

Medicinal plant knowledge of the Panchase region in the Middle Hills of the Nepalese Himalayas

K. R. Bhattarai¹, I. E. Måren² and R. P. Chaudhary³

Use of plants as medicine has been practiced all over the world since the dawn of human civilisation. In the Himalayas, many medicinal plants yield essential ecosystem services/benefits for the subsistence farmers, many of which grow in the forest ecosystem. However, documentation of traditional medicine and medicinal plants used by local communities is rather poor in Nepal. Panchase forest, Central Nepal, is home of many wild plants, used in traditional medicine, and a livelihood source for many ethnic groups. This study was conducted to document medicinal plant knowledge and plant use in the treatment of different ailments. To explore the ethnobotanical knowledge interviews were conducted with local healers, plant traders and knowledgeable villagers. The study provides information on 45 plant species, belonging to 32 families under 44 genera. The studied medicinal plants were found to be useful for treating 34 different ailments. The study which has 57% resemblance with previous studies. We conclude that a wealth of ethnobotanical knowledge still persists in the Panchase region. However, due to land use change and migration it needs to be preserved for the future through extensive publications and disseminations.

Key words: Ethnobotany, Panchase, medicinal plants, ailments

The UN-commissioned Millennium Ecosystem Assessment (MA, 2005) finds that the increasing demands on ecosystem services over the past 50 years have been fulfilled at the cost of ecosystem degradation and diversity loss. The MA stresses that immediate action is needed to enhance the conservation and sustainable use of ecosystems to maintain their provisions/services to human well-being. Population growth, increasing wealth and changing consumption patterns, combined with land use and climate change, are exerting strong pressures on biodiversity, thereby, this possessing a challenge to biodiversity conservation and consequently it's provisioning of ecosystem services.

Nepal is part of the Himalayan biodiversity hotspot and one of the poorest countries in the world with a growing population and increasing demands on ecosystem services. Human settlement has existed in the Himalayas for thousands of years and the use of medicinal plants and traditional medicinal practice has been developed over

the same time. Traditional medicinal practice has maintained its popularity in many parts of Himalayas even after the introduction of Western medicine. The traditional medicinal knowledge has been developed into a successful system of medicine, namely *Ayurveda*, where hundreds of plant species were documented as medicinal plants almost 3000 years ago. The traditional herbal medicine possesses great significance in Nepal, and the interest in herbal medicine has gradually increased over recent years (Burlakoti and Kunwar, 2008). However, proper documentation of traditional medicinal knowledge within different ethnic communities and tribes has not yet been conducted. Nepal Biodiversity Strategy (2002) has highlighted the urgent need for the documentation of indigenous knowledge for conservation of the Himalayan biodiversity (HMG-N-MFSC, 2002).

Within the Himalayas, forests are the richest habitats for medicinal plants forming the basis for several ecosystem services (Ives, 1987). Panchase is a sacred region where many *Yogis* used to live

¹ National Herbarium and Plant Laboratories, Department of Plant Resources, Nepal. Email: bhattaraikhemraj@gmail.com

² Bjerknes Centre for Climate Research, University of Bergen, Norway

³ Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu, Nepal

and where they practiced herbal medicines in the past. The tradition of *Yogis* living at the top of Panchase has been discontinued over the past years. Consequently, the knowledge of the local villagers may also contribute to valuable information about the historical use of medicinal plants of the area. Although some studies have been conducted to document biodiversity of this region (Koirala, 1998), the documentation of ethnobotanical information has been lacking. The aim of this study is to explore the plant based indigenous knowledge of the people living in adjoining villages to the Panchase forest.

Materials and methods

Study site

Panchase is situated in the Middle Hills of Nepal, just west of Pokhara, between the longitudes 83° 45' to 83° 57' E and the latitudes 28° 12' to 28° 18' N. Altitude ranges from 855 masl at the Harpan River to 2517 masl at the peak of Panchase whereas the forest ranges from 1450 masl to the peak. The forest covers an approximate area of 10-12 km². The Panchase Mountain is the origin of many rivers and tributaries supplying water to the villages and a primary source area for Phewa Lake. Climate is subtropical at lower altitudes and moist temperate at elevation above 2100 m. The Panchase forest is spread over three districts; Kaski, Parbat and Syangja, and with five different Village Development Committees (VDCs). The ethnic composition of the area constitutes Brahmin, Chhetri, Gurung, Bishwokarma, Nepali, Pariyar, Magar and Thakali, where generally Gurung communities inhabit higher elevation and Brahmin and Chhetri dominate the valley bottom. Of these, Gurung and Magar are indigenous to the area and Bishwokarma, Nepali and Pariyar are the disadvantaged groups. Approximately 40000 people live in the adjoining villages and depend upon the forest for their livelihood (fodder, firewood, timber, edible and medicinal plants). This region is densely populated by subsistence farmers and livestock rearing is an integral part of their livelihood.

Sampling

Field study was carried out over three periods; March-April 2010, April 2011 and November 2011. Primary data regarding plant species

traditional knowledge used and treated ailments were collected through group discussions, informal meetings; cross-checking and field observations (Kunwar *et al.*, 2010). Field survey was conducted in all adjoining VDCs of Kaski, Parbat and Syangja districts. In Kaski district, local people from Bhadhuare, Damdame, Kutmidanda, Sidhane, Tamagi, and Bhaudhaureurali were interviewed. The local people of Bange of Syangja district and Chitre and Aarthar of Parbat district were consulted. Among the respondents, knowledgeable women were the dominant group which was followed by knowledgeable older men and traditional healers. Species were identified on site by using reference literatures. Unrecognized plants were identified at the National Herbarium and Plant Laboratory at Godawari, Lalitpur. Plants were collected and displayed during group discussions, interviews and consultations.

During group discussions and interviews information was sought about medicinal use, local names and any other uses of the particular plant species. Ethnobotany and chemical properties of the species were checked with published literature (Manandhar, 2002; Baral and Kurmi, 2006; Bhattarai and Ghimire, 2006; Kunwar *et al.*, 2010). Whereas the Ayurvedic system and the Unani system of medicinal use was verified with literature (Kirtikar and Basu, 1980).

Results and discussion

Medicinal plants and traditional medicine

We found 45 medicinal plant species belonging to 32 families under 44 genera (Table 1). These 45 locally used medicinal plants were found to treat 34 different ailments. The family namely, Rosaceae include the highest number of medicinal species (four), followed by Moraceae and Asteraceae (each three) and Pteridaceae (two). About 57% of the indigenous use of plant species at Panchase resembled use documented by earlier ethnobotanical reports from other parts of Nepal. The majority of plant species from the forested areas of Panchase have more affinity towards the *Ayurvedic* system of medicine than the *Unani* system of medicine (Table 2).

Among the 34 different ailments reported in the present study wounds, dysentery and fever are

considered most common and the majority of the medicinal plants are used for the treatment of these ailments. The plant parts used for herbal remedies were bark, leaf, latex, rhizome and whole plant. In the majority of cases, whole plant or leaf extract is taken for treatment. Among the 45 species there are four species which are used to prepare yeast. The yeast is used to ferment the local alcohol *raksi* for the Gurungs and Newars and other schedule casts like Biswokarma, Nepali and Pariyar also prepare alcohol themselves.

People of this region have deep knowledge on herbal medicine and traditional medicinal plant practice, practiced since ancient times. There is still a lack of modern hospital facilities and modern medicine so people heavily rely upon local medicinal plants for their primary health care. The present study showed that traditional plant based knowledge has flourished in the periphery of the Panchase region. It might be not only be due to long travel and higher costs of using modern medicine, but traditional medicinal practice has been more culturally acceptable, globally (Brown, 1994), as well as in Nepal (Chaudhary, 1998). Many of the most used plant species in the present study area are also used in other parts of Nepal (Manandhar, 2002; Baral and Kurmi, 2006; Bhattarai and Ghimire, 2006). Very few species, e.g. *Paris polyphylla* and *Swertia chirayita*, are harvested commercially; the majority of species are folkloric in importance. International treaties and policies have over the last decades emphasized the need to create greater awareness and a wider application of indigenous knowledge for sustainable biological resource management and Nepal needs to contribute to this effort.

Pharmacology and chemical properties of medicinal plants

Some of the plants used as medicine in the Panchase region are unknown to *Ayurvedic* and *Unani* practice. This might be due to the fact that the *Ayurvedic* system of medicine where plants were documented as Ayurvedic medicinal plants was developed a long time back and the use of undocumented plant species was developed later through the practices and experiences of local people. The *Unani* system of medicine is mostly practiced in Muslim communities which is lacking in the Panchase region. In the literature relatively few species have been found with their *Unani* use (Kirtikar and Basu, 1980.). Documented chemical

properties of all species could not be found. This indicates that traditional knowledge has existed and been practiced in rural areas but the knowledge has not been streamlined for pharmacological test and use yet. Among the 45 medicinal plant species found in the study area only 20 species could be traced for their main chemical constituents. This shows that phytochemistry may be an essential component to research in this region. According to the *Ayurvedic* system of medicine, some plants like *Artemisia dubia* and *Cannabis sativa* have been used as anthelmintic and to cure rheumatism but these are actually used to cure skin diseases and to control bleeding from wounds in the Panchase region. Phytochemistry studies need whether the chemical properties of the plant really document results in support of the traditional use.

When comparing the *Ayurvedic* system and the *Unani* system, both have certain similarities and both systems have the affinity towards to use of plant species for curing an array of ailments (Kirtikar and Basu, 1980).

Acknowledgements

Thanks to Basudha Gurung, Dil Bahadur Bhattarai, Lila N. Sharma, Bishnu Chapagain, Ashok Chaudhary, Kuber Bhatta, Rupesh Gurung and Keith McInturff for field work assistance, and to all the villagers around Panchase who participated in the project. The Machhapuchhare Development Organisation is acknowledged for its cooperation. Financial support was received from the Norwegian Research Council (190153/V10) and Grolle Olsens Legat.

References

- Agrawal, V. and Chauhan, B.M. 1988. A study of composition and hypolipidemic effects of dietary fiber from some plant foods. *Plant Foods and Human Nutrition* **38** (2): 377-381.
- Ambasta, S.P., Ramchandran, K., Kashyapa, K. and Chanda, R. 1992. **The Useful Plants of India**. Council of Science and Industrial Research (CSIR), New Delhi, India.
- Anonymous. 1976. **Medicinal Plant of Nepal**. Bulletin No. 3. His Majesty Government of Nepal, Department of Medicinal plants, Thapathali, Kathamndu, Nepal.

- Baral, S.R. and Kurmi, P.P. 2006. **A Compendium of Medicinal Plants in Nepal**. Mrs, Rachana Sharma, Kathmandu-7, Nepal.
- Bhattarai, K.R. and Ghimire, M.D. 2006. **Cultivation and Sustainable Harvesting of Commercially Important Medicinal and Aromatics Plants of Nepal**. Heritage Research and Development Center, Kathmandu, Nepal.
- Bhattarai, N.K. 1989. Traditional phytotherapy among the Sherpa of Helambu. *J. of Ethnopharmacology* 27(1/2): 45-55.
- Brown, K. 1994. Approaches to valuing plant medicines: the economics of culture or culture of economics? *Biodiversity and Conservation* 3: 734-750.
- Buckingham, J. 1994. **Dictionary of Natural Products, Vol.7**. Chapman and Hall, Logndon, UK.
- Burlakoti, C. and Kunwar, R. M. 2008. Folk herbal medicine of Mahakali watershed area, Nepal. In *Medicinal Plants: An Anthology of Contemporary Research* (eds.) Jha, P. K., Karmarcharya, S. B., Chhetri, M. K., Thapa, C. B. and Shrestha, B. B. Ecological Society, Kathmandu, Nepal, 187-193.
- Chapagain, D.J., Joshi, S.D. and Jnawali, S.R. 2004. Indigenouse use of medicinal plants by tharu community in southern buffer zone of Bardia National Park, Nepal. *Proceeding of National Congress on Science and Technology* 738-751.
- Chaudhary, R. P. 1998. **Biodiversity in Nepal: Status and Conservation**. S. Devi, Saharanpur, India and Tecpress Books, Bangkok, Thailand.
- DPR. 2007. **Medicinal Plants Bull. of the Department of Plant Resources No. 28. of Nepal** (revised). Department of Plant Resources, Kathamndu, Nepal.
- HMG-N-MFSC 2002. **Nepal Biodiversity Strategy**. His Majesty's Government of Nepal, Ministry of Forest and Soil Conservation., Kathmandu, Nepal.
- Husain , A., Viramani, O. P., Popali, S. P., Mishra, L.N., Gupta, M. M., Sirvatava, G. N, Abraham, Z. and Singh, A. K. 1992. **Dictionary of Indian Medicinal Plants**. Central Institute of Medicinal and Aromatic Plants, Lucknow, India.
- IUCN. 2004. **Nepal: National Register of Medicinal and Aromatics Plants of Nepal**. The World Conservation Union, Nepal.
- Ives, J.D. 1987. The theory of himalayan environmental degradation: Its validity and Application Challenged. *Mountain Research and Development* 7: 189-199.
- Joshi, S. G. 2006. **Medicinal Plants**. Oxford and IBH publishing, New Delhi, India.
- Kirtikar, R. K. and Basu, B. D. 1980. **Indian Medicinal Plants Vol.I-Vol. IV**. Bisen Singh Mahendra Pal Singh, Dehradun, India.
- Koirala, R. 1998. Botanical diversity within the project area of Machhapuchhare Development Organization, Bhadaure/ Tamagi, VDC VDC Kaski District, Nepal.
- Kunwar, R. M., Shrestha, K. P., and Bussman, R. W. 2010. Traditional herbal medicine in Far-west Nepal a pharmacological appraisal. *J. of Ethnobiology and Ethnomedicine* 6/35: 1-18.
- Manandhar, N. P. 2002. **Plant and People of Nepal**. Timber Press, Oregon, USA.
- Rajbhandari, K. R. 2001. **Ethnobotany of Nepal**. Ethnobotanical Society of Nepal, Central Department of Botany, TU, Kirtipur, Kathmandu, Nepal.
- Rastogi, R. P. and Marhotra, B. N. 1979. In *A compendium of medicinal plants*, Volume II. Central Drug Research Institute, Lucknow, Publication and Information Directorate, New Delhi, India.
- Watanabe, T., Rajbhandari, K. R., Malla, K. J., and Yahara, S. 2006. **A Handbook of Medicinal Plants of Nepal**. Ayur Seed Life Environmental Institute, Japan.

Table 1: Plant species used for medicinal purposes from the forest ecosystem at Panchase, Central Nepal.

Scientific name	Family name	Local name	Plant parts used
<i>Achyranthus aspera</i> L.	Amaranthaceae	Apaamarga	Root
<i>Aesculus indica</i> (Colebr. Ex Cambess)	Hippocastanaceae	Lekhpangra	Seed
<i>Aloe vera</i> (L) Burm f	Liliaceae	Ghiukumari	Leaf
<i>Artemisia indica</i> Willd.	Asteraceae	Titepati	Leaf, stem
<i>Artocarpus lakoocha</i> Wall. ex Roxb.	Moraceae	Badahar	Bark
<i>Azadirachta indica</i> A. Juss.	Meliaceae	Neem	Leaf
<i>Bauhinia variegata</i> L.	Fabaceae	Koiralo	Flower
<i>Boehmeria platyphylla</i> D. Don	Urticaceae	Kamle	Root
<i>Cannabis sativa</i> L. Syn. C. indica	Cannabaceae	Bhang	Leaf, stem
<i>Cbelanthes tenuifolia</i> (Burm.f.)Sw	Pteridaceae	Kalisinka	Rhizome
<i>Cissampelos pareira</i> L.	Menispermaceae	Batulpate	Root
<i>Clematis montana</i> Buch.-Ham.ex Dc.	Ranunculaceae	Jungelahara	Root
<i>Curcuma angustifolia</i> Roxb.	Zingiberaceae	Haldi	Rhizome
<i>Daphne bholua</i> Buch-Ham. Ex D. Don.	Thymeleaceae	Kajapate	Seeds, root
<i>Drymaria diandra</i> Bl.	Caryophyllaceae	Abijalo	Whole plant
<i>Engelhardtia spicata</i> Leschen ex Blume	Juglandaceae	Mauwa	Flower
<i>Euphorbia hirta</i> L.	Euphorbiaceae	Dhudhe	Plant latex
<i>Ficus auriculata</i> Laur	Moraceae	Nibaro	Fruit, bark
<i>Ficus plamata</i> Forssk	Moraceae	Bedulo	Latex, fruit
<i>Fragaria nubicola</i> Lindl	Rosaceae	Bhuikafal	Fruit
<i>Hibiscus mutabilis</i> L.	Malvaceae	Baramasephool	Leaf, flower
<i>Innula cappa</i> Buch-Ham. Ex D. Don.DC.	Asteraceae	Rasnaa	Leaf, twig
<i>Lobelia pyramidalis</i> Wall .	Campanulaceae	Aklebir	Leaf, twig
<i>Maesa chisia</i> Buch-Hamex D. Don	Myrsinaceae	Bilaune	Leaf, fruits
<i>Myrica esculenta</i> Buch-Ham ex D. Don	Myricaceae	Kafal	Fruits, bark
<i>Nephrolepis auriculata</i> (L.) Trimen	Nephrolepidaceae	Paniamala	Tuber
<i>Oxalis corniculata</i> L.	Oxalidaceae	Chariamilo	Whole plant
<i>Paris polyphylla</i> Sm.	Liliaceae	Satuwa	Rhizome
<i>Persicaria barbata</i> (L) Hara	Polygonaceae	Pirejhar	Leaf
<i>Potentilla fulgens</i> Wall. ex Hook.	Rosaceae	Bajardanti	Whole plant
<i>Pteris biaurita</i> L.	Pteridiaceae	Sotar	Leaves and rhizome
<i>Pyracantha creulata</i> (D Don) M Roemer	Rosaceae	Ghangaru	Fruits
<i>Quercus lanata</i> Sm.	Fagaceae	Banjha	Hard resin
<i>Rubus ellipticus</i> Sm.	Rosaceae	Auselu	Fruit
<i>Sapium insigne</i> (Royle) Benth. ex Hook. f.	Euphorbiaceae	Khirro	Latex
<i>Sebima wallichii</i> (DC.) Korth.	Theaceae	Chilaune	Bark, young plant
<i>Scutellaria discolor</i> Colebr.	Labiatae	Dampate	Leaf, twig
<i>Smilax aspera</i> L.	Smilacaceae	Kukurdaino	Root
<i>Solanum capsicoides</i> All.	Solanaceae	Kantakari	Fruit
<i>Spilantbes paniculata</i> Wall.	Asteraceae	Marathi	Flower head
<i>Swertia chirayita</i> (Roxb. ex Fleming) Karsten	Gentianaceae	Chirayaito	Whole plant
<i>Taxus wallichiana</i> (Zucc.) Pilger	Taxaceae	Lothsalla	Leaf, twig
<i>Tectaria caudumata</i> (Wall. ex J Sm) C Chr	Dryopteridaceae	Kuthkure	Rhizome
<i>Tinospora sinensis</i> (Lour.) Merr.	Menispermaceae	Gurjo	Stem
<i>Vitex negundo</i> L.	Verbenaceae	Simali	Leaf

Table 2: Medicinal plant species and their documented uses in the Ayurvedic and Unani system of medicine

Scientific name	Folk use at Panchase	Folk use in previous studies	Major use in Ayurveda	Major use in Unani	Known chemical constituents
<i>*Achyranthus aspera</i>	Root decoction; typhoid fever	Plant decoction; pneumonia, cough and kidney stone renal dropsy (Baral & Kurmi, 2006), (DPR, 2007);	Purgative diuretic astringent used in dropsy and piles (Kunwar <i>et al</i> 2010)	UA	Root; ecdysterone and oleanoic acid. Seeds: saponins- saponin A dimethyl ester, d saponin B methyl ester, olenoleic acid and esters
<i>Aesculus indica</i>	Oil extracted from seed is applied to cure joint pain	Oil is used in scabies and skin disease (Manadhar, 2002)	Oil: rheumatism	UA	Seeds; aescin (a mixture of triterpenoid saponins namely asein Ia Ha IIb & their deacyl derivatives) (DPR 2007)
<i>Aloe vera</i>	Plant sap is applied at fire burns and juice; to cure diabetes	Expel intestinal worms (Baral and Kurmi, 2006), It is aphrodisiac (DPR, 2007).	Plant is bitter sweet cooling, purgative alterative, fattening tonic, aphrodisiac, anthelmintic, liver complaints, fever, asthma, biliousness skin disease, jaundice bronchitis, enlargement of spleen (Kirtikar and Basu, 1980)	Plant is bitter purgative carminative tonic digestive spleen inflammation lumbago pain in the muscles ophthalmic (Kirtikar and Basu, 1980)	Leaves; cathartic anthraquinone glucosides, mainly barbaloin a glucoside of aloe-amodin, others are aloesin and aloesone (Husain <i>et al.</i> 1992)
<i>*Artemisia indica</i>	Fresh leaf sap is applied to treat wounds to stop bleeding	Fresh leaf sap; to stop bleeding wounds (Baral & Kurmi, 2006)	Anthelmintic, stomachic, purgative, antispasmodic, insecticide (DPR, 2007)	UA	Maackiain and Exiguafavanone A (Watanabe <i>et al</i> 2005 essential oil containing alpha and beta-thujone (DPR 2007)
<i>Artocarpus lakoocha</i>	Bark extract is given to reduce heat and fever	Bark powder; applied to sores to draw out the purulent matter (Kirtikar and Basu, 1980; Baral & Kurmi, 2006)	Ripe fruit is sour sweet, aphrodisiac, enhances taste and appetite	UA	
<i>Azadirachta indica</i>	Raw and dry leaves; for fever and blood disorder	Leaves; anthelmintic and good for cough, asthma and urinary discharge (IUCN, 2004)	Leaves: skin disease and blood circulatory defect	UA	Azadirachtin Zedunin Limonoids Linolic acid Nimbin Nimbidin Oleic acid and steric acid (Agrawal and Chauhan 1988)
<i>Bauhinia variegata</i>	Flower/floral buds eaten regularly to cure leucorrhoea and mumps	Flower juice; diarrhea and dysentery (Manandhar, 2002)	Flowers: astringent, diarrhea and hemorrhage	UA	Betulin Hentriacontane Lepueol Nicotiflorin Octacosanol
<i>Boehmeria platyphylla</i>	Root paste; control bleeding	Root juice; stomachic (Rajbhandari, 2001) and dysentery (Manandhar, 2002)	Plant juice poisonous to fish	UA	Rhamnopyransid Acetophenone, Cryptopleurine
<i>*Cannabis sativa</i>	Plant sap is stop bleeding, seeds are used for cold	Leaf juice; healing wounds, control bleeding and stomachic (Watanabe <i>et al.</i> ., 2006, Kunwar <i>et al.</i> ., 2010)	Plant juice: rheumatism	UA	Cannabigerol, Cannabidiol

*	Juice of rhizome; peptic ulcers	Juice of rhizome; peptic ulcers, plant paste; wounds (Bhattarai, 1989; Manandhar,2002)	UA	UA	UA
<i>Cissampelos pareira</i> <i>L</i>	Fresh juice from root is given to treat stomach disorder	Leaves; externally for itch (Rajbhandari, 2001; Baral & Kurmi, 2006)	UA	UA	UA
* <i>Clematis montana</i>	Root decoction; tuberculosis leaves are mixed with ingredients to prepare yeast	Root decoction; tuberculosis, extract; skin disease (Baral and Kurmi, 2006)	UA	UA	UA
<i>Curcuma angostifolia</i>	Rhizome powder is cooked and drunk to cure cough and cold	Rhizome paste; externally applied to bruises and injuries (IUCN, 2004)	UA	UA	UA
<i>Daphne bhulua</i>	Seeds; stomach disorders	Root extract; intestinal disorder (Rajbhandari, 2001)	UA	UA	UA
<i>Drymaria diandra</i>	Fresh leaf extract; reduce fever	Plant juice; gastric trouble, root juice; inhaled to treat sinusitis (Manandhar, 2002)	UA	UA	UA
* <i>Engelhardtia</i> <i>spicata</i>	Flower juice; abdominal pain	Flower juice: abdominal pain (Burlakoti et al. 2008; Chapagain, <i>et al.</i> , 2008)	UA	UA	UA
* <i>Euphorbia hirta</i>	Plant latex; wounds	Plant juice: boils, cuts, wounds (Manandhar,2002)	UA	UA	UA
* <i>Ficus auriculata</i>	Unripe fruits are eaten to cure dysentery	Bark juice and roasted figs; diarrhea and dysentery (Manandhar, 2002)	UA	UA	UA
<i>Ficus plamata</i>	Plant latex; to get rid of thorns from flesh	Fruits: constipation, lung and bladder disease (Baral & Kurmi, 2006)	UA	UA	UA
<i>Fragaria nubicola</i>	Fruit paste; healing wounds	Fruits juice; cure inflammation of nerves and lungs (Baral & Kurmi, 2006)	UA	UA	UA
* <i>Hibiscus mutabilis</i>	Fresh leaf and flower; ground to a paste applied to treat biles	Leaf paste; swellings (Baral & Kurmi, 2006)	UA	UA	UA

<i>Innula cappa</i>	Leaf powder is used to make yeast	Leaves and roots are used as stomachic	Aromatic tonic. Roots are bitter acid thermogenic stimulant antiseptic carminative	Root; tonic, stomachic, afeiteric, carminative, dispels effects of shocks, cures heart pains, spleen, liver and joints, ears, hemicrania (Kirtikar & Basu, 1980)	UA
<i>Lobelia pyramidalis</i>	Plant sap; body ache	Leaves and inflorescence are antispasmodic (Manandhar, 2002 Kunwar <i>et al.</i> , 2010)	Leaves and flower are antispasmodic	Lobeline, radicansmine	UA
<i>Maesa chisia</i>	Leaves; clean milk container to kill germs. Fruits are given to sterile female buffalo/cow	Paste of the ripe fruit is used to treat Scabies (Manandhar, 2002; DPR, 2007)	UA	UA	UA
<i>Myrica esculenta</i>	Fruits; eaten for dysentery, Bark decoction; bronchitis (IUCN 2004)	Bark is useful for cough, asthma and sinusitis (DPR, 2007)	UA	Friedelin, Myricanone, Myricadiol Myricanone, Myricitrin (Cunningham, 2001)	UA
* <i>Nephrolepis auriculata</i>	Fresh tuber; eaten to reduce fever	Root juice; indigestion and fever (Baral & Kurmi, 2006)	UA	UA	UA
* <i>Oxalis corniculata</i>	Leaf infusion; to remove opacities of cornea	Fresh plant juice; cure dyspepsia piles, anemia, and tympanitis	Plant is astringent emmenagogue antiseptic, digestive, carminative, liver tonic, diuretic, febrifuge, opacities of cornea (DPR, 2007; Rajbhandari, 2001)	UA	UA
<i>Paris polyphylla</i>	Rhizome powder; joint pain	Rhizome powder; tonic (Rajbhandari, 2001; Baral & Kurmi, 2006)	expectorant antispasmodic stomachic	UA	Saponins, Alpha-paridine alpha-paristypinin, kaempferol 3-gentiobioside, polyphyllin A (Bhattarai & Ghimire, 2006)
* <i>Persicaria barbata</i>	Steam juice; boils and pimples	Root paste; scabies wounds and swollen parts (Rajbhandari, 2001; Manandhar, 2002)	Steam decoction; ulcers (Ambasta <i>et al.</i> , 1992)	UA	UA
* <i>Potentilla fulgens</i>	Dried roots are eaten for dentifrice	Root powder; toothache (Manandhar, 2002)	Root powder; toothache	UA	Carotene, polyphenol
* <i>Pteris bicularita</i>	Fresh leaf juice is applied to stop bleeding	Paste of fronds is applied to wounds (Manandhar, 2002)	UA	UA	UA
* <i>Pyracantha creulata</i>	Raw fruits; dysentery	Fruit wood powder; blood dysentery (Manandhar, 2002; Baral & Kurmi 2006)	UA	UA	Pyraecic acid Sorbitol tannin (Osuka <i>et al.</i> , 1981)
<i>Quercus lanata</i>	Hardwood; as tea, laxative	Resin; soothing body ache (Manandhar 2002) Dry resin; dysentery (Baral & Kurmi, 2006)	UA	UA	Cycloblanon Triedelin Pelagodin sitosterol tannins (Rastogi & Marhotra, 1979)
* <i>Rubus ellipticus</i>	Concentrated fruit decoction; typhoid fever	Concentrated decoction of ripe fruits; typhoid fever (Baral & Kurmi, 2006)	Plant is astringent and tonic Fruits are cooling (DPR 2007)	UA	UA
* <i>Sapium insine</i>	Milky latex; fish poisoning	Bark latex; to expel worms and germs for livestock (Baral & Kurmi, 2006)	Latex is vesicant	UA	Cortigin gujaverin ncoiflorin (Devkota, 2009)

<i>Schima wallichii</i>	Bark paste; applied on wounds to stop bleeding	Young plant leaves and rootstock; fever (Baral & Kurmi, 2006)	Bark is anthelmintic and rubifacient (DPR, 2007)	UA	Octacosenol phytol, alpha-spinasterol and a saponin schiwallin (Husain, 1992)
<i>Scutellaria discolor</i>	Plant paste; cure wounds	Plant juice; headache and fever (Rajbhandari, 2001)	Plant juice; rheumatism	UA	Wogonin (Kunwar <i>et al.</i> , 2010)
<i>Smilax aspera</i>	Root decoction; venereal diseases	Root extract cures scabies (Manandhar, 2002)	UA	UA	Asparagenin, engelitin, parallin pseudogenin rutinoside, smilogenin (Buckingham, 1994)
* <i>Solanum capsicooides</i>	Paste from seeds; toothache	Smoke from fruit; relive severe toothache (Rajbhandari, 2001; Baral & Kurmi, 2006)	Roots are expectorant; cough, asthma, catarrhal fever. Stem flowers and fruits are crminative (DPR, 2007)	UA	Fruits; solasonine, solamargine β -solamargine and solasodiene (Husain <i>et al.</i> , 1992)
<i>Spilanthus paniculata</i>	Used as ingredient in yeast preparation	Plant is applied to snake bite	UA	UA	Plant contains alpha and β -myrin ester myricyl alcohol stigmaterol and 13-Dglucoside (Husain <i>et al.</i> , 1992)
* <i>Sweritia chirayita</i>	Plant extract; reduce fever	Flower heads; chewed for toothache. Its juice; stomach pain (DPR 2007) Plant extract; chronic fever (Baral & Kurmi, 2006; Anonymous, 1976)	Plant; bitter cooling, anthelmintic, antipyretic, antiperiodic, laxative, galactagogue, cures thirst, biliousness, leucoderma, burning, bronchitis, urinary discharge, pregnancy nausea (Kiritkar & Basu, 1980)	UA	Characin, Bitter acid, Ophelic acid, Amarogentin, Gentiopicroin Swerchirin (Bhattarai & Ghimire, 2006)
<i>Taxus wallichiana</i>	Leaf juice; bronchitis	Bark and leaf juice; asthma and cancer (Manandhar, 2002)	Dried leaves used for asthma, bronchitis and cancer	UA	Uterus good for pain in the joints scabies leucoderma skin disease chronic fever (Kiritkar & Basu, 1980)
<i>Tectaria caudunata</i>	Decoction of rhizomes; diarrhea and dysentery	Decoction of rhizome; diarrhea and dysentery (Manandhar, 2002)	UA	UA	Baccatin, 19-hydroxy-baccatin III Cephalomannine 10-deacetylcephamannine, taxol (DPR, 2007)
* <i>Tinospora sinensis</i>	Stem juice; cure diabetes	Stem juice; dysentery, diabetes and gonorrhoea (IUCN, 2004)	Stem juice bitter, stomachic, cures jaundice, burning sensation, urinary disease, urethral discharges, diabetes (Kiritkar & Basu, 1980)	UA	Stems; cardifol tinosporidine tinosporide perberlin hepticosanol and β -sistotol (Watanabe <i>et al.</i> , 2006)
* <i>Vitex negundo</i>	Leaf juice; sinusitis, some smoke dry leaves to relieve sinusitis	Leaf juice; used externally for foetid discharge and maggots in ulcers (Baral & Kurmi, 2006)	Plant is pungent bitter acid anthelmintic, expectorant digestive, stomachic, antiseptic, and tonic (Kiritkar & Basu, 1980)	UA	Leaves; alkaloid-nishindime flavonoids-5-hydroxy-3 6 7 3' 4'-pentamethoxyfl-avonee and caticin irridid glucosides-aucubin angusid (Husain <i>et al.</i> , 1992)

UA=Unavailable

* = traditional use found in the present study that resembles previous studies