

Ethnomedicinal uses of *Eclipta prostrata* Linn.

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Present communication records ethnomedicinal uses of *Eclipta prostrata* (L.) Linn. gathered from 5 districts of western Uttar Pradesh. It also presents the results of the screening of 5 *Eclipta prostrata* crude extracts for antibacterial activity against 18 human pathogenic bacteria. Standard methods of ethnobotanical explorations were followed and first hand information was collected by interviewing traditional medicine men / wise women. Antibacterial activity was determined by Standard Disk Diffusion method. A total of 33 claims were recorded from the study area. An attempt has been made to correlate the ethnomedicinal claims, gathered in this study with the already known pharmacological properties and antibacterial activity of crude extracts of this species. Ethyl acetate and methanol extracts showed antibacterial activity against maximum number of bacteria tested, followed by aqueous, benzene and petrol extracts.

Key Words: *Eclipta prostrata*, Ethnomedicine, Antibacterial activity, Traditional knowledge

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Uttar Pradesh is the abode of a number of ethnic groups and diverse cultures. All ethnic groups have preserved a considerable part of their traditional knowledge. Over the years, a voluminous literature has accumulated on ethnobotany of the state¹⁻⁸. However, Aligarh, Budaun, Bulandshahar, Farrukhabad and Hathras districts were still under explored or unexplored⁹⁻¹⁶. Therefore, these districts were extensively explored during the period 1998-2002¹⁷. The study brought to light many interesting medicobotanical data¹⁸⁻²¹. Present communication records the traditional uses of *Eclipta prostrata* (L.) Linn, Mant 2:206.1771, syn *Eclipta alba* (L.) Hassk. (Asteraceae) [Local name: *Bhringraj*, *Bhangra*, *Ghamra*]. Further, 18 human pathogenic bacteria causing such disease as diarrhoea, dysentery, bronchitis, hair fall, and skin disorders were screened for sensitivity to crude extracts of this taxon. The results of this screening are reported here and also correlated to medicobotanical uses of the plant. Alcoholic extract (50% EtoH) of plant cured patients with infective hepatitis, viral hepatitis and jaundice in children in clinical trials. Alcoholic extract (50% EtoH) of leaf cured patients of myocardial depressant and hypotension²²⁻²³. The study was conducted in 5 districts of western Uttar Pradesh, viz. Aligarh (27° 34 and 28° 11 N and 77° 29 and 78° 38 E);

Bulandshar (28° 4 and 28° 0 N and 77° 0 and 78° 0 E); Budaun (27° 40 and 28° 29 N and 78° 16 and 79° 37 E); Farrukhabad (26° 45 and 27° 42 N and 79° 10 and 80° 6 E) and Hathras (27° 35 N and 78° 3 E). The SC population of the area consists of: *Agariya*, *badhik*, *balmiki*, *beldar*, *chamar*, *jatav*, *dhanuk*, *koli* and *kori*²⁴.

Methodology

Reputed traditional healers known as *Vaidyas* or *Hakeem* were identified on the basis of a pilot survey before the study commenced. Usually the elderly (age group 55-75) herbal healers were preferred. After collecting, healthy plant is shade dried, powdered and paste is prepared. Fresh juice, decoction, powder, extract are commonly used by the traditional healers. Avoidance of spicy food, consumption of hygienic and easily digestible vegetables & pulses and protection from colds are maintained. The informants were requested to provide information on medicobotanical uses of plants along with complete recipe. Plant specimens were identified²⁵⁻²⁶. Each entry in observation section contains disease/conditions, form of recipe, mode of administration, secondary ingredients, food restriction if any and duration of treatment, and place / places wherefrom the claim was obtained in the same order. Voucher specimens were deposited in the herbarium of Department of Botany Aligarh Muslim University, Aligarh.

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Five hundred gm freshly dried and powdered *Eclipta prostrata* plant material was refluxed with 95% methyl alcohol in a round-bottom flask on a water bath for 10 hrs. The process was repeated 4 times to obtain maximum yield of methyl alcohol extract. The extract was evaporated to dryness at 50°C under reduced pressure. Methanol extract, so obtained, was fractionated with light petrol, benzene and methyl alcohol in the same order. Each step was repeated four times to obtain maximum yields²⁷. 500 gm powder of shade dried plant material was mixed with distilled water and left for 72 hrs at room temperature. The plant material was then refluxed over hot water bath for 10 hrs and the mother liquor was filtered. This process was repeated 4 times. The filtrate, thus obtained, was evaporated to complete dryness on a water bath²⁷. Yields per 1,000 gm dry material were as follows: Petrol \approx 10 gm, Benzene \approx 12 gm, Ethyl acetate \approx 8.5 gm, Methanol \approx 13 gm. Aqueous extract material (500 gm) (yield \approx 40.0 gm).

The plant extracts were tested for antibacterial activity by Disk Diffusion Method using 18 human pathogenic bacteria (Table 1). The bacterial cultures were obtained from the bacterial stock, Department of Microbiology, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, and were maintained at 4 °C on nutrient agar. Autoclaved agar plates (9 cm) were inoculated with a swab under aseptic conditions. Paper disks impregnated with 500µg/ml, 1.0 mg/ml, 2.0 mg/ml, 5.0 mg/ml, 10 mg/ml and 15.0 mg/ml plant extracts were dried and placed on the agar surface. Inoculated petri dishes were incubated overnight at 37°C and the inhibition zones were recorded²⁸⁻³⁰. Each treatment was replicated thrice and the mean inhibition zone was calculated.

Results

Acidity

Plant decoction is administered with cow milk thrice a day. Spicy food is not permitted during this therapy (1&3). Plant decoction is administered orally before each meal for 15 days. Spicy food is not allowed during the course of treatment (1-5).

Alopecia

Equal amounts of fresh extract of *Allium cepa* L. (Liliaceae, *Pyaz*) bulb and *Azadirachta indica* A. Juss leaves (Meliaceae, *Neem*) is applied. Leaf extract of *Eclipta prostrata* is given orally twice a day for 3 months. Treatment can be continued if necessary (1-5).

Asthma

Whole plant ash is given orally with honey, thrice a day for 3 months. The treatment is continued till complete cure is obtained (1-5).

Body pain

Fresh leaf extract is given orally thrice a day for 5 days or till the patient recovers fully (1-5).

Bronchitis & pneumonia

Whole plant decoction is given orally twice a day with honey for 7 days. The treatment is continued till complete cure is obtained (1-5).

Burns

Whole plant extract is given orally twice a day for 15 days. Leaf paste is used for external application. The treatment is continued till complete cure is obtained (1-5).

Constipation

Root powder is given orally once a day for 3 days (1-5).

Diarrhoea and dysentery

Whole plant decoction is given orally thrice a day for 7 days. The treatment is continued till complete cure is obtained (1-5).

Fever

Whole plant extract is given orally twice or thrice a day for 7 days or till the patient recovers fully (1-5).

General weakness

Whole plant extract mixed with three gm fruit powder of *Phyllanthus emblica* L. (Euphorbiaceae, *Amla*) is given orally twice a day for 6 weeks or till the patient fully recovers (1-5).

Gingivitis

Leaf extract is given orally twice a day for 3 weeks or till complete cure is achieved (1-5).

Haemorrhoids

Root extract is administered orally thrice a day. Spicy food is not permitted during the treatment (1&2).

Hair fall

Leaf extract is given orally twice a day with cow milk for 3 months till complete cure is achieved (1-5).

High blood pressure

Plant decoction is given orally twice or thrice a day for three months or till the patient recovers fully. This therapy is prescribed to adult patients only. Minimum intake of spices, fat and salt is advised during treatment (1-5).

Jaundice

Fresh plant extract is given orally twice or thrice a day for 3 weeks or till the patient fully recovers (1-5). Leaf extract along with honey is given orally twice or thrice a day for 15 days or till the patient recovers fully. Plant extract mixed with plant extract of *Boerhavia diffusa* L. (Nyctaginaceae, *Punarnava*) is given orally twice a day for 15 days or till the patient recovers fully (1-2).

Liver enlargement

Plant extract is given orally twice or thrice a day for one month or till the patient recovers fully. This therapy is prescribed to adult patients only. Minimum intake of spices, fat and salt is advised during treatment (1-5).

Loss of appetite

Leaf decoction is given orally before each meal, twice a day for 15 days till complete cure is obtained (1,2,3). Leaf powder is given orally after each meal for 15 days (1,2,6).

Oedema

Plant extract is given twice a day for 7 days or till the patient fully recovers.

Palpitation of heart

Leaf extract mixed with honey is given orally thrice a day for 5 days or till the patient recovers fully (1-5).

Paronychia or whitlo

Whole plant paste is applied externally (1-5).

Pimples

Fresh leaf extract is given orally twice a day with cow milk for 2 months till complete cure is achieved. Spicy food is prohibited (1-5).

Premature graying of hair

Fresh leaf extract is gently applied to hair (1-5).

Skin diseases

Plant paste is applied externally in eczema for 15 days. Leaf paste is applied externally to boils and extract is given orally twice a day for 15 days (1,2,5).

Spleen enlargement

Leaf extract mixed with honey is given orally, twice or thrice a day for 15 days or till the patient fully recovers.

Urinary tract infections

Plant extract is given orally twice a day for 15 days. The same recipe is used to wash genitalia externally; treatment continues till complete cure (1-5).

Weakness of vision

Leaf extract is given orally twice a day with cow milk for 3 months till complete cure is obtained (1-3).

Wounds

Leaf extract is used to wash open wounds (1,3,5).

Wrinkles

Leaf extract with *Withania somnifera* (L.) Dunal (Solanaceae, *Ashwagandha*) root powder is given orally with cow milk twice a day for 3 months (1-5).

(1= Aligarh, 2= Budaun, 3= Bulandshahar, 4= Farrukhabad and 5= Hathras)

Antibacterial activity

Ethyl acetate and methanol extracts were found to be most effective, both extract showed antibacterial activity against 61% of bacteria tested. Minimum growth inhibition activity (39%) was shown by benzene extract. *Streptococcus haemolyticus* Group-A, *Streptococcus haemolyticus* Group-B, *Streptococcus faecalis*, *Pseudomonas aerations*, *Salmonella typhi* and *Plesiomonas shigelloides* were resistant to all tested extracts (Table 1).

Discussion

The study documented 33 medicobotanical uses of *Eclipta prostrata* for phytotherapy of 29 diseases and conditions as practiced by traditional healers in five districts. Some of the claims gathered during the study may be explained on the basis of known pharmacological properties of this species. There are two claims for the treatment of haemorrhoids and constipation making use of the plant roots. Constipation is often a predisposing factor for haemorrhoids. *Eclipta prostrata* roots possess purgative, haemostatic and anti-inflammatory properties²²⁻²³. Therefore, administration of root extract may ease the passage of stool and reduce blood flow and inflammation. Similarly, myocardial depressant and hypotensive activity of alcoholic extract of *Eclipta prostrata* leaves explain its application in treatment of high blood pressure and palpitation of heart²²⁻²³. Hyperacidity and loss of appetite are often a manifestation of liver disorders. Powder of *Eclipta prostrata* plant has been shown to cure infective hepatitis, viral hepatitis and jaundice. Therefore administration of *Eclipta prostrata* decoction may rectify the functioning of liver resulting in improved appetite and reduced acidity.

Application of *Eclipta prostrata* in the treatment of wounds, fever, hair fall, pimples, gingivitis, bronchitis, pneumonia and urinary tract infection, etc.

Table 1—Antibacterial activity of *Eclipta prostrta* Linn.

Extract and concentration	INHIBITION							ZONE (mm)										
	Gram Positive Bacteria							Gram Negative Bacteria										
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10	11
PETROL	06	02	03	-	-	-	-	-	00		04	-	-	-	-	05	06	-
500 µg																		
1 mg	06	05	06	-	-	-	-	-	03	-	04	05	-	-	-	06	06	-
2 mg	11	08	10	-	-	-	-	-	08	-	09	08	-	-	-	09	09	-
5 mg	14	11	12	-	-	-	-	-	12	-	12	11	-	-	-	12	13	-
10 mg	18	16	16	-	-	-	-	-	17	-	17	16	-	-	-	18	17	-
15 mg	22	19	19	-	-	-	-	-	20	-	21	19	-	-	-	20	19	-
BENZENE																		
500 µg		-	06	-	-	-	04	00	00	-	04	-	-	-	00	-	-	-
1 mg	03	-	07	-	-	-	05	05	02	-	06	-	-	-	03	-	-	-
2 mg	06	-	10	-	-	-	09	08	06	-	09	-	-	-	07	-	-	-
5 mg	12	-	14	-	-	-	12	11	09	-	12	-	-	-	12	-	-	-
10 mg	16	-	17	-	-	-	16	16	12	-	16	-	-	-	16	-	-	-
15 mg	19	-	20	-	-	-	21	19	16	-	19	-	-	-	19	-	-	-
ETHYL ACETATE																		
500 µg	04	04	04	-	-	-	04	05	04	-	04	03	-	-	03	02	02	-
1 mg	04	05	05	-	-	-	05	07	04	-	05	04	-	-	05	03	03	-
2 mg	08	08	07	-	-	-	09	11	08	-	08	06	-	-	09	06	06	-
5 mg	14	14	12	-	-	-	15	15	10	-	11	09	-	-	14	09	09	-
10 mg	17	16	17	-	-	-	19	21	13	-	13	14	-	-	17	11	11	-
15 mg	21	20	21	-	-	-	21	22	17	-	22	19	-	-	21	13	15	-
METHANOL																		
500 µg	03	04	04	-	-	-	04	05	04	-	03	03	-	-	04	02	02	-
1 mg	04	05	04	-	-	-	05	05	06	-	04	05	-	-	05	02	05	-
2 mg	08	09	08	-	-	-	08	08	10	-	08	08	-	-	04	09	06	-
5 mg	14	15	12	-	-	-	14	14	14	-	11	14	-	-	13	09	09	-
10 mg	17	17	17	-	-	-	17	17	17	-	13	17	-	-	19	11	11	-
15 mg	21	21	20	-	-	-	20	20	21	-	18	20	-	-		15	14	-
AQUEOUS																		
500 µg	-	04	02	-	-	-	03	05	04	-	03	03	-	-	02	02	-	-
1 mg	-	05	04	-	-	-	05	05	06	-	04	05	-	-	03	02	-	-
2 mg	-	06	06	-	-	-	06	08	10	-	08	08	-	-	07	10	05	05
5 mg	-	11	10	-	-	-	11	14	14	-	11	14	-	-	13	09	07	-
10 mg	-	15	16	-	-	-	15	17	17	-	13	17	-	-	19	11	10	-
15 mg	-	19	19	-	-	-	19	20	21	-	18	20	-	-		15	12	-
Chloramphenicol																		
10 µg/disc	18	18	16	-	-	-	16	18	16	-	16	18	-	16	17	19	18	20

Gram Positive Bacteria: 1. *Staphylococcus aureus* 2. *Staphylococcus aureus* ATCC 25953 3. *Staphylococcus albus* 4. *Streptococcus haemolyticus* Group-A 5. *Streptococcus haemolyticus* Group-B 6. *Streptococcus faecalis* 7. *Bacillus subtilis*
 Gram Negative Bacteria: 1. *Escherichia coli* 2. *Edwardsiella tarda* 3. *Klebsiella pneumoniae* 4. *Proteus mirabilis* 5. *Proteus vulgaris* 6. *Pseudomonas aeruginosa* 7. *Salmonella typhi* 8. *Shigella boydii* 9. *Shigella dysenteriae* 10. *Shigella flexneri* 11. *Plesiomonas shigelloides*

^aValues are the mean of three replicates; (-) no inhibition.

is indicative of antibacterial properties possessed by this species. Further studies are needed to isolate active principles from various fractions of crude extracts and determine their antibacterial potential.

The bacteria included in the study also cause some other human diseases, such as oral and throat infections, stomatitis tonsillitis, gastroenteritis, food poisoning, septicemia, toxic shock syndrome, scarlet

fever and folliculitis, etc²⁹⁻³¹. Therefore, active constituents of *Eclipta prostrata* could be useful in the treatment of these diseases as well.

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References

- Dixit RS & Pandey HC, Plant use as folk medicine in Jhansi and Laitpur sections of Bundelkhand, Uttar Pradesh, *Int J Crude Drug Res*, 22 (1984) 47.
- Jain SK, *Dictionary of Indian Folk Medicine and Ethnobotany*, (Deep Publications, New Delhi), 1991.
- Khanna KK & Mudgal V, Ethnobotany of Uttar Pradesh Plains, 4th Int Cong Ethnobiol, NBRI Lucknow, 1994, 340.
- Ali MS & Azhar I, Treatment by natural drugs, *Hamdard Medicus*, 63 (2000) 72.
- Sharma SK & Ali M, Ansari SH & Gupta J, Evaluation of Indian hepatoprotective drugs, *Hamdard Medicus*, 63 (2) (2000) 39.
- Singh VK, Ali ZA & Siddiqui MK, Medicinal plants used by the forest ethnics of Gorakhpur district (Uttar Pradesh), *Int J Pharm*, 35 (3) (1997) 194.
- Khan AV & Khan AA, Herbal folklores for male sexual disorders and debilities in western Uttar Pradesh, *Indian J Traditional Knowledge*, 4 (3) (2005) 317.
- Siddiqui TO, Javed K & Alam MM, Folk medicinal claims of western Uttar Pradesh, India, *Hamdard Medicus*, 43 (2) (2000) 59.
- Nath D, Sethi N, Srivastava S & Jain AK, Survey in indigenous medicinal plants used for abortion in some districts of Uttar Pradesh, *Fitoterapia*, 68 (3) (1997) 223.
- Alam MM, Siddiqui MB & Husain W, Treatment of diabetes through herbal drugs in rural India, *Fitoterapia*, 61 (3) (1990) 240.
- Ali ZA, Folk veterinary medicine in Moradabad district (U.P.), *Fitoterapia*, 70, 1998, 340.
- Anis M & Iqbal M, Medicinal plant lore of Aligarh, India, *Int J Pharm*, 32 (1) (1994) 59.
- Khan AV & Khan AA, Ethnomedicinal uses of *Achyranthes aspera* L. (Amaranthaceae) in management of gynaecological disorders in western Uttar Pradesh (India), *Ethnobotanical Leaflets* (e-Journal). (Southern Illinois University Carbondale.) (<http://www.siu.edu/~ebl/>) (Edition 2005)
- Khan AV, Alam MM & Singh VK, Ethnomedicinal uses of *Citrullus colocynthis* (L.) Schrad. in rural areas of Aligarh district of Uttar Pradesh, India, in: *Ethnomed & Pharmacog II Rec Prog In: Med. Plants*, V 7, by Singh VK, Govil JN, Hashmi S & Singh G, (Sci Tech USA), 2003, 383-388.
- Dixit RS & Pandey HC, Plants used as folk medicine in Jhansi and Lalitpur sections of Bundelkhand, Uttar Pradesh, *Int J Crude Drug Res*, 22 (1984) 47.
- Singh VK & Ali ZA, Folk medicines of Aligarh (Uttar Pradesh) India, *Fitoterapia*, 60 (6) (1988) 483.
- Khan AV, *Ethnobotanical studies of plants with medicinal and anti bacterial properties*, (PhD Thesis Aligarh Muslim University Aligarh), 2002.
- Khan AV, Parveen G, Alam MM & Singh VK, Ethnomedicinal uses of Neem in rural areas of Uttar Pradesh, India, in: *Ethnomed & Pharmacog II Rec Prog in Med Plants*, Vol 7, by Singh VK, Govil JN, Hashmi S & Singh G, (Sci Tech USA) 2003, 319-326.
- Khan AV & Khan AA, Herbal abortifacient used by folk people of some districts of Western Uttar Pradesh (India), *J Nat Remedies*, 3(1) (2003) 41.
- Khan AV & Alam MM, *Achyranthes aspera* L. in the healthcare of rural population of Uttar Pradesh, India, *Hamdard Medicus*, 52 (1) (2003) 447.
- Khan AV & Khan AA, Medico-ethnobotanical uses of *Phyllanthus fraternus* webst. (Family- Euphorbiaceae) from western Uttar Pradesh, *J Nat Remedies*, 4(1) (2003) 73.
- Asolkar LV, Kakkar KK, Chakra OJ, *Second Supplement to Glossary of Indian Medicinal Plants with Active Principles*, Part I (A-K), (Publications and Information Directorate, CSIR, New Delhi), 1992, 414.
- Chopra RN, Chopra LC & Varma BS, *Supplement to Glossary of Indian Medicinal Plants*, (Publications and Information Directorate, CSIR, New Delhi), 1980, 104.
- Anonymous, *Census of India, Vol iii General Population and SC ST Tables*, The SC & ST Order Amendment Act 1976, (Directorate of Census Operations, Uttar Pradesh), 2001.
- Bennet SSR, *Name Changes in Flowering Plants of India and Adjacent Regions* (Triseas Publishers, Dehradun, India), 1987, 203
- Shetty BV & Singh V, *Flora of Rajasthan*, Vol I, (Botanical Survey of India, Calcutta, India), 1987 409
- Harbone JB, *Phytochemical Methods, A Guide to Modern Technique of Plant Analysis*, (Chapman and Hall, London), 1973, 269.
- Bauer AW, Kirby WMM & Sherris T, Antibiotic susceptibility testing by a standard single disc method, *Am J Clin Path*, 45 (1996), 493.
- Colle JA & Marr W, Cultivation of Bacteria, in: *Practical Microbiology*, by Mackie & Mc Cartney (Churchill Livingstone, USA), 1989, 121-140.
- Cruickshank R, *Medical Microbiology: A Guide to Diagnosis and Control of Infection*, (E & S Livingston Ltd Edinburgh & London), 1968, 888.
- Leslie C, Albert B & Max S, *Microbiology and Microbiological Infections*, (Tople and Wilsons, Oxford University Press New York), 1997, 345.