Ethnopharmacological values of weeds in Eastern Uttar Pradesh, India

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Weeds may be potential source of useful drugs if they are evaluated through proper identification, characterization, and biochemical screening. The main goal of this study was to know the importance of weeds in the modern medicine sector and addresses their implications for public health. The ethnomedical data of weeds were collected through semi-structured interviews of fifty four healers, group discussion, and field observation. According to the results, weeds have been an exemplary source of medicine in human health care system. The present paper reviews 24 weeds of medicinal importance that have been mostly used by tribal people for the treatment of several diseases like respiratory, stomach, kidney disorders, diabetes, wounds healings, etc. The most commonly used drugs of modern medicine such as atropine, berberine, vinblastine and vincristine (anti-cancers), digitalis, etc., have been originated from weeds. Therefore, weeds are one of the best choices in establishing a new way for drugs development in herbal medicine sector.

Key words: Weeds, medicinal plants, phytopharmacological study, chemical composition, drugs, traditional value.

INTRODUCTION

Drugs discovery in current scenario has become possible in the international pharmacopoeia via the study of ethnopharmacology and traditional medicine. Traditional knowledge of weeds can serve as powerful approaches which will greatly facilitate the drug discovery. Weeds are important source of medicines for indigenous peoples and having a highly significant role in indigenous pharmacopoeias just like to other plants. Weeds are easily available throughout the world in all types of disturbed environment. It has been estimated that in 250,000 flowering plants (Heywood, 1993), 8000 plants are weeds (Holm, 1978). These weeds are generally non-cultivated plants (Baker, 1965), unlike to other medicinal plants but can achieve higher rank in drug development in near future.

Isolation and characterization of pharmacological compounds from weed plants are increasing day by day. Several important drugs have been derived from weeds that are used in treatment of different diseases. Twelve families of weeds have been reported, that are common for other medicinal plants. Some of them are Asteraceae, Fabaceae, Convolvulaceae, Euphorbiaceae, Malvaceae, and Solanaceae. Weeds are generally used by tribal practitioners in stomach disorders, skin diseases, aphrodisiacs, fever, tonic, ulcer, asthma, snake-bite, respiratory diseases, leucorrhoea, dandruff, eye-diseases, and diabetes. Medicines were prepared in the form of powder, decoction, paste, and juice.

Plants become medicinally important when their therapeutic uses are discovered (Singh and Singh, 2009). Weeds can also be a potent source of useful drugs if they are evaluated through proper characterization and phytochemical screening. The knowledge of phytochemical composition and their medicinal value can play a pivotal role in establishing the importance of weeds in the modern health care system. Drug discovery from weeds will be more holistic and can provide maximum benefits to community. A large number of
phytochemicals have been isolated from weeds that include sitosterol from *Adhatoda vasaica*, saponin A and B from *Achyranthes aspera*, aspartate aminotransferase from *Andrographis paniculata*, alkaloids from *Argemone mexicana* and atropine from *Datura metal*.

There is a need to open new researches on weeds to investigate their pharmaceutical importance in pharmaceutical industries. There is no need for weeds to be conserved at a large scale, because they are wide spread, but in present time, they also occupy a limit space like other valuable medicinal plants. Such a non-discriminatory approach made for the conservation of both weeds and medicinal plants will be same in our future interests. The main focus of this study was to characterize the traditional and ethnopharmacological importance of weeds in the modern medicine sector.

**MATERIALS AND METHODS**

**Study area**

The Sonbhadra Districts of the Eastern Uttar Pradesh in India are well known for their highly dense forest and rich vegetation with a wide variety of plants due to its geographical and climatic conditions, selected to document the medicinal values of weeds.

**Data collection**

Information was collected through interviews with 54 persons of age between 45 and 70. The methods used for this study were semi structured interviews described by Cotton (1996) and Martin (1995). Our questions were based on their medicinal uses, plant parts used in drug preparation, detailed information about mode of use (that is, decoction, paste, powder, and juice), and form of usage either fresh or dried and mixtures of other plants used as ingredients.

**RESULTS**

The ethnomedicinal knowledge of all weeds are based on exiting literature and information gathered mainly from several tribal areas that is inhabiting surrounding the forest area of Sonbhadra district. The significant representation of weeds in the medicine sector from which drugs are currently derived is reported here. There are about 250 plant species growing as weeds. Out of 62 studied problematic weeds, 24 weeds are medicinally important and are used to treat different diseases (Table 1).

The importance of weeds in the present pharmaceutical sector has been overlooked despite significant evidences that weeds are an important source of drugs for indigenous peoples. The overall results suggest that the use of these plants in folk medicine remedies for treating various health problems has already been reported. So, scientific community should attain more attention for proper phytochemical screening of weeds and also for their conservation. These weeds are most frequently used as antihelminthic, anti-inflammatory, antihepatoxic, anticarcinogenic, and anti diabetic. Some weeds are also reported here that are very important apart from those reported in scientific research like *Phyllanthus amarus* and *Lantana camara*.

**DISCUSSION**

**Biochemical investigations of weeds in relation to ethnomedicine**

In recent years, approximately 110 plants based new drugs were introduced in India pharmaceuticals, including reserpinamine, reserpine, vinblastine, and vincristine which were derived from weed plants. Thus, weeds provide outstanding contribution to modern therapeutics; for example: serpentine isolated from the root of Indian plant *Rauwolfia serpentina* in 1953, was a revolutionary event in the treatment of hypertension and lowering of blood pressure. Vinblastine, isolated from the *Catharanthus roseus* is used for the treatment of cancer (Surh, 2003). Vincristine is recommended for acute lymphocytic leukemia in childhood advanced stages of hodgkins, lymphosarcoma, small cell lung, cervical and breast cancer. Drugs derived from weeds are used to cure mental illness, skin diseases, tuberculosis, diabetes, jaundice, hypertension, and cancer. Weeds play an important role in the development of potent therapeutic agents. Some weeds have been found to possess significant antibacterial properties, such as *A. aspera* L., *Boerhavia diffusa* L., and *Tribulus terrestris* L., and also anti diabetic properties such as *C. roseus* L., while lupeol acetate isolated from the root extract of Indian sarsaparilla *Hemidesmus indicus* R.Br is used for antidotes activity in viper and cobra snake venom neutralization. It has been reported that an active compound from the *Strychnus nux vomica* seed extract, inhibited viper venom induced lipid peroxidation in animals.

**Importance of weeds in remote areas**

Mostly, tribal people that inhabit in remote areas where government facility for medical care system is null and medicinally rich dense forest are very far away, depend on the weeds to treat their ailments, because they can easily grow and quickly colonize everywhere. Weeds are successful in disturbed environments, short lived and fast growing.

**Future status of weeds plants in pharmaceutical industries**

The R&D thrust in the pharmaceutical sector is focused on the development of plant based drugs through
Table 1. Ethnopharmacological importance of weeds.

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Family</th>
<th>Local name</th>
<th>Part used</th>
<th>Ethnomedicinal uses</th>
<th>Phytochemical constituents</th>
<th>Phytopharmacological status</th>
</tr>
</thead>
</table>
| Adhatoda vasica Nees.   | Acanthaceae       | Adusa        | Root, flower, leaf             | Leaves, flowers, fruits and roots are extensively used for treating cold, cough, chronic bronchitis and asthma. | Vasicine, β-sitosterol, kaempferol, adhatodic acid                                           | - Abortifacient activity  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Anti-asthmatic |
|                         |                   |              |                                |                                                                                    |                                                                                               | - Antitussive effect  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Antipasmodic activity  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Uterotonic |
| Abutilon indicum L.     | Malvaceae         | Atibala      | Roots, leaves, flower          | The milk of the plant cures urinary discharge.                                        | Abutilin- A, 4-hydroxybenzamide, sesquiterpene, alantolactone                              | - Wound- healing activity  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Analgesic activity |
| Achyranthus aspera L.   | Amaranthaceae     | Latjeera     | Different parts including seeds | The root of the plant is used for easy delivery. It is also used with shami root to cure jaundice given with butter. | Achyantine, saponin-A, saponin-B, tanine                                                   | - Anti-inflammatory activity  
| Andrographis Paniculata | Acanthaceae       | Kalmegh      | Whole plant                    | Used in stomach problem.                                                              | Alanine aminotransferase se (ALT), aspartate aminotransferase se (AST), neo-andrographolid e | - Anti-periodic activity  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Cardioprotective activity  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Hepatoprotective activity  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Immune Enhancement  |
| Argemone Mexicana Linn. | Papaveraceae      | Bhadbhand    | Whole plant                    | Along with black piper the panchang used in indigestion and its milky juice is used for conjunctivitis. | Alkaloids, protopine, allocryptopine                                                      | - Clinicopathology |
| Boerhavia diffusa L.    | Nyctaginaceae     | Punarnawa    | Leaves, root                   | The decoction of whole plant is taken continuously once every morning to improve general health. | Punarnavine, ursolic acid, liroderin steroids                                            | - Anti-bacterial  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Anti-inflammatory activity  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Anti-convulsant  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Anti-bacterial property  |
| Carissa carandas Linn.  | Apocynaceae       | Karaunda     | Root, fruit                    | Root extract is used in fever.                                                        | Carissone, β-sitosterol, caffeic acid, D-glucose                                          | - Anthelmintic activity  
|                         |                   |              |                                |                                                                                    |                                                                                               | - Anti-pyretic activity  |
| Cleome viscosa L.       | Capparidaceae     | Hurhum       | Seed                           | The dried seed powder is mixed with sugar and administered orally twice a day for 7 days to relieve body pain. | 7-phenoxycaumain lactone, cleomeolide                                                      | - Anti-pyretic activity  |
| Catharanthus roseus L.  | Apocynaceae       | Sadabahar    | Leave, root                    | It is useful in leukemia and diabetes.                                                | Tabersonine, serpentine, vindoline                                                          | - Hypotensive activity  
<p>|                         |                   |              |                                |                                                                                    |                                                                                               | - Hypolipidemic effects  |</p>
<table>
<thead>
<tr>
<th><strong>Table 1. Contd.</strong></th>
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<tbody>
<tr>
<td><strong>Coccinia indica W &amp; A</strong></td>
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<tr>
<td><strong>Cyperus rotundus Linn.</strong></td>
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<tr>
<td><strong>Datura metal Linn.</strong></td>
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<tr>
<td><strong>Euphorbia thymifolia Linn.</strong></td>
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<tr>
<td><strong>Eclipta alba L.</strong></td>
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<tr>
<td><strong>Hemidesmus indicus B</strong></td>
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<tr>
<td><strong>Lantana indica Linn.</strong></td>
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<tr>
<td><strong>Leucas cephalotus Spreng. Labiatae</strong></td>
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investigation of traditional system of medicine. Around 80% of pharmaceutical products are of plant origin. The higher rate of human population is responsible for depletion of plants and plants based product in forest regions that are essential raw materials for pharmaceutical industries in drugs development. In such conditions, weeds can also be used in pharmaceutical industries as raw materials in the drug development (John, 2004). Many weeds are used in curing more than one disease, for example, *H. indicus* is used to cure 34 types of diseases, *Aegle marmelos* is

<table>
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<tr>
<td><strong>Phyllanthus niruri</strong> Linn.</td>
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<tr>
<td><strong>Phyllanthus amarus</strong> Schum. &amp; Thonn.</td>
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<tr>
<td><strong>Sida rhombofolia</strong> L.</td>
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<tr>
<td><strong>Solanum Xanthocarpum</strong> Schrad &amp; Wenell.</td>
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<tr>
<td><strong>Strychnos. Nux-Vomica</strong> Linn.</td>
</tr>
<tr>
<td><strong>Tribulus terrestris</strong> L.</td>
</tr>
<tr>
<td><strong>Vetiveria zizanoides</strong> L.</td>
</tr>
</tbody>
</table>

- Anti-HIV
- Anti-malarial
- Anti-cancerous
- Anti-hepatitis
- Anti-diabetic
- Anti-cholesterol agents
- Anti-hepatotoxic
- Anti-hypertensive
- Antinociceptive
- Anti-inflammatory
- Anti-oxidant activity
- Anti-bacterial activity
- Antitumor activity
- Hypoglycaemic activity
- Antipyretic activity
- Anti-inflammatory
- Anti-asthamatic
- Anthelmintic
- Immunomodulation activity
- Diuretic
- Contractile effect
- Anti-inflammatory activity
- Antioxidant activity
used to cure 31 types of diseases and *Phyllanthus emblica* is used to cure 29 types of diseases.

**Conclusion**

The evidence presented here suggests that screening of the weeds may yield more medicinal compounds and play an important role in the healthcare system of the tribal community. The claimed therapeutic values of the reported species call for modern scientific studies for their phytochemical composition. These weeds are relatively high in bioactive secondary compounds and are thus likely to hold promises for new drug development.

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**REFERENCES**


Cotton CM (1996). Ethnobotany: Principles and applications Chichester, New York: John Wiley and Sons Ltd.


