Folk Medicinal Uses of the Plant Roots from Banaras Hindu University Main Campus, India

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INTRODUCTION

Folk medicine also known as traditional medicine comprises knowledge system that developed over generations within various societies before the era of modern medicine. According to the World Health Organization 80% of the population of developing countries relies on traditional medicines for their primary health care needs. Plants have been the basis of many traditional medicine systems throughout the world for several thousand years and continue to provide mankind with new remedies. According to an estimate about 25,000 formulations in modern allopathic system of medicine are derived from those plants which are being used as folk medicines throughout the world since ages (Pandey and Kumar, 2006). The rural people of India are still dependent on traditional medicines for treatment of various diseases. Out of more than 8,000 plant species used in India, many of them are used for their medicinal values by the rural people and tribals to cure their diseases (Tiwari, 2000). Several studies have been conducted to explore the folk medicinal uses of plants in India (Jain, 1963; Pandey et al., 1981; Singh and Maheshwari, 1983; Dixin and Pandey, 1984; Saxena, 1986; Malkhuri et al., 1998; Dhiman and Khanna, 2001; Khanna, 2002; Singh et al., 2002; Tomar and Singh, 2005 a, b; Pandey and Kumar, 2006; Tomar, 2009; Singh, 2015a).

Banaras Hindu University which is the largest teaching and residential university of Asia was founded by great freedom fighter and social reformer Pandit Madan Mohan Malaviya (1861-1946) in 1916 during the Indian freedom movement as a national university with donations from both rich and the poor. Presently this vast university has two campuses, 4 institutes, 16 faculties and 140 departments, 4 advanced centers and 4 interdisciplinary centers (Gautam and Mishra, 2015). The newly established fourth institute of the university named Institute of Environment and Sustainable Development (IESD) has been founded by internationally renowned Ecologist Professor J. S. Singh. About a century old protected main campus of Banaras Hindu University hosts a vast variety of plant species (Singh, 2015b). Studies have been conducted to assess the medicinal floristic wealth of the university campus (Singh, 2015c, d). However, the main objective of the present study was to explore the folk medicinal uses of the plant roots growing on the Banaras Hindu University main campus.

STUDY AREA

Banaras Hindu University main campus (Figure 1) which spreads over 1,350 acres of land area is located about 5 km south of Varanasi city on the western bank of sacred river Ganges (25º18′ N latitude and 83º 1′ E longitude), on levelled topography at an elevation of 76 m (Singh et al., 1971). The campus is covered with alluvial deposits of river Ganges. Soil is fertile and sandy loam in texture.
The climate is Tropical monsoonal type with three distinct season; the cold (November to February), the hot (March to mid-June), and the rainy (mid-June to September), while October is regarded strictly as transitional month. The diurnal range of temperature ranges as average between 13ºC and 14.5ºC in the cold and hot months. The highest monthly temperature is recorded in May, varying between 32ºC and 42ºC. The annual rainfall is around 100 cm (Singh and Rana, 2006).

METHODOLOGY

The present study is based on intensive field survey conducted between July 2006 to June 2014 from time to time in different seasons on the Banaras Hindu University main campus for the observations and collections of vascular plant specimens to explore the flora of the university campus. During the field survey it was observed that rural people residing in the villages nearby the university campus like Seer Govardhanpur, Bhagwanpur, Chhittupur, Sushwahi, Karmanveer, Nasirpur, Jangampur, Narayanpur, Nuao, Narottampur, Madhopur, Brindavan, Tikari, Kandwa, Kanchanpur, Madarwa etc. frequently visit the university campus to collect the plant roots for the fulfillment of their medicinal needs. The folk medicinal uses of plant roots is based on interviews with these rural people. The traditional medicinal practitioners and elderly people of villages were also consulted to confirm the folk medicinal uses of plant roots. The plant specimens were identified through various sources (Hooker, 1875-1897; Duthie, 1903-1922; Kirtikar and Basu, 1975). Based on the habits the recorded plants were categorized into three types; herb, undershrub and shrub. The APG III (2009) classification was followed for arranging the taxa to families.

RESULTS AND DISCUSSION

Plants of Banaras Hindu University main campus whose roots are used as folk medicines for treatment of different diseases are presented in Table 1. Previous studies on the medicinal flora of the Banaras Hindu University main campus reveals that university campus hosts a large variety of medicinal plants (Singh, 2015c, d). However, in the present medico-ethnobotanical study
Table 1: Plants of the Banaras Hindu University main campus whose roots are used as folk medicines against different ailments by rural people residing in villages nearby the university campus

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Plant Species</th>
<th>Family</th>
<th>Habit</th>
<th>Local name</th>
<th>Medicinal uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Asparagus racemosus</em> Willd.</td>
<td>Asparagaceae</td>
<td>Shrub</td>
<td>Satawar</td>
<td>Juice of roots is used against epilepsy. Root powder is taken with milk and sugar against seminal debility</td>
</tr>
<tr>
<td>2.</td>
<td><em>Biophytum sensitivum</em> (Linn.) DC.</td>
<td>Oxalidaceae</td>
<td>Herb</td>
<td>Lajoni</td>
<td>Root decoction is used in treatment of fever</td>
</tr>
<tr>
<td>3.</td>
<td><em>Boerhavia diffusa</em> Linn.</td>
<td>Nyctaginaceae</td>
<td>Herb</td>
<td>Gadahpurna</td>
<td>Crushed or powdered roots are given with honey to cure jaundice</td>
</tr>
<tr>
<td>4.</td>
<td><em>Coccinia grandis</em> (Linn.) Voigt</td>
<td>Cucurbitaceae</td>
<td>Herb</td>
<td>Kunru</td>
<td>Juice of roots is used in treatment of jaundice and diabetes</td>
</tr>
<tr>
<td>5.</td>
<td><em>Desmodium gangeticum</em> (Linn.) DC.</td>
<td>Fabaceae</td>
<td>Under-shrub</td>
<td>Salparni</td>
<td>Root juice is used to cure asthma</td>
</tr>
<tr>
<td>6.</td>
<td><em>Peristrophe bicalyculata</em> (Retz.) Nees</td>
<td>Acanthaceae</td>
<td>Herb</td>
<td>Chitchita</td>
<td>Root decoction is used against fever</td>
</tr>
<tr>
<td>7.</td>
<td><em>Phyllanthus niruri</em> Linn.</td>
<td>Phyllanthaceae</td>
<td>Herb</td>
<td>Bhui aonla</td>
<td>Decoction of roots is used against jaundice</td>
</tr>
<tr>
<td>8.</td>
<td><em>Rauvolfia serpentina</em> Benth.</td>
<td>Apocynaceae</td>
<td>Shrub</td>
<td>Sarpagandha</td>
<td>Root decoction is given during labour pain to promote uterine contraction</td>
</tr>
<tr>
<td>9.</td>
<td><em>Sida cordifolia</em> Linn.</td>
<td>Malvaceae</td>
<td>Under-shrub</td>
<td>Bariara</td>
<td>Root bark is used to cure leucorrhoea</td>
</tr>
<tr>
<td>10.</td>
<td><em>Solanum xanthocarpum</em> Schrad. &amp; Wendl.</td>
<td>Solanaceae</td>
<td>Herb</td>
<td>Bhatkatiya</td>
<td>Decoction of roots is given in fever, cough and asthma</td>
</tr>
<tr>
<td>11.</td>
<td><em>Sphaeranthus indicus</em> Linn.</td>
<td>Asteraceae</td>
<td>Herb</td>
<td>Mundi</td>
<td>Root decoction is used in treatment of chest pains and cough</td>
</tr>
<tr>
<td>12.</td>
<td><em>Tephrosia purpurea</em> Linn.</td>
<td>Fabaceae</td>
<td>Herb</td>
<td>Sarpunkha</td>
<td>Juice of root bark is used against stomach pain</td>
</tr>
<tr>
<td>13.</td>
<td><em>Tribulus terrestris</em> Linn.</td>
<td>Zygophyllaceae</td>
<td>Herb</td>
<td>Gokhru</td>
<td>Root extracts are used against kidney stones</td>
</tr>
<tr>
<td>14.</td>
<td><em>Ziziphus jujuba</em> Mill.</td>
<td>Rhamnaceae</td>
<td>Shrub</td>
<td>Ber</td>
<td>Decoction of root bark is given in treatment of diarrhea</td>
</tr>
</tbody>
</table>

14 plant species of 14 genera belonging to 13 families were recorded on the university campus whose roots are used as folk medicines against diseases such as fever, cough, asthma jaundice, diabetes, diarrhoea, leucorrhoea, epilepsy, chest pains, stomach pains, kidney stones, seminal debility and to ease the child birth. Compared to this study on folk medicinal uses of roots, Singh (2015a) recorded 41 plants of 38 genera belonging to 23 families on the Banaras Hindu University main campus whose leaves are used as folk medicines against different ailments.

The maximum number of plants i.e. 2 species were represented by the Fabaceae family. Thus it is evident from the study that Fabaceae is the dominant family of the plants of Banaras Hindu University main campus whose roots are used as folk medicines. Study on folk medicinal uses of the plant leaves from university campus also reorts the dominance of the Fabaceae family (Singh, 2015a). Furthermore, studies on medicinal flora of the Banaras Hindu University main campus also suggests the dominance of the Fabaceae family (Singh, 2015 c, d).
Habit analysis of the plants reveals that of total recorded species, 9 (64.29%) were represented by the herbs, 3 (21.42%) by the shrubs and 2 (14.29%) plant species were represented by the undershrubs. Therefore, the study clearly suggests that the roots of the plants of herbaceous habit are medicinally more useful compared to the roots of shrubs and undershrubs. A study on the folk medicinal uses of the plant leaves growing on the Banaras Hindu University main campus also demonstrates that the leaves of the plants of herbaceous habit are medicinally more useful than the leaves of the plants of other habits (Singh, 2015a).

It was observed during the study that the herb *Boerhaavia diffusa* was the most exploited plant for its root on the Banaras Hindu University main campus which is used as popular remedy against jaundice.

**CONCLUSION**

It can be concluded from the study that roots of various plant species of Banaras Hindu University main campus are utilized in traditional system of disease treatment by the rural people residing in villages nearby the university campus. Hence, these folk medicinal plants needs to be preserved and propagated on the Banaras Hindu University campus for the fulfillment of the medicinal requirements of the present and future generations. This would also be helpful in inheritance of the traditional knowledge of using plant roots in treatment of diseases from one generation to the other generation.

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