, iron, manganese, zinc in soil of each species (Table-1,).

Some of the important medicinal plants are described below:

1*Alternanthera sessile* (L.) DC. Khakhi weed Amaranthaceae

Habit&habitat-Aquatic, herb, growing near semiaquatic areas, near ponds

Pharmacological uses-Used as diuretic, anti ulcer activity and in memory enhancer

***2 Amaranthus spinosus* L. Katili chaurai Amaranthaceae**

Habit& habitat- Terrestrial,, herb growing near wastelands and roadside

Pharmacological uses-Whole plant is used for snake- bite, burning sensation, gonorrhea and menorrhea

3 *Argemone maxicana L.* Satyanashi Papaveraceae

Habit& habitat-Terrestrial, shrub,growing near wastelands, grasslands, soil alluvial, light yellowish

Pharmacological uses-The herb is bitter, acrid, appetizer, diuretic, aphrodisiac

4 *Barleria prionitis* L. kastira Acanthaceae

Habit& habitat-Terrestrial , shrub,occurs near wastelands, fields, soil clayish

Pharmacological uses-Leaves and bark are used in abdominal disorder, fever, cough, toothache

5 *Calotropis gigantia* (L.)R.Br. Safed madar Asclepiadaceae

Habit& habitat- Terrestrial , shrub,common in wastelands and grasslands, soil alluvial

Pharmacological uses-Plant is used in cure of leprosy, leucoderma, ulcer, tumour, piles and spleen disorders

6 *Chenopodium album* L. bathua chenopodiaceae

Habit& habitat- Terrestrial , herb,occurs in waste places

Pharmacological uses-Plant is used as tonic, laxative, blood puifier, spleen and liver enlargement

7 *Cissus quadrangularis* L. harjor vitaceae

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Habit& habitat- Terrestrial, succulent twiner, shrub, growing as cultivated plant, occurs in hotter part of the country

Pharmacological uses-Heals bone fracture, cures jaundice, obesity, piles, ulcer , wound healing

8 *Curcuma domestica* Roxb. haldi zingiberaceae

Habit& habitat- Terrestrial, herb,grown as cultivated plant

Pharmacological uses Rhizome is bitter, stimulant, aromatic, laxative, used in treatment of asthma, bronchitis, bones healing

9 *Datura strumonium* L. dhatura solanaceae

Habit& habitat- Terrestrial, herb, growing near wastelands

Pharmacological uses -Cures asthma, Parkinson disease, whole plant is antispasmodic

10 *Eclipta alba* (L.) Hassk. bhringraj asteraceae

Habit& habitat- Semiaquatic plant,herb, growing near grasslands

Pharmacological uses -Cures hairfall, emetic, purgative, anodyne, cures jaundice, astha, ulcer

11 *Euphorbia hirta* L. Badhi duddhi euphorbiaceae

Habit& habitat- Terrestrial, herb,common in grasslands

Pharmacological uses -Whole plant cures dysentery, asthma, urinogenital disorders, urinogenital disorders, diarrhoea

12 *Evolvulus nummularis* (L.)L.Safed shankhpuspi convolvulaceae

Habit& habitat- Terrestrial, herb,growing in unused places, gardens

Pharmacological uses- Roots are used in intermittent fever, bleeding epilepsy insanity, nervine bleeding

13 *Madhuca indica* J.F. Gmel .mahua Sapotaceae

Habit& habitat- Terrestrial, tree, growing in cultivated gardens

Pharmacological uses- Plant is analgesic, anti ulcer, antidiabetic, anti pyrtic, fertility, wound healing, headache

14 *Nicotiana tobaccum* L. tambakoo Solanceae

Habit& habitat- Terrestrial,Herb, growing in grasslands, waste places, waste fields

Pharmacological uses- Plant cures urinary disorders, skin diease, rheumatism

15 *Papaver somniferum* L. Apheem Papaveraceae

Habit& habitat- Terrestrial, Herb, growing in grasslands, waste places

Pharmacological uses- Fruits narcotic, analgesic, hypnotic activity

16 *Rauwolfia serpentine* (L.)Benth..ex.Kurz. Sarpagandha Apocynaceae

Habit& habitat- Terrestrial, shrub, growinggrasslands and wasteland

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Pharmacological uses- Root cures hypertension, sedative. Cns stimulant, dysentery

17 *Solanum nigrum* L.Makoiya Solanaceae

Habit& habitat- Terrestrial, herb,grasslands, waste places, fields

Pharmacological uses- Berries cures fever, vomiting, asthma, bronchitis, fever

18 *Strychnos* ***nux-vomica*** **L.Kuchla Loganiaceae**

Habit& habitat- Terrestrial. Tree, occurs in waste places, cultivated in gardens

Pharmacological uses- Root is bitter, leaves used as nervine tonic, antispasmodic, antidysenteric

19 *Tinospora cordifolia* (Willd.)Hook. F.& Thomas. Gurach Menispermaceae

Habit& habitat- Terrestrial, climber,herb, growing near waste lands, grasslands

Pharmacological uses- Cures cough, jaundice, leprosy, diabetes, bleeding piles

20 Vitex nigundo **L.Nirgund Verbenaceae**

Habit& habitat- Terrestrial, shrub, growing in grasslands, wastefields

Pharmacological uses- Leaves cures spleen enlargement, leucoderma, stomachic, anthelmintic

Conclusion:

The unscientific disposal of hazardous waste generated during carpet manufacturing processes, containing residual dyes, mordants, synthetic chemicals,microfibrils,aniline dyes, perflorinated chemicals, antimicrobial and moth proofing chemicals are harmful for an flora and fauna of ecosystem, medicinal crop plants, river streams, soil profile, growth of plants, causing various diseases like dermatitis,respiratory issues, carcinogenic effects, neurological problems, endocrine problems etc, in the soil, waterstreamsposes great threat to local peoples of bhadohi district. Due to lack of medical health facilities in rural areas of Bhadohi disrict , financially weak people relying more on natural low cost herbal medicines for combating their health ailments, so one should conserve and do more research on the medico flora of bhadohi district.

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Table-1-Qualitative analyses of soil of medicinal plants growing near carpet industries of Bhadohi district of Uttar Pradesh, India

Serial no.	Botanical name	Soil colour	Soil type	PH	Electrical conductivity
1	*Alternanthera sessiles*	Light brown	clayish	8.0	0.40 mmho/sec
2	*Amaranthus spinosus*	Dark brown	alluvial	7.80	0.38 mmho/sec
3	*Argemone maxicana*	Light brown	Sandy loam	7.90	0.46 mmho/sec
4	*Barleria prionitis*	Light brown	Clayish/ loam	8.90	0.28 mmho/sec
5	*Calotropis gigantea*	Light brown	clayish	7.90	0.14 mmho/sec
6	*Chenopodium album*	Light brown	sandy	8.0	0.79 mmho/sec
7	*Cissus quadrangularis*	Light yellow	alluvial	7.90	0.75 mmho/sec
8	*Curcuma domestica*	Dark black	alluvial	8.20	0.44 mmho/sec
9	*Datura strumonium*	Light brown	sandy	8.0	0.76 mmho/sec
10	*Eclipta alba*	Light brown	sandy	8.0	0.42 mmho/sec
11	*Euphorbia hirta*	Light brown	alluvial	8.0	0.2 mmho/sec
12	*Evolvulus nummularis*	Yellowish brown	Clayish loam	7.90	0.46 mmho/sec
13	*Madhuca indica*	brown	Silty loam	7.90	0.12 mmho/sec
14	*Nicotiana tobaccum*	Dark brown	clayish	8.30	0.24 mmho/sec

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15	*Papaver somnifera*	Yellowish brown	clayish	8.20	0.15 mmho/sec
16	*Rauwolfia serpentina*	Dark brown	Sandy loam	7.7	0.65 mmho/sec
17	*Solanum nigrum*	Light brown	Clayish/loam	7.70	0.09 mmho/sec
18	*Strchnos nux-vomica*	Yellowish brown	Clayish loam	6.90	0.15 mmho/sec
19	*Tinospora cordifolia*	brown	Clayish loam	7.90	0.29 mmho/sec
20	*Vitex nigundo*	Light brown	Clayish loam	8.80	0.24 mmho/sec

Table- 2: Quantitave analyses of soil of medicinal plants growing near carpet industries of Bhadohi district, Uttar Pradesh

S.No	Botanical name	Organic carbon	Available phosphorus	potash	copper	iron	manganese	Zinc ppm
1	*Alternanthera sessiles*	0.18%	15 kg/hec	14 kg/hec	2.58 ppm	5.62 ppm	1.95 ppm	2.54
2	*Amaranthus spinosus*	0.65%	14 kg/hec	249 kg/hec	2.69 ppm	5.69 ppm	7.45 ppm	1.65
3	*Argemone maxicana*	0.45%	12 kg/hec	184 kg/hec	2.59 ppm	7.11 ppm	1.92 ppm	1.61
4	*Barleria prionitis*	0.67 %	19 kg/hec	119 kg/hec	1.49 ppm	8.37 ppm	5.09 ppm	1.27
5	*Calotropis gigantea*	0.65 %	15 kg/hec	265 kg/hec	1.57 ppm	11.92 ppm	6.51 ppm	1.37
6	*Chenopodium album*	0.67 %	16 kg/hec	217 kg/hec	2.92 ppm	1.65 ppm	7.11 ppm	2.07
7	*Cissus quadrangularis*	0.65%	14 kg/hec	217 kg/hec	2.05 ppm	2.0 ppm	7.12 ppm	2.06
8	*Curcuma domestica*	0.26 %	14 kg/hec	15 kg/hec	1.59 ppm	5.65 ppm	1.59 ppm	3.55
9	*Datura strumonium*	0.65%	15 kg/hec	217 kg/hec	2.06 ppm	2.05 ppm	7.19 ppm	2.06
10	*Eclipta alba*	0.46%	25 kg/hec	189 kg/hec	3.07 ppm	1.52 ppm	1.16 ppm	1.07

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11	*Euphorbia hirta*	0.37%	16 kg/hec	249 kg/hec	1.07 ppm	3.64 ppm	5.28 ppm	3.08
12	*Evolvulus nummularis*	0.44 %	14 kg/hec	185 kg/hec	0.24 ppm	7.19 ppm	1.94 ppm	1.69
13	*Madhuca indica*	0.76 %	11 kg/hec	264 kg/hec	1.76 ppm	9.75 ppm	5.71 ppm	1.22
14	*Nicotiana tobaccum*	0.11 %	19 kg/hec	14 kg/hec	0.25 ppm	6.69 ppm	1.04 ppm	1.05
15	*Papaver somnifera*	0.15 %	15 kg/hec	15 kg/hec	2.57 ppm	5.64 ppm	4.47 ppm	1.62
16	*Rauwolfia serpentina*	0.99 %	22 kg/hec	15 kg/hec	0.52 ppm	8.06 ppm	1.14 ppm	3.54
17	*Solanum nigrum*	0.65 %	14 kg/hec	264 kg/hec	1.54 ppm	11.19 ppm	3.55 ppm	1.24
18	*Strchnos nux-vomica*	0.65 %	14 kg/hec	261 kg/hec	1.87 ppm	10.25 ppm	4.92 ppm	1.34
19	*Tinospora cordifolia*	0.65 %	14 kg/hec	265 kg/hec	1.55 ppm	11.17 ppm	1.79 ppm	2.54
20	*Vitex nigundo*	0.62 %	15 kg/hec	107 kg/hec	1.7 ppm	7.15 ppm	5.9 ppm	1.26