TRADITIONAL KNOWLEDGE ON HEALING PROPERTIES OF PLANTS IN BANDIPORA DISTRICT OF JAMMU AND KASHMIR, INDIA

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INTRODUCTION

Linnaeus (1754) wrote that “Man, ever desirous of knowledge, has already explored many things, but more and greater still remains concealed; perhaps reserved for distant generations, who shall prosecute the examination of their Creator’s work in remote countries, and make many discoveries for the pleasure and convenience of life.” Even after two and more than half centuries, with so much scientific and technological advancement around, it holds true and remains writing on the wall. Despite remarkable progress in laboratory drug development at present, the earth’s flora and fauna are still the most important source for potential drugs. Traditional medicine refers to health practices, approaches, knowledge and beliefs incorporating plant, animal and mineral based medicines, spiritual therapies, manual techniques and exercises, applied singularly or in combination to treat, diagnose and prevent illnesses or maintain well-being. Over the centuries people have been dependent on the materials around them and through trial and error have learned the special properties of plants in the environment. Sixty percent of the world population and 80% of the population in developing countries rely on traditional medicine, mostly plant drugs, for their primary health care needs (Shrestha and Dhillon, 2003). India and China are two of the largest countries in Asia which have the richest arrays of registered and relatively well known medicinal plants (Ravan, 1998). Ancient Indians were acquainted with large number of plants than the natives of any other country. This is evident from the ancient Indian treatises such as Materia Medica, Nighantu and Koshas. According to Ayurvedic Materia Medica there is no plant on earth which does not have medicinal value. India endowed with a rich wealth of medicinal plants is unique in that these plants are used by all sections of people either directly as folk remedies or in different indigenous systems of medicine or indirectly in the pharmaceutical preparations of modern medicine. In India, the maximum species of medicinal plants have been reported from Uttarakanch (Kala, 2004), followed by Sikkim and North Bengal. The knowledge of medicinal plants has been accumulated in the course of many centuries based on different Indian systems of medicines such as Ayurveda, Unani and Siddha (Alagesaboopathi, 2011). Rigveda and Atharveda which dates back to 2000-1000 BC and several post Vedic treatises, viz., Charakasamhita (100 AD), Sushruthasamhitha (100-800 AD), Dhanwanthari Nighantu (1200 AD), are the important ancient sources of information on medicinal plants (Rajith et al., 2010). It is interesting to note that the ethnomedicinal uses of plants is one of the most successful criteria used by the pharmaceutical industry in finding new therapeutic agents for the various fields of biomedicine (Cox and Balick, 1994). Some outstanding medicinal drugs which have been developed from the ethnomedicinal uses of plants include: vinblastine and vincristine from Catharanthus roseus (the periwinkle) used for treating acute lymphoma, acute leukemias etc. reserpine from Rauwolfia serpentina (Indian Sarpagandha) used for treating hypertension, aspirin from Salix purpurea (Willow) used for treating inflammation, pain and thrombosis and quinine from Cinchona pubescens (Cinchona) used for treating malaria. Research interest and activities in the area of ethnomedicine have increased tremendously in the last decade. It has lead to the well established Asian systems of medicines including Ayurveda and Siddha of India, Unani system of middle and East Asia, Ying and Yan principles of Chinese herbal medicines, Jamu of Indonesia and others (Natesh, 2000).

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The state of Jammu and Kashmir, cradled in the lap of Himalayas has been recognized as heaven on earth and is also called the “Biomass” state of India. This area, located in the far north of the Indian Republic, has a diverse variety of plant species especially those having medicinal properties due to wide variations in its topography and microclimatic conditions. Many studies have been carried out in different areas of the region from time to time to document the traditional knowledge information of the medicinal plants (Sharma and Kachroo, 1981; Sharma and Jamwal, 1988; Bhattacharyya, 1989; Ara and Naqshi, 1992; Kaul, 1994; Kaul, 1997; Kapur, 1995; Singh, 1995; Sharma, 2002; Lone, 2003). But so far as Bandipora District is concerned, a little amount of documented information is available on traditional knowledge about the of uses medicinal plants (Kapahi et al.,1993; Dad and Khan, 2011; Ara and Naqshi, 1992). Therefore, in the present study an attempt has been made with the view to document the medicinal plants that are used traditionally for the treatment of various diseases by the local people in Bandipora district of Jammu & Kashmir, India. Such studies would definitely prove useful for the identification of important medicinal plants that can be subjected to thorough pharmacological investigation so that new potent compounds may be discovered and also appropriate measures may be taken for their conservation.

**MATERIAL AND METHODS**

**Study area**

Bandipora district is one of the 10 districts of Kashmir in northern India with a geographical area of 398 Sq.km’s. The District is located on the northern bank of the Wular Lake- the largest fresh water lake in Asia. The District lies 34°64’ N latitude and 74°96’ E longitude and is situated at an average height of 1701 meters above mean sea level (AMSL). Most of area of the District is hilly terrain and is bounded in the west by district Kupwara, in the South-east by district Ganderbal and in the east by district Kargil, Baramulla in the south and on the north side it is bounded by LOC (Line of Control). The climate of the District has its own peculiarities. The seasons are marked with sudden change and the climate can be divided into six seasons of two months each. These include, Spring (16 March to 15 May), Summer (16 May to 15 July), Rainy Season (16 July to 15 September), Autumn (16 September to 15 November), Winter (16 November to 15 January) and Ice Cold (16 January 15 March). All these seasons are locally called Sont, Retkol, Waharat, Haraed, Wandh and Shishur respectively. The winters are usually harsh due to heavy snowfall and low temperatures. The district is divided into three tehsils namely Bandipora, Gureiz and Sonawari (Fig. 1).

**Procedures**

During investigation, frequent field trips and plant collections were made from various regions of the study area from March 2012 to October 2012. Methods used to document the traditional knowledge included interviews and discussions with local knowledgeable persons, herbal healers called “Bhoris” and Tribals (Gujjars and Bakerwals). During surveys a total of about 77 informants were consulted who were between the ages of 37-95 years. Most of the informants enjoyed a respectable status in the community. A questionnaire was devised to collect the traditional knowledge about medicinal plants from local people especially those residing on hilly areas. Informants were asked questions in Kashmiri language that was understandable in most of the cases. However, Urdu language (official language of J&K) was also used in tribal areas. In order to provide independent information, informants were separately asked to share their traditional knowledge on the utilization of medicinal plants such as the local name, plant part used, ailment(s) in which the part of the plant is used and mode of administration. Data was collected according to an appropriate methodology (Jain, 1967; Jain, 1995; Khan, 1993).

With a view to bring an element of accuracy, the information was cross-checked with that of others. From the natural habitats, plants were collected in their flowering and fruiting stages as far as possible. Field photographs of the plants were taken for easy identification and habitat recognition. Collected plants were dried, pressed, preserved (poisoned) and finally mounted on herbarium sheets following standard herbarium techniques. Plant specimens were identified and then accessioned by matching them with the labelled herbarium specimens lying in the departmental herbarium (KASH herbarium) of Kashmir University, Srinagar (J&K), where one copy of every specimen was deposited for authenticity and future use. Apart from that, available floristic literature (Javeid, 1968; Nawchoo and Kachroo, 1995; Kachroo, 1978; Wali and Tiker, 1964; Kachroo et al.,1977; Kirtikar and Basu, 1933-35; Nasir and Ali, 1970-87) and various publications dealing with the flora of temperate regions were also consulted for identification purposes. Finally one more copy of every specimen was deposited in the herbarium section of the Department of Botany, Government Narmada Post Graduate College, Hoshangabad (M.P), for authenticity and future use.

**RESULTS AND DISCUSSION**

Where there is a life, diseases are bound to exist, therefore life and diseases go together. Since ancient times plants have been indispensable sources of both preventive and curative traditional medicine for human beings and livestock. Medicinal plants are living resources, exhaustible if overused but sustainable if used with care and wisdom. It is noticed that the people living in urban areas have almost no knowledge about medicinal properties of plants (Alcorn, 1984; Altieri and Merick, 1987). In rural areas however, the people especially elders have a sufficient knowledge about this prosperous natural treasure, which is gifted to mankind by God. The important factor to use plants in curing various ailments is the higher prices of allopathic medicine and unavailability of better medicinal facilities (Qureshi et al., 2006). The mountainous areas of Bandipora district remain cut off from the rest at least for 2 months every year due to harsh climatic conditions such as heavy snowfall and low temperature (sometimes below -10°C) during winter. Thus, people have to depend upon wild resources for their daily needs. While on surveys, ethnomedicinal data was gathered by consulting people of different ethnic groups such as Gujjars, Bakerwals and Bhoris. Besides, the knowledgeable persons of the plains who themselves have used these plant-based therapies for health treatments were interviewed to prove veracity of the curative features of plants. All of them were asked for their consent to share their knowledge only for the purpose of this study. Gujjars are generally permanent settlers at the foot hills of Himalayas. Bakerwals are nomadic tribe and high altitude goatherds/shepherds who lead a lonely and tough life in the high altitude meadows of the Himalayas and Pir Panjal ranges (Bhat et al., 2012). While interacting with the Bakerwals it was found that they actually belonged to for flung Rajouri and Poonch districts of Jammu & Kashmir and visited the study area every year in the months of April and May. They take their livestock animals high into the mountains, above the tree line to graze in the lush meadows.
During summer, they move from one meadow to other and ultimately leave the entire district in the months of August and September. However, some of them have settled permanently at the foothills of the Himalayas of the district. For example, a few could easily be found near Saderkoot Bala area who are living there for years. Both these ethnic groups (Gujjars and Bakarwals) have their own knowledge of traditional herbal medicine inherited from their fore-fathers. These medicines are well accepted by the local people since generations have experienced their efficacy in alleviating a variety of diseases (Tantray et al., 2009). Besides, these ethnic groups have to rely on the traditional system as they do not have the modern medicinal facilities available in the vicinity.

Traditionally, Bhoris are the practitioners of this indigenous medicine system, who use to buy important medicinal plants from needy people living both in plains as well as in tribal areas (Lone et al., 2013). They either visit the areas by themselves or the same people visit them for selling these plants. The people especially tribals who sell them herbal medicine in return get a little money to sustain their basic needs of livelihood. Bought medicinal plants are then sold simply by establishing small shops not only in villages but also in towns and cities. While interacting with Bhoris it was found that they used different diagnosis and treatment methods depending on the type of the ailment. The practitioners commonly diagnose each health problem by an interview and visual inspection of the patient. Changes in eye and skin colour, tongue and throat regions, body temperature and status of sores were all visually inspected by the practitioner and the remedy was prescribed. The low cost of herbal medicine and its unlikely income is one of the reasons that youth of Bhoris are discouraged from carrying forward this ethnomedicine prescribing profession and that is why only few Bhoris were found in the study area. It would be appropriate to mention here that, earlier, in the study area, Bhoris were mainly the Kashmiri Pandits (followers of Hinduism) who had vast deep rooted knowledge of prescribing the patients by traditional herbal medicine.

But due to uprising turmoil that started in 1989 in the valley, they left the district in order to defend themselves and migrated along with this precious knowledge to other parts of the state as well as country. This is the reason that a few abandoned shops that belonged to them were reported during the course of survey in the main market of Bandipora. Until they stayed in the district they shared their precious medicinal knowledge with some Kashmiri Muslims among whom a few at present are carrying forward and practicing this profession.

Each medicinal plant species is provided with its botanical name followed by local name, family, flowering period, accession number, plant part used and ethnomedicinal uses (Table 1). As a result of present ethnomedicinal survey of Bandipora district, a total of 34 plant species belonging to equal number of genera and 24 different families were found to be used as effective remedies by the local people to treat and cure various human and livestock ailments. Out of 34 species, angiosperms comprised the highest number being represented by 33 species followed by gymnosperms (1 species). Dicotyledonous and monocotyledonous were represented by 27 species in equal number of genera and 21 families, and by 6 species in equal number of genera and 3 families, respectively, whereas, 1 species of gymnosperm belonging to equal number of genera and family was also recovered (Fig 2).

![Fig 1: Map of the Bandipora District](image1)

**Table 1:** Number of families, genera and species of different groups

<table>
<thead>
<tr>
<th>Plant Group</th>
<th>No. of plant species</th>
<th>No. of genera</th>
<th>No. of families</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dicotyledonous</td>
<td>27</td>
<td>21</td>
<td>1</td>
</tr>
<tr>
<td>Monocotyledonous</td>
<td>6</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Gymnosperms</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Though gymnosperms were represented by only one species, they formed the dominant component in the forests of the study area on account of congenial physiographic conditions and altitudinal location of the area. Of these 34 species, 27 species were alone used as human medicine, only 1 species alone as livestock medicine and the remaining 6 species were used for treating both human and livestock ailments (Fig. 3). The presence of such a large number of medicinal plant species and associated ethnomedicinal knowledge in the district indicates that the area has a very high diversity of medicinal plant species and is a site of precious indigenous knowledge.

Amongst the species, 23 species were collected from the wild, 7 species from cultivation and 4 species from both the sources (Fig. 4). This indicates that the residents depend mostly on the wild source or the natural environment rather than home/vegetable gardens to obtain the medicinal plants, and the activity of cultivating medicinal plants is very poor in the study area. It also indicates that the natural forest of Bandipora district is being over exploited by the people especially by Gujjars, Bakerwals and also traditional practitioners (Bhoris) for its medicinal plants composition.

The highest number of medicinal plants were recorded in two families viz. Liliaceae and Rosaceae (4 species each) followed by families Lamiaeceae, Scrophulariaceae, Caprifoliaceae and Polygonaceae (2 species each) while all other families included one species only (Fig. 5).

This also indicates that the area consisted of considerable diversity of plant species. The general flowering calendar of collected medicinal plants of the study area depicted that maximum number of plants species were in flowering stage in the month of July (22%) followed by June (21%), May (17%), August (14%), April (11%), September (7%), March (4%) and February and Octembe (2% each) whereas no plant species flowered during the months of January, November and December (Fig. 6).

The species in flowering over 9 months of the year first shows an increasing trend reaching maximum in the month of July and then falling again. This trend of flowering during summer is attributable to the physiography of the study area, as major portion of the study area remains covered with snow till the end of June, which prevents seedlings and other vegetative parts from coming out of the soil. The extended flowering period of certain herbaceous annuals is because of their extended distribution along altitudinal gradient. Since there is a gradual decrease of temperature as the altitude increases, the growth of certain plants triggers earlier at lower levels as compared to the species growing at higher elevations (Singh and Kachroo, 1994).

These medicinal plant species were reported to grow in a diverse range of habitats along with an altitudinal range of 1510-3600 meters (amsl), spanning from plains, montane forests, sub-alpine and alpine pastures (Malik et al., 2011). As for as the life form of medicinal plants is concerned the herbs made up the highest proportion being represented with 22 species, followed by trees and shrubs (5 species each) and climbers (2 species) in descending order (Fig. 7). This finding is in conformity with the earlier findings (Srivastava, 1988; Khan et al., 2004; Khuroo et al., 2007; Rashid et al., 2008; Tantray et al., 2009; Kumar et al., 2009; Gangwar et al., 2010; Pant and Pant, 2011; Punjaji, 2012; Ahmad et al., 2012) where herbaceous medicinal plants were also reported to dominate. This could be associated to the abundance and almost year round availability of herbaceous species in the study area.
On the basis of nature of habitat of collected medicinal plants, the highest number were represented by xerophytes (31 species, 91%) followed by mesophytes (3 species, 9%). The maximum number of xerophytes was probably due to physiologically non-availability of usable form of water. While on the basis of the plant parts used, it was observed that the maximum plant species (8 species) were found to be used as various parts such as leaves, roots, rhizomes, flowers, seeds and fruits etc. followed by whole plants and roots (5 species each), fruits (4 species), leaves and rhizomes (3 species each), bulbs and tubers (2 species each), bark and flowers (1 species each) to cure various ailments (Fig. 8).

Mostly plant parts were used for herbal preparations in dried form rather than in fresh form and dried parts were also stored for later use especially for winter months when life in the entire district becomes very tough and medicinal plants become scarce. Mostly collection of underground parts was preferred by the locals in the area. Such wide harvesting of underground parts which are important for survival of plants has a negative influence on the survival and continuity of useful medicinal plants and hence affects sustainable utilization of the plants. The medicinal plants had various preparation forms including powder, paste, poultice, decoction, latex, juice, infusion, lotion and raw. In the present study decoction constituted the highest type of preparation form, followed by powder, paste, poultice, juice, raw, infusion, lotion etc. The medicinal plant preparations were applied through different routes of administration like oral, topical or dermal, and nasal routes. However, oral application was the highest and most commonly used route of application followed by topical or dermal application. So far as the treatment of various ailments is concerned, internal ailments were commonly treated by making the patient to drink herbal preparations; skin infections were treated by massaging preparations on an infected skin; painful areas such as boils and wounds by chewing and spitting remedial plant part on the affected part; fever and body muscular pain by hot water and steam bath and vapour inhalation. This is in accordance with the findings of various authors (Hiremath et al., 2010; Malik et al., 2011). In the preparation of various remedies water was most frequently used as solvent/dilutant but occasionally herbal formulations were prepared with milk, oil or ghee - clarified butter made from cow’s milk (Panghal et al., 2010; Jain et al., 2010). Besides all these, human saliva was also used in some circumstances as dilutant in the preparation of remedies. Availability was perhaps one of the criteria used in the selection of solvents/dilutants. This is in accordance with the results of Giday et al., 2009. While gathering the medicinal plants from their habitats, it was reported that the people of the study area avoided collecting those plants that were infected by insects, pests and other diseases. Besides, plants affected by toxicity, sunstroke, hailstorms, high wind velocity and fire were also ignored. Only plants that were fresh and best in all respects were preferred (Kala, 2005; Samal et al., 2010). Results also showed that the people used these plants for curing various ailments such as rheumatism, asthma, diarrhoea, dysentery, sprains, wounds, boils, throat infection, chilblains, toothache, urinary disorders, jaundice, indigestion, cough, general body weakness, gaseous bloat, fever, diarrhoea, cold, headache, hair fall, warts, skin diseases, gynaecological disorders etc. Most of the medicinal plant species collected and identified in this study were also medicinally used in other parts of India in general and Kashmir in particular. Such a widespread use of these plants by different groups of societies could to a certain extent be attributed to their efficacy. In other words, the ethnomedicinal reports of those species from wider geographical regions and different cultural groups could validate the medicinal properties of the species.

The choice of use for herbs was noticed to be influenced by many factors such as season of the year, accessibility and knowledge of other species. People who lived at lower altitudes of the district had no easy access to herbs found at higher altitudes such as Angelica glauca, Rheum emodi, Wahlenbergia amherstiana, Geranium wallichiana, Notholirion thomsonianum, Polygonum amplexicaule, Sambucus wightiana, Taxus wallichiana, Trillium govanianum, Skimmia anguetillia, Dioscorea deltoidea etc. hence their first choice remained the species available in and around their homes. However, people especially tribal who lived at higher altitudes and had vast knowledge about these important medicinal plant species used to collect and store them and eventually made available to others residing at lower altitudes.

Results revealed that a major proportion (75%) of folk medicinal knowledge came from people above the age of 55 years, while a small proportion (25%) of it came from people between the ages of 37 and 50. This finding is in accordance with the earlier findings (Hamayun et al., 2006; Khan et al., 2006). Gender wise, men especially old ones had more traditional knowledge about medicinal plants and their uses than females. This may be attributed to two reasons. Firstly because of the involvement of males in collection and trade related activities. Secondly higher reaches had been under seize of security forces since decades in response to terrorist threats thus posing biggest hindrances in the movement of women (Lone et al., 2013). Informants below the age of 50 years were reported less aware of the potential of medicinal plants than their older counterparts who had gathered...
knowledge from the point of view of their traditional healthcare and their day to day practices. The differences in the perception of the two age classes will likely result in knowledge loss over time. Discussions and interviews with both old and young people and Bhoris indicated that the attitude of the younger generation was not interested towards continuing this traditional medicine system because they realized less opportunity in this tradition for getting immediate benefits mainly in terms of cash. Though special care was taken, some herbal preparations had side effects and resulted in diarrhoea and vomiting. When such conditions happened, antidotes like milk, honey, hot salt tea locally called as “Noon Chai”, Chuchwoor-a kind of bread locally made by Kashmiri bakers (Kandar) and rice decoction were used to reverse the condition. In bandipora district the majority of the inhabitants rely on wild plants for various purposes such as forage, medicine, firewood, charcoal making, construction and food. It was found that some species of medicinal plants had values other than their medicinal role.

For example, Robinia pseudoacacia, Salix acmophylla and Taxus wallichiana were used as firewood, for charcoal making, construction besides their medicinal value. Leaves of some plants such as Allium proliferum, Dioscorea deltoidea, Phytolacca acinosa and Rheum emodi were used as vegetables at their juvenile stages. Stem of Salvia moorcroftiana after removing the bark/rind was eaten raw due to its sweet taste. People of the study area are Muslims and practice Islam. They use miswaak (local toothbrush) for cleaning their teeth. The miswaak is made from the fresh twigs of finger size of Salix acmophylla, and stem cuttings of Rubia cordifolia. Thus, this indicates that plants are known for their values other than their medicinal role and this could be associated directly with the cause of their depletion in the study area. It also indicates that special focus should be given for conservation of these plants since they are being widely exploited also for purposes other than their medicinal value.

Field photographs of some important medicinal plants of Bandipora District (J&K)
Table 1: Medicinal plants of Bandipora District of Jammu and Kashmir used traditionally for the treatment of various diseases

<table>
<thead>
<tr>
<th>Botanical name/ Local name/ Family</th>
<th>Flowering period /Acc. number</th>
<th>Plant part used</th>
<th>Ethnomedicinal uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allium proliferum (Moench) Schrad. ex Willd. / “Praan” / Liliaceae</td>
<td>May-July/38840</td>
<td>Bulb</td>
<td>The leaves are eaten cooked. Bulbs are completely sundried and later used by Kashmiri chefs popularly known as “Waz” to prepare feasts for marriages. Roasted bulb scales are tied tightly with muslin cloth on the corn (labul/turner) of fingers which helps them to rise, burst and evacuate the pus and hence to relieve the pain. Bulbs after crushing with salt are made into semisolid balls which are given to horses to cure frothy bloaat which is caused in them by the grazing of Trifolium repens. Bulbs after frying are crushed to make a semi-liquid paste which is applied to joints to cure their loosening and pain. The same paste is given to horses to keep them healthy and to protect them from the adverse effects of severe cold during winter.</td>
</tr>
<tr>
<td>Angelica glauca Edgew. / “Chora” / Apiaceae</td>
<td>June-August/392 81</td>
<td>Roots</td>
<td>Root powder is applied over aching teeth. It is also taken with water against stomach disorders. Fresh roots are crushed and given to cattle against cold, diarrhoea and alopecia (in goats).</td>
</tr>
<tr>
<td>Colchicum luteum Baker./ “Vir Kim Posh” / Lilacaeae</td>
<td>February-March/388 94</td>
<td>Corms and seeds.</td>
<td>An extract obtained by boiling the corms thoroughly in water is used for bathing especially by fresh mothers to cure body pains. Fresh corms after crushing are mixed with gur (local raw sugar) and then fried in ghee- a pure butterfat left over after the milk solids and water are removed from butter. It is taken to cure back pain, weakness of bones, fever and cough. Seeds are given against stomach gases, constipation and to induce sleep.</td>
</tr>
<tr>
<td>Crataegus songarica K. Koch/ “Reeng Kul” / Rosaceae</td>
<td>May/38853</td>
<td>Fruits</td>
<td>Fruits are eaten fondly for the treatment of palpitation of heart and hypertension.</td>
</tr>
<tr>
<td>Dioscorea deltoidae Wall. ex Kurth / “Kreeth / Krees” / Ecklonia</td>
<td>May-July/3847</td>
<td>Tubers</td>
<td>Leaves at juvenile stage are used as vegetable. Tubers are collected, dried and then ground into powder. Powder is used as detergent to wash clothes. Sometimes, powder is mixed with edible oil to make paste which is used by women to kill lice.</td>
</tr>
<tr>
<td>Fragaria nubicola (Lindl. ex Hook.f.) / “Rengresh”/ “Ishab ur”/ Rosaceae</td>
<td>April-May/38883</td>
<td>Rhizome</td>
<td>Fruits are edible. Dried rhizomes are thoroughly boiled in water for about half an hour and then a pinch of salt and milk is added to prepare a special kind of tea. Tea is given to patients suffering from rheumatic pains, headache and fever. Tea is also given to ladies to cure profuse menstruation, general body weakness and enhance lactation.</td>
</tr>
<tr>
<td>Geranium wallichianum D. Don.ex Sweet “Ratanjog” / Geraniaceae</td>
<td>July-September/39280</td>
<td>Roots</td>
<td>Roots are dried and then crushed to obtain powder. Powder is mixed with suji (rice flour) and sugar and the mixture is fried in ghee. The whole mixture is the boiled in 1kg of water for 10 minutes to prepare Halwa. Later is given to enhance perspiration (excessive sweating) that subsequently gives relief from fever, body joint and muscular pains. Fresh roots are crushed and given to cows in the form of balls against weakness and to enhance milk production.</td>
</tr>
<tr>
<td>Nepeta cataria Linn./ “Gund Soi” / Lamiaceae</td>
<td>July-Octemver/39911</td>
<td>Leaves</td>
<td>Leaves are dried and crushed into powder. Powder is added to warm water to make an infusion which is administered orally against fever, worms and diarrhoea. In case of a small baby fresh leaves are crushed and applied on abdomen in the form of poultice against worms. Poultice is also applied to sprains to relieve pain and swellings.</td>
</tr>
<tr>
<td>Notholirion thomsonianum (Royle) Stafff/ “Salamisri” / Liliaceae</td>
<td>April-May/38843</td>
<td>Bulb</td>
<td>Bulb is sundried and ground to make powder. Powder is mixed with milk to prepare an infusion which is kept as such for overnight. The infusion is then taken next day early in the morning to cure body muscular pains. Dried bulb decoction is given to ladies to cure frequent menstruation.</td>
</tr>
<tr>
<td>Papaver somniferum Linn./ “Khas-khash”/ Papaveraeaceae</td>
<td>May-July/38879</td>
<td>Fruit (capsule)</td>
<td>Plant is watered early in the morning while as in evening of the same day immature fruits (capsule) are scratched by means of knife. Milky latex oozes out in the form of small droplets on those scratches which are locally called as “Aafeen”. “Aafeen” is collected next day early in the morning which is used in small doses as narcotic. Capsule wall is dried and then ground to obtain powder which is administered orally with water to cure stomach problems and strengthen male potency. Capsule wall is soaked in hot water for about 20 minutes and then tied over knees to alleviate pain. Young leaves are used as vegetable and are considered best against stomach disorders. Root is dried and cut into small pieces. Form these pieces oil is obtained which is used to cure swelling of nipples and arthritic pains by its external massage.</td>
</tr>
<tr>
<td>Phytolacca acinosa Roxb./ “Brand Hakh”/ Phytolacaceae</td>
<td>July-August/388 41</td>
<td>Leaves and roots.</td>
<td>Dried roots are boiled in water. A little salt and milk is added to prepare tea. Tea is given to cure laziness, sleepiness and drying of mouth. Root powder is applied on wounds and burns.</td>
</tr>
<tr>
<td>Polygonum amplexicaule D. Don./ “Maachran Chai”/ Polygonaceae</td>
<td>June-September/39282</td>
<td>Roots</td>
<td>Dried roots are boiled in water for half an hour and then milk and salt is added to make tea. Tea is taken for the treatment of body muscular pains, headache and whitenning of tongue.</td>
</tr>
<tr>
<td>Potentilla reptans Linn./ “Ringa Chai” / Rosaceae</td>
<td>June-August/ 38857</td>
<td>Roots</td>
<td>Fruit juice is used in case of fever, jaundice, urinary problems and loss of appetite. It considered highly energetic and is used as tonic to cure general body weakness. The rind of the fruit is sun dried and ground to make powder which is administered orally in case of diarrhoea. Fruit wall is smoldered and the charcoal obtained is made into powder by grinding. Powder is gently massaged on teeth and gums by means of finger to check their infection.</td>
</tr>
<tr>
<td>Punica granatum Linn. / “Daen”/Punicaceae</td>
<td>May-August/ 38860</td>
<td>Fruits</td>
<td>Fruit juice is used in case of fever, jaundice, urinary problems and loss of appetite. It considered highly energetic and is used as tonic to cure general body weakness. The rind of the fruit is sun dried and ground to make powder which is administered orally in case of diarrhoea. Fruit wall is smoldered and the charcoal obtained is made into powder by grinding. Powder is gently massaged on teeth and gums by means of finger to check their infection.</td>
</tr>
<tr>
<td>Species</td>
<td>Month/Year</td>
<td>Part Used</td>
<td>Uses</td>
</tr>
<tr>
<td>----------------------------------------------</td>
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<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ranunculus arvensis</td>
<td>May-August</td>
<td>Whole plant</td>
<td>Young plants are used as vegetable. Plants are crushed into poultice which is applied on eczema. This is followed by the application of a paste made by mixing cow butter with the ash obtained by the burning of the plants of Tribulus terrestris. This whole process is considered best for the treatment of eczema.</td>
</tr>
<tr>
<td>Rheum emodi Wall. ex Meisn. / &quot;Pumbchalan&quot; / Polygonaceae</td>
<td>June-July</td>
<td>Rhizome</td>
<td>Leaves are fondly used as vegetables. Rhizome is dried completely and ground to make powder. Powder is sprinkled on ulcers, burns and non-healing wounds for quick healing.</td>
</tr>
<tr>
<td>Robinia pseudoacacia Linn. / &quot;Keeker&quot; / Fabaceae</td>
<td>May-June</td>
<td>Roots, leaves and flowers</td>
<td>Lukewarm root decoction is used for mouth gurgling to provide an immediate relief from toothache. Flowers along with the dried leaves of Salix acomophylla and whole plants of Cotula anthemoids are thoroughly boiled in water to prepare a hot water extract which is used for bathing purpose to cure hernia, chilblain, fever and swelling of joints. Sometimes a mixture of fresh leaves and flowers along with the leaves of Cannabis sativa and whole plants of Cotula anthemoids are placed in hot water for half an hour and then removed, crushed and tied in the form of poultice over sores and swellings for beneficent results.</td>
</tr>
<tr>
<td>Rorippa islandica (Oeder) Borbas / &quot;Thru&quot; / Brassicaceae</td>
<td>May-July</td>
<td>Whole plant</td>
<td>Ariel petals of the flower are consumed as vegetable to stimulate appetite. Roots are roasted and given orally to cure asthma.</td>
</tr>
<tr>
<td>Rosa damascena Mill. / &quot;Kashur Gulab&quot; / Rosaceae</td>
<td>May-June</td>
<td>Flowers</td>
<td>Sundried flower petals and sugar after mixing are crushed. The mixture is then kept in a closed jar for about 10-15 days for fermentation. This fermented mixture is locally called as &quot;Gulkand&quot;. It is given to cure cough, cold, throat infection and swelling, diarrhoea, asthma, body muscular pains, headache and bronchitis. It is also given to poultry in small doses to cure chicken pox. &quot;Gulkand&quot; is also added to a famous Kashmiri drink locally called as &quot;Kehwa&quot; to enhance its smell and flavor. The flower petal decoction is given to children to cure fever and measles.</td>
</tr>
<tr>
<td>Rubia cordifolia Linn. / &quot;Majareth&quot; / Rubiaceae</td>
<td>July-October</td>
<td>Whole plant</td>
<td>Root powder is given with water in case of stomach ailments. Stem cuttings are used to clean the teeth and to avoid their infection. Aerial portion is boiled in water to prepare a hot water extract which is used to wash feet to cure diabetic ulcers and lower body temperature.</td>
</tr>
<tr>
<td>Salix acomophylla Boiss. / &quot;Knl Veer&quot; / Salicaceae</td>
<td>February-April</td>
<td>Leaves and twigs</td>
<td>Leaves are chewed to make paste which is spitted on boils to help them to ripe, burst and to release the pus. Fresh twigs of finger size are chewed and the sap is swallowed to cure the stomach problems. They are also used as toothbrush to clean the teeth and hence to prevent their infection. Dried leaves along with the whole plants of Cotula anthemoids and the flowers of Robinia pseudoacucacia are thoroughly boiled in water to prepare a hot water extract which is used for bathing purpose to cure hernia, chilblain, fever and swelling of joints.</td>
</tr>
<tr>
<td>Salvia mooscroftiana Wall.ex Benth. / &quot;Shollart&quot; / Lamiaceae</td>
<td>May-July</td>
<td>Whole plant</td>
<td>Dried seed powder is administered orally with water to combat cough, constipation and acidity. Roots are dried and grounded to make powder. Powder after mixing with rice flour, sugar is fried in ghee to make a local sweet dish called Halwa. It is given to cure joint and back pains. Milky juice from fresh flowers is sucked to get relief from stomach problems. Sometimes fresh root is crushed into paste which is applied on hard boils to soften them. Stem after removing the bark is eaten raw due to its sweet taste.</td>
</tr>
<tr>
<td>Sambucus wightiana Wall. / &quot;Gandhoola&quot; / Caprifoliaceae</td>
<td>June-July</td>
<td>Roots</td>
<td>Juice of the roots is used to treat the foot and mouth disease in cattle.</td>
</tr>
<tr>
<td>Skimmia anquetilla N.P. Taylor. / &quot;Naera&quot; / Rutaceae</td>
<td>April-June</td>
<td>Leaves</td>
<td>Fresh leaves are crushed and added to water to which sugar is also added. The mixture is kept outside open to the environment for overnight to form a cool extract which is given orally next day early in the morning on an empty stomach to cure abdominal pain, whooping cough, body muscular pains, sore throat, dysentery and urinary infections. It is also taken by tribal people while crossing high altitude passes as it is believed to enhance the intake of oxygen. Leaf powder is also given to domestic livestock orally with water for the treatment of cough, cold and indigestion. Leaves are used as incense. The smoke produced from the smouldering of dried leaves is used as an insect repellent as well as to cure nasal catarrh in cattle.</td>
</tr>
<tr>
<td>Solanum tuberosum Linn. / &quot;Alu&quot; / Solanaceae</td>
<td>April-June</td>
<td>Tuber</td>
<td>Fresh tubers are crushed to prepare lotion which is applied on burns for quick relief from pain and blister formation.</td>
</tr>
<tr>
<td>Taxus wallichiana Zucc. / &quot;Postal/Bramuni&quot; / Taxaceae</td>
<td>April-July</td>
<td>Bark</td>
<td>Fresh fruits are edible. Dried stem bark is boiled in water to prepare a special kind of tea. Tea is given in case of asthma, headache, giddiness, arthritis and tumorous growths.</td>
</tr>
<tr>
<td>Tribulus terrestris Linn. / &quot;Meitcher&quot; / Kund / Zygophyllaceae</td>
<td>August-September</td>
<td>Whole plant</td>
<td>Dried fruits along with the leaves of Arnebia benthamii, seeds of Cucumis sativus and Cydonia oblonga are thoroughly boiled in water to prepare decoction. Decoction is given against kidney stones, uriner disorders and jaundice. Plants are burnt to get ash which is mixed with cow butter to prepare paste. Paste is applied on burns. CRushed rhizome is given in the form of balls to livestock against worms. It is also used to cure boils by applying externally.</td>
</tr>
<tr>
<td>Trillium govanianum Wall. ex Royl. / &quot;Surinnga/Reechki Jadi&quot; / Liliaceae</td>
<td>June-August</td>
<td>Rhizome</td>
<td>Dried grains after soaking in hot water are placed on aching teeth for about 5 minutes to relieve toothache. Grain husk is thoroughly boiled in water to prepare hot water extract which is used for bathing purpose by ladies to cure fever and back pain. Seed decoction is given to children as an effective wormicide.</td>
</tr>
<tr>
<td>Triticum aestivum Linn. / &quot;Kanik&quot; / Poaceae</td>
<td>March-April</td>
<td>Fruits (Grains)</td>
<td>Dried leaves and seeds are smoked for relaxation of mind and to cure asthma. Leaves and flowers are crushed to make paste which is applied on burns.</td>
</tr>
<tr>
<td>Verbasum thapsus Linn. / &quot;Wantanook&quot; / Scrophulariaceae</td>
<td>June-September</td>
<td>Leaves, seeds and flowers</td>
<td>Dried leaves and seeds are smoked for relaxation of mind and to cure asthma. Leaves and flowers are crushed to make paste which is applied on burns.</td>
</tr>
</tbody>
</table>

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Viburnum grandiflorum Wall. ex DC./"Kilmunch" /Caprifoliaceae March-April /38892 Fruits Fruits are eaten raw to cure cough and improve eye vision. Stem is cut into small pieces which are placed in a small pitcher. Pitcher is heated externally from below. This causes an oil to ooze out from the pieces and accumulate at the bottom of the pitcher. The oil is collected and considered best for the treatment of eczema.

Vitis vinifera Linn. /"Dauch" /Vitaceae June-July /38862 Leaves, Fruits, and Sap. Fresh leaves are boiled in water to form hot water extract which is then mixed with cold water and used for bathing purpose for the treatment of skin rashes and itching. Fresh leaf is gently placed in warm mustard oil with haldi (Turmeric) till it becomes soft. It is then tightly tied with muslin cloth on boils or corns (labul/timber) of fingers which helps them to rise. This is followed by the application of powdered sugar which causes them to burst and evacuate the pus and hence to alleviate the pain. Leaf decoction is given in case of heart problems. Twigs of the plant are incised to collect the sap which is considered to be a best home remedy against hair fall by simply washing the hair with it. Sap is also administered orally to enhance the memory and purify blood. Fruit juice is given in case of fever.

Wulfenia amherstiana Benth./“Badikakbai” /Scrophulariaceae July-August /39275 Leaves Leaf decoction is given to cure body muscular pains and high fever.

Ziziphus jujuba Mill. /"Badi" /Rhamnaceae April-May /38881 Fruits and Leaves Dried fruits form an important ingredient of “Sharbeth”. Composite decoction of “Sherbeth” is given to cure jaundice, cough, cold, chronic constipation, fever and also acts as a good blood purifier. It is also given to nursing mothers to enhance their lactation. Fresh leaves are boiled in water for about half an hour and then water bath is used to wash whole body to cure scabies and check hair fall. Dried leaves are grated to make powder which is administered orally with water against diabetes.

Since, in the present study, it was noticed that the majority of the species were collected from the wild sources. It is well known fact that the wild populations of medicinal plants are the main sources of raw materials to the pharmaceutical industries (Ved et al., 1998). In Bandipora district, various factors that are considered as main threats to medicinal plants were recorded by interviewing the informants. The major factors claimed were increasing population of the area, over-grazing by animals, deforestation, agricultural expansion, lack of job opportunities, increased marketing pressure, trading of charcoal and firewood and indiscriminate harvesting by unskilled gatherers. Besides, in the lap of the dense forests of Bandipora district, the work on 330 MW Kishenganga hydro electric power project by Hindustan Construction Company (HCC) was found still on during the course of study. The company was found violating the environment conservation norms by not only destroying the scenic topography but also causing destruction of valuable plant resources including beautiful coniferous trees and other crucial medicinal plants. Among the collected medicinal plants, many important plant species such as Angelica glauca, Colchicum luteum, Dioscorea deltoidea, Rheum emodi and Taxus wallichiana have already been placed in different threat categories according to the existing literature (Nayar and Sastry, 1987, 1988, 1990; CAMP 2003; Pant and Pant, 2011). To prevent their extinction, efforts need to be made with a view to protect these important plant species by initiating conservation practices, cultivation programme, scientific harvest and research institutes which lead from folklore and develop medicine on scientific basis. Creating awareness among the local people and giving them incentives will definitely help and protecting these plants. The knowledge base obtained in this investigation, besides contributing in the documentation of treasure troves of cultural diversity, requires to be rigorously subjected to pharmaceutical analysis in order to validate their authenticity and future prospects in the drug development. Besides, giving conservation priority for identified threatened medicinal plants, promoting in-situ and ex-situ conservation of medicinal plants in the study area as well as supporting the district’s Traditional Healers Association, by providing funds, land for cultivating medicinal plants and assisting their activities with professional guidance will definitely help fast eroding medicinal plants of the study area.

CONCLUSION

The realization of the significance of biodiversity in human welfare and in environmental and developmental context during the earth summit (1992) has necessitated mandatory assessment of plant, animal and microbial resources of any region of the world. Biodiversity is depleting at an alarming rate and the restoration of the lost biodiversity is a big task at present time, hence efforts need to be made to conserve the biological diversity in a sustainable manner. In Bandipora district, the use of medicinal plants against different ailments plays a significant role in meeting the primary health care needs, keeping in view the high cost and side effects of allopathic medicine. This district is fairly rich not only in medicinal plant species but also has deeply rooted traditional knowledge among the people. Traditional uses of medicinal plants as drugs will increase the local industry on one hand and minimize the expenditure incurred on the purchase of foreign drugs on the other. It can also provide direct or indirect employment to a large number of people. This is only possible if these resources are used in sustainable manner. But in the present study a number of factors mentioned earlier were found responsible for depletion of these medicinal plants and therefore, research and conservation efforts should be focused on these resources of the area so that in future, the coming generation could benefit from these precious plants that are a real gift to mankind. Besides, long term conservation of the threatened plant species should be initiated by involving the local people through creating awareness among them as they are the best judges of the area.

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References


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