Indigenous Use and Ethnopharmacology of Medicinal Plants in Far-west Nepal

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Research

Abstract

Ethnopharmacological knowledge is common and import among tribal populations but much of the information is empirical at best lacking scientific validation. Despite widespread use of plant resources in traditional medicines, bioassay analysis of very few plant species have been conducted to investigate their medicinal properties, and to ascertain safety and efficacy of traditional remedies. The present study analyses indigenous uses of medicinal plants of far-west Nepal and compares with earlier ayurveda studies, phytochemical assessments and pharmacological actions. A field study was carried out in Baitadi and Darchula districts of far-west Nepal. Group discussions, informal meetings, questionnaire surveys and field observations were employed for primary data collection. Voucher specimens were collected with field notes and codes and deposited at Tribhuvan University Central Herbarium (TUCH), Kathmandu. Only 50% of species surveyed shared common uses with ayurvedic medicine. This implies that these herbal remedies are part of an independent health care system in the Nepal Himalaya, which is indigenous and influenced by ayurveda. The folk uses of some of the species were contradicting to those of ayurveda and phytochemical bioassays. A detailed phytochemical study on those species would be an important line of research.

Introduction

Medicinal plants help in alleviating human suffering and are widely used for subsistence, home remedies, and trade (Kunwar *et al*. 2006). It is estimated that 70-80% of people worldwide rely on traditional herbal medicine to meet their primary health care needs (Farnsworth & Soejarto 1991). The ayurveda is an ancient traditional system of medicine with remedies for health and alleviation of illness. The acceptance of the ayurveda is gearing up and use of indigenous drugs of natural/plant origin is a major part of these therapies. Interest in phytomedicine is also renewed during the last decade and many medicinal plant species are being screened for pharmacological activities. The global demand of herbal medicine is growing and its market is expanding at the rate of 20% annually in India (Srivastava 2000, Subrat 2002). The world market for herbal remedies in 1999 was worth of U.S.$19.4 billion (Laird & Pierce 2002).

Numerous drugs have entered into the international market through exploration of ethnopharmacology and traditional medicine (Bussmann 2002) with extensive uses of medicinal plants. It is estimated that 25% of prescription drugs contain active principles derived from higher plants (Tiwari & Joshi 1990). The first compound derived from herbal remedies to enter the international market was ephedrine, an amphetamine like stimulant from *Ephedra sinica* Stapf. The next was artimisinin, a potent antimalarial drug from *Artemisia annua* L. (Patwardhan *et al.* 2005). Numerous other molecules have come out of the ayurvedic experiential base, including alkaloids of *Rauvolfia* for hypertension, *Holarrhena* for amoebiasis, *Mu-*

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cuna pruriens (L.) DC. for Parkinson's disease, *Commiphora* as a hypolipidemic, *Asclepias* as cardiotonic, psoralens for vitiligo, curcumines for inflammation, baccoside for mental retention, picrosides for hepatoprotective, diosgenin for the synthesis of steroidal hormones, guggulsterons as hypolipidemic, piperidine as bioavailability enhancers, asarone as hallucinogenic, phyllanthins as anti-virals, withanolides and many other steroidal lactones and their glycosides as immunomodulators (Jain 1994, Patwardhan 2000). As an example, the sale of drugs derived from the plant *Taxus baccata* L. was U.S.$23 billion in 2000 (Laird & ten Kate 2002).

The increasing use of traditional therapies demands more scientifically sound evidence for the principles behind therapies and for effectiveness of medicines (Patwardhan *et al.* 2005). The therapies are often criticized due to dearth of research, critical evaluation, *in vivo* studies and validations (Fong 2002, Houghton 1995) to support the safety of uses. At the same time, ethnopharmacological knowledge is percolating down these days among the tribal population. The present study, therefore aimed at documenting ethnopharmacological knowledge and then comparing the results with earlier reports of ayurvedic medicine, phytochemical findings and pharmacological uses and then developing recommendations for further use of the plants as guided by this study.

Methods

The study area was Baitadi and Darchula districts of far-west Nepal (Figure 1). Dashrathchand, Khodpe, Kulau, Pancheswor, Patan, Salena, and Sera villages of Baitadi district and Dumling, Gokule, Joljibi, Khalanga, Lali and Uku villages of Darchula district were selected as study sites. Baitadi district ranges with 29°19'–29°57'N latitude, 80°15'–80°57'E longitude and altitude 390-6936 m and Darchula district lies within 29°26'-30°15'N latitude, 80°22'-81°09'E longitude and 357-7132 m altitude. As there is varied topography and bioclimate, both the districts possess a diversity of non-timber forest products (NTFP) and knowledge of uses (Devkota & Karmacharya 2003, Pant & Pant 2004) and the products have been collected since ancient times for domestic use particularly for home herbal healing. Field visits for this study were carried out in May through June and December 2006 and January through February 2007. The first visit lasted for 24 days, and two other visits were of 20 days each.

Participatory interview tools including group discussions, informal meetings, questionnaire surveys and field observations were used for primary data collection. Group discussions were held in Khodpe and Anarkholi of Baitadi district and Khalanga and Dumling of Darchula district. Khodpe and Dumling are rural areas of the districts where local people collect and grow non-timber forest products. Anarkholi and Khalanga are collection centers where collectors and healers reside. Group discussions were carried out using fresh plant specimens from which voucher specimens were prepared and deposited with field notes in the herbarium of Tribhuvan University Central Herbrium (TUCH), Department of Botany, Tribhuvan University, Kathmandu, Nepal.

All informal meetings were held in villages while staying with them. Women actively participated in informal meet-

Figure 1. Study areas: Baitadi (blue) and Darchula (orange) districts of far-west Nepal.

ings. Schedule surveys were designed separately for different respondents. Community forest user groups, farmers, collectors, traditional healers (**baidhya**) and NTFP traders were selected for discussions, meetings and surveys. Elderly people, forest guards, nursery caretakers, indigenous people and women representing the major ethnic groups, castes and occupations were prioritized for selection. Respondents were requested to furnish for each plant: vernacular names, folk use and mode of preparation.

Primary data collection was facilitated by ten local assistants. The information was further validated by common response. The information from at least three or more respondents was considered as common response.

Species collection, identification, enumeration and analysis

Voucher specimens were collected with field notes and codes. Specimen collection was made following Cunningham (2001) and identified up to species level. Most of the species were identified in field and the remaining unidentified species were identified in Kathmandu with comparing deposited specimens in TUCH. Voucher specimens were housed at TUCH.

Species for enumeration in the present study were selected based on data/information availability. The criteria for selection were information of ayurvedic uses, chemical constituents, phytochemical screening, observations from earlier studies and present study. Earlier studies of Nepal (Anonymous 1997, Baral & Kurmi 2006, IUCN 2004, Joshi & Joshi 2001, Kunwar 2006, Lama *et al*. 2001, Manandhar 2002, Rajbhandari 2001, Watanabe *et al*. 2005) were taken as major sources of earlier information. Comparative analysis was made only for the selected plant species that contained all the requisite information of the ayurveda, phytochemical findings, earlier observations and present survey. The observations of the present survey were compared to earlier observations and common uses of the ayurveda. The common uses of the ayurveda for the present analysis were drawn from Anonymous (1995), Bajracharya (1979), Dash & Gupta (1994), Dey (1998), Longman (1994), Joshi 2006, and Sapkota and Adhikari (2001).

Results

Among the respondents, 76% were male and 24% were female. Brahmin and chettri were dominant ethnic groups of the sites and they represented about 80% of the sample respondents. Of the rest, about 20% were from other ethnic groups and schedule castes. A total of 48% were adults, 40% were elder and 12% were young. The respondents' age group ranged from 25-78 but most of the respondents were from 40-65 age group.

The present study yielded ethnomedicinal information on 135 plant species. Non-timber forest products collectors and traditional healers were knowledgeable on ethnomedine and ethnopharmacology respectively.

Table 1. Forty-eight plants used in Baitadi and Darchula districts of far-west Nepal (new results noted in light blue) that are also used in ayurvedic medicine and have information about their pharmacology, chemical constituents, and prior folk uses in Nepal. Each species identification is followed by the number of the voucher specimen that has been deposited in TUCH and an evaluation of resemblance between medicinal systems: * = Species' use resembled ayurveda; ! = Species's use resembled pharmacological bioassays; ‡ = Species' use resembled all categories (uses in other folk medicine, ayurveda and pharmacological bioassays); E = English, L = Local Nepali dialect, N = Nepali, S = Sanskrit.

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
**!Achyranthes aspera* L. Amaranthaceae; BKU 098			
Bipya kuro (L), **apamarga**, **dattiwan** (N), **apamarga**, **kharamanjari** (S). The root juice is used for cough, common cold, diarrhoea and dysentery.	Prickly chaff flower (E). A leaf paste is taken for insect and snake bites (Manandhar 2002). Seed powder acts as brain tonic. Root extract is used in dysentery and menstrual disorders. Plant is used as a diuretic, purgative, and astringent (Baral & Kurmi 2006).	Whole plant is used in leprosy, bronchitis, expectorant, asthma, cough, skin diseases, sinusitis, headache, colic, boils and piles. Plant has emetic properties. In Chinese traditional medicine, hot water extract of the plant is used to alleviate arthritic pain (Bajracharya 1979, Dash & Gupta 1994, Joshi 2006).	A plant extract is antimycobacterial (Newton *et al.* 2002). Dry leaves are employed against asthma (Singh 1995). Ethanol extract of plant roots possesses anti-inflammatory, anti-implantation and abortifacient activity (Vasudeva & Sharma 2006). Plant extract shows activity against Bacillus bacteria (Risal 1994). Seed is cardiotonic and diuretic. Oleanolic acid shows anti-inflammatory activity (Singh *et al.* 1992).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
*!*Acorus calamus* L. Araceae; BKU 176*!			
Sutak, **charila** (L), **bojho** (N), **wacha**, **ugragandha** (S). Rhizome juice is anthelmintic and pesticidal. The juice is given for stomachache and trunk pain. It is considered to increase memory longevity.	Sweet flag, sweet sage (E). Fresh rhizome promotes memory longevity and good voice (Watanabe *et al.* 2005). It is a nerve tonic, emetic, stomachic and used in dyspepsia, calculi and epilepsy (Baral & Kurmi 2006).	Plant is used for bronchitis, cough, dyspepsia, dysentery, and leprosy. It is also used as a brain tonic, emetic, antispasmodic, antipyretic, carminative and for gastritis, toothache, liver and kidney disorders and cancer (Bajracharya 1979, Dash & Gupta 1994, Dey 1998).	Oil possesses antimycobacterial activity (Chopra *et al.* 1957). Antifungal, antibacterial and insecticidal properties from ethanolic extract of stem and rhizomes (Devkota *et al.* 1999, Shinwari & Khan 2000).
‡*Aegle marmelos* (L.) Corrêa Rutaceae; BBU 097			
Bael, **gudu** (N), **bilba**, **shreephal**, **malur** (S). Fruit juice is useful in digestion. Root bark has antipyretic properties. A decoction of plant leaves and fruit is used in dysentery, diarrhoea, respiratory tract infections and heart ailments.	Bengal quince, holy fruit tree, stone apple (E). Leaves are a febrifuge and laxative (IUCN 2004). Unripe fruit is astringent, digestive, and stomachic. Fruit is useful in diarrhoea and dysentery.	Fruit are used in cough. Fruit and bark are useful as an antipyretic, antihistamine, antidiabetic, antidysenteric and antidiarrheal (Anonymous 1995, Bajracharya 1979, Dash & Gupta 1994).	Alcoholic extract of fruit is anti-inflammatory, antipyretic, analgesic (Arul *et al.* 1999) and antimycobacterial (Newton *et al.* 2002). Methanolic fruit extract is used to treat dementia and increase memory (Vinutha *et al.* 2007). Aqueous fruit and seed extract reduces blood glucose level (Kamalakkannan & Prince 2004, Kesari *et al.* 2006). Regular administration of seed extract normalizes lipid profile (Kesari *et al.* 2006). According to Veerappan *et al.* (2007), extracts of Bael leaf have a high margin of drug safety. Alkaloid leaf extract and stem bark exhibit hypoglycemic (Saxena & Vikram 2004), antidiarrheal (Shoba & Thomas 2001), antibacterial (Rani & Khullar 2004) and antiviral (Badam *et al.* 2002) effects. Plant extract endows anti-cancer property (Lotufo *et al.* 2005). Fresh extracts have stimulant effect on heart and circulatory systems (Arul *et al.* 1999).
Alstonia scholaris (L.) R.Br. Apocynaceae; BKU 033			
Chhatiwan (N), **saptaparna** (S). The infusion of stem bark relieves fever and headache. Milk is used in asthma disease.	Devils tree, dita bark tree (E). Bark juice is considered to increase lactation (Rajbhandari 2001). Milky juice is applied to ulcer (IUCN 2004). Bark has astringent, antipyretic, stomachic properties and it is useful in asthma, diarrhoea, and dysentery (Baral & Kurmi 2006).	Stem bark has effective property against ulcers, liver complaints, dyspepsia and diarrhea and dysentery. It is also used as an astringent, antidiarrheal and febrifuge (Bajracharya 1979, Dash & Gupta 1994, Sapkota & Adhikari 2001).	Picrinine is used as depressant of central nervous system. Stem bark is hypotensive and anticancerous (Chandel *et al.* 1996).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
‡*Asparagus racemosus* Willd. Liliaceae; BBU 065			
Jhirjhirine (L), **kurilo**, **satawari** (N), **abhiru**, **satmuli** (S). Roots are used for milking cattle, fermenting and local brewing.	Asparagus (E). Root is tonic, aphrodisiac, diuretic, carminative, appetizer and antispasmodic. It is useful in mental disorders, dyspepsia and diarrhoea (Baral & Kurmi 2006). Tender shoots are tonic and useful in dysentery and rheumatism (Rajbhandari 2001).	Asparagus roots are used in tuberculosis, measles, diarrhoea, epilepsy and liver problems and considered as a galactogogue, aphrodisiac, diuretic, antispasmodic, and nerve tonic. It is also considered to prevent ageing, impart immunity, improve mental functions and add vigor and vitality to the body (Anonymous 1995, Bajracharya 1979, Dey 1998).	Root extract increases mammary gland in post-partum period (Sabnis *et al.* 1968) and acts as a lactogogue (Sharma *et al.* 1996a). Dysmenorrhoea and premenstrual syndrome were found to be symptom free after usage of root extract (Nevrekar *et al*. 2002). Root extract is cardioprotective (Khanna *et al*. 1991). Plant extract is: antitumor (Kamat *et al*. 2000), antifungal, anti-ulcer (Sairam *et al*. 2003), immunostimulatory (Dhuley 1997), and diuretic (Balansand & Rayband 1987). The crude saponins from the shoots are useful in dyspepsia (CSIR 1992). Ethanol plant extract is found to be an alpha-amylase digestive enzyme inhibitor (Manandhar 1999). Extracts of plant rhizomes reduce blood sugar levels (Manandhar & Adhikary 1988) and cholesterol (Visavidaya & Narasimhacharya 2005).
‡*Berberis asiatica* Roxb. ex DC. Berberidaceae; DKU 034			
Kirmada (L), **chutro**, **rasanjan** (N), **daruharidra**, **darwi** (S). Root and stem bark paste is used to treat eye diseases and control worms.	Barberry (E). Root decoction is used in fever (IUCN 2004). Root bark is useful in skin diseases, diarrhoea, jaundice and eye problems (Baral & Kurmi 2006).	Roots, stems and fruit are used in conjunctivitis, inflammation, diabetes, dysentery, jaundice, skin diseases and fever. They are astringent, antipyretic, antidiarrheal and stomachic (Anonymous 1995, Dash & Gupta 1994, Joshi 2006).	Berberine effectively treats genital infections (Vermani & Garg 2002) and has been shown to bind to DNA and inhibit its cleavage (Krey & Hahn 1969). Its use, as an extract in eye drops for conjunctivitis is widespread. It is effective as an antipyretic, anaesthetic, and antihypertensive (Sabir & Bhide 1971).
‡*Bergenia ciliata* (Haw.) Sternb.f. Saxifragaceae; DKU 124			
Silphode (L), **pakhanved**, **dhungephool** (N), **asmahan**, **asyavedak**, **pashanveda** (S). Rhizome and root are used in diarrhoea, dysentery, gallstone and gastritis.	Rock foil (E). Rhizomes are bitter, aphrodisiac, astringent, carminative and diuretic (Baral & Kurmi 2006, IUCN 2004). Whole plants and rootstocks are used in diarrhoea, dysentery and liver and blood disorders in **amchi** system (Lama *et al*. 2001).	Piles, diarrhoea, dysentery, cancer, urinary calculi, heart problems and liver disorders are treated with rhizomes. Rhizome extract is considered as antipyretic, antidiarrheal, diuretic and expectorant (Bajracharya 1979, Dash & Gupta 1994, Dey 1998).	Methanolic aqueous extract with its trypsin shows considerable antiviral activity against influenza virus (Rajbhandari *et al*. 2001).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
Bombax ceiba L. Malvaceae; BBU 105			
Simal (N), **moca**, **salmali** (S). Flowers and seeds are used in dysentery. Roots, bark and seeds are emetic and stimulant.	Silk cotton tree (E). Gum or resin from bark is useful in blood disorders (Rajbhandary 2001). It is an aphrodisiac, astringent and tonic. Root bark is emetic, tonic and used in constipation. Flowers are useful in snake bite and seeds are taken for gonorrhoea (Baral & Kurmi 2006).	Flowers are astringent and cooling. Young root juice is stimulant and tonic (Dash & Gupta 1994, Joshi 2006, Longman 1994).	Shamimin shows a hypoglycemic effect but it has lethal effect at higher doses (Saleem *et al*. 1999). Seeds are cardiostimulant (Chandel *et al*. 1996).
Calotropis gigantea (L.) W.T. Aiton Apocynaceae; BBU 054			
Aak (N), **ark**, **alarka** (S). Latex is useful in arthritis, inflammation and keeping out thorns from wounds. It is also applied on wasp stings.	Giant milkweed, crown plant (E). Latex as well as other parts have emetic, purgative and anthelmintic properties and are used for swelling and boils. Flowers are used in asthma and inflammation (Baral & Kurmi 2006). Leaf buds are used for skin diseases (Anonymous 1997).	Useful in leprosy, asthma, cough, indigestion, piles and fistula. Flowers have the strongest anticancer properties. Milk is purgative and leaves are used in gout (Bajracharya 1979, Dash & Gupta 1994, Joshi 2006).	The latex exhibits toxic irritation, inflammation and allergic reactions (Garg 1979, Tomar *et al*. 1970) but it does not act as an antidote for scorpion stings (Uawonggul *et al*. 2006). The flowers possess nematocidal activity (Iqbal *et al*. 2005), analgesic (Pathak & Argal 2007) and antimycobacterial (Grange & Davey 1990) activities. Cardenolide calotropin shows anticancer properties.
Cedrus deodara (Roxb.) G.Don Pinaceae; DKU 027			
Dyar, **debdar** (N), **devadaru**, **suradaru** (S). Essential oil from wood is externally used for scabies.	Himalayan cedar (E). Wood is diuretic and useful to disintegrate kidney stones (Anonymous 1997). It is astringent and used in fevers, diarrhoea and dysentery (Anonymous 1995). Wood paste is applied on the forehead for relief from headaches (Manandhar 2002).	Leaves and cones are useful in bronchitis and tubercular gland diseases. Heart wood and oil have diuretic, carminative, anti-inflammatory, analgesic and antipyretic properties. Oil is useful in piles and snake bite (Anonymous 1995, Bajracharya 1979, Dash & Gupta 1994).	Cone extracts show antimycobacterial activity (Digrak *et al*. 1999). Himachalol is a chief antispasmodic agent (Kar *et al*. 1975).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
!Centella asiatica (L.) Urb. Apiaceae; DBU 006			
Khochade (L), **ghodtapre**, (N), **brahmi**, **manduka parni** (S). Leaf juice is used in urinary problems and cuts and wounds.	Penny wort (E). Plant juice is valued for fever, dysentery and throat pain (IUCN 2004). The plant is a stomachic and used in leprosy, indigestion, skin diseases, epilepsy and asthma (Baral & Kurmi 2006).	The whole plant is useful in bronchitis, skin diseases, blood disorders, asthma and leprosy. It is alterative, tonic and diuretic (Dash & Gupta 1994, Joshi 2006).	Whole plant extract shows antimycobacterial activity (Newton *et al*. 2002). Methanolic and aqueous extracts of plant are moderately effective at lessening body pain, inflammation, vascular and bronchodilation (Kumar & Muller 1999). Asiaticoside is used to treat leprosy and stimulate wound healing and skin grafts. It promotes mental calm and clarity. Asiatic acid and madecassic acid possess anti-inflammatory properties (Somchit *et al*. 2004). Brahmic acid treats ulceration. Extracts do not reduce sugar levels in blood (Manandhar & Adhikary 1988) but lower uric acid (Manandhar *et al*. 1991). Plant extract is a potential antidiarrheal agent (Mamtha *et al*. 2004).
Cinnamomum tamala (Buch.-Ham.) T. Nees & Nees Lauraceae; BBU 095			
Tejpat (N), **bahugandh**, **tachula**, **patra** (S). Leaf is used in gastric problems. Bark is useful in checking nausea and vomiting.	Cinnamon (E). Bark and leaves are astringent, stimulant and carminative, relieving diarrhoea, colic pain, and ophthalmia (Baral & Kurmi 2006).	Leaves are carminative and stimulant. Leaves and bark are used in gonorrhoea, rheumatism, diarrhoea, bronchitis and diabetes (Bajracharya 1979, Dash & Gupta 1994, Dey 1998).	A plant extract exhibits hypoglycemic effects and reveals a phenomenon of less hypoglycemic response at a higher dose (Sharma *et al*. 1996b). Eugenol acts against herpes simplex virus (Bourne *et al*. 1999).
!Cissampelos pareira L. Menispermaceae; BKU 023			
Batulpate, **gurjegano** (N), **ambashtha** (S). Root is anthelmintic and antipyretic. Root juice treats headache, stomachache, asthma and urinary problems of livestock.	False pareira, brava (E). Plant juice induces abortion and stops bleeding after delivery (Rajbhandary 2001). Root paste is applied on snake bites (Manandhar 2002).	Leaves and stem parts are used in asthma. Roots are useful in skin diseases, blood disorders, leukorrhea, diarrhoea, dysentery and indigestion and have antiperiodic effects (Anonymous 1995, Dash & Gupta 1994, Joshi 2006).	An alcoholic extract of stems and leaves possesses antimycobacterial activity (Antoun *et al*. 2001). Pelosine acts against urinary complaints. Hyatin is a muscle relaxant (Jain *et al*. 1991).
**Curculigo orchioides* Gaertn. Amaryllidaceae; BKU 020			
Kalmusali (N), **talmule** (S). Roots are used as a tonic and to treat paralysis.	Black musale (E). Rhizome is an aphrodisiac, diuretic and tonic and used in piles, jaundice, asthma and skin disease (Anonymous 1995). The powered rhizome stops bleeding and treats cuts and wounds (IUCN 2004).	Roots are diuretic, tonic, aphrodisiac, antidiarrheal, and are used in liver problems, piles, asthma and gonorrhoea (Anonymous 1995, Bajracharya 1979, Joshi 2006).	Extracts are known to have vascular protective activities (Palazzino *et al*. 2000, Valls *et al*. 2006).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
Cuscuta reflexa Roxb. Convolvulaceae; BKU 053			
Aakasbeli (N), **amaruela** (S). Plant paste is used for headache, body ache and itches.	Dodder (E). Plant juice is used in jaundice, fever (Manandhar 2002, Rajbhandari 2001), asthma, bronchitis, headache, rheumatism, itches, skin diseases and bilious disorders (IUCN 2004). Seed is carminative, anthelmintic and alterative (Baral & Kurmi 2006).	Plant is purgative in properties (Dash & Gupta 1994).	Whole plant extract is considered as antiviral (Awasthi 1981) and analgesic (Pal *et al*. 2003). Methanol extract of stem possesses broad-spectrum antibacterial activity (Pal *et al*. 2006). Plant extract has diaphoretic, demulcent, laxative and tonic properties. Plant is antifertility agent.
!Cyperus rotundus L. Cyperaceae; BBU 096			
Nagarmothe, **siru** (N), **nagarmusta** (S). Rhizomes extract is used in fever, diarrhoea, dysentery and blood disorders.	Nut grass (E). Tuberous roots are used in indigestion, diarrhoea, dysentery, cholera and fever. It is astringent, anthelmintic, stomachic and diuretic (Baral & Kurmi 2006, Rajbhandari *et al*. 1995).	Plant is used in inflammation. Tuber has diuretic, astringent, anthelmintic, digestive and galactogogue properties (Anonymous 1995, Bajracharya 1979, Dash & Gupta 1994).	Rhizome extract is used to lower blood glucose levels (Raut & Gaikwad 2006). Beta-sitosterol possessed anti-inflammatory and antipyretic activity (Gupta *et al*. 1980). Methanol extract of rhizome is antidiarrheal (Uddin *et al*. 2006).
Datura stramonium L. Solanaceae; DKU 094			
Dhatura (N), **kanak**, **dhatura** (S). Fruit are used as sedative. Seed paste is used for boils.	Devil's apple, thorn apple, (E). Flower juice is applied to scalp for dandruff and hair loss (IUCN 2004).	Seeds and fruit are antispasmodic and narcotic in properties. Fruit juice is useful in dandruff and promotes hair growth. Plant is described as toxic (Dash & Gupta 1994).	Seed extract causes increase in activity of brain lipids and reduction in glucose metabolism (Hasan & Kushwaha 1987).
**!Eclipta prostrata* (L.) L. Asteraceae; BKU 055			
Bhringraj, **kal jira** (N), **kesaranjan**, **bhringraj** (S). Leaf juice is given for dyspepsia and is applied for scorpion stings. Roots are used as a tonic for the liver.	Eclipta, false daisy (E). A plant paste is used on cuts and wounds, pimples and skin diseases (IUCN 2004). Plant is specific for curing eye problems. Roots are used as liver tonics, antiseptics, emetics and purgatives (Baral & Kurmi 2006).	The whole plant has emetic and purgative effects and is useful in jaundice and filariasis (Anonymous 1995, Bajracharya 1979, Dash & Gupta 1994).	Plant juice is antiviral and liver protective (Dixit & Achar 1979) with activity against hepatitis B virus (Subramonium & Pushpangadan 1999). Alcoholic extracts confer protection against snake venom (Mors *et al*. 1989). It is anti-inflammatory (Chandra *et al*. 1987), a bronchodilator (Leal *et al*. 2000) and antimycobacterial (Al-Shamma & Mitscher 1979). Plant powder counteracts an increase of liver weight (Chandra *et al*. 1987).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
‡*Holarrhena pubescens* Wall. ex G. Don Apocynaceae; BKU 093			
Bankhirra, **desikhirra** (L), **indrajau** (N), **indrabriksha**, **kutaj**, **watsak** (S). Bark is antidiarrheal, antipyretic and anthelmintic. Seed powder is uses for fevers.	Easter tree, ivory tree, conessi bark, kurchi (E). Seeds are used in fever, jaundice, diarrhoea, intestinal worms and gallstones (IUCN 2004). Root bark is used in dysentery and leaves are used in bronchitis, boils, ulcers and dysentery (Baral & Kurmi 2006).	Bark and seeds show astringent, antipyretic, expectorant and stomachic effects and are taken for diarrhoea and dysentery. Seeds are used for treating jaundice, gall stone and intermittent fever (Bajracharya 1979, Dash & Gupta 1994, Dey 1998).	Conisine is effective against dysentery. Conkurchine is vasodilator. Methanol extract of plant bark is antimycobacterial (Newton *et al*. 2002). Bark powder is hypotensive (Chaturvedi & Singh 1983).
Jatropha curcas L. Euphorbiaceae; BBU 056			
Inna (L), **sajiwan** (N), **vyaghra eranda** (S). Seed oil is applied for arthritis and boils. Bark juice is used on wounds, scabies and ringworm.	Physic nut (E). Twigs are used as tooth brushes. The latex is used on pimples and boils (Manandhar 2002). The plant juice is a purgative. Root bark is used in rheumatism and fruit is anthelmintic (Baral & Kurmi 2006).	Seeds and latex are astringent and purgative and are employed in scabies, eczema, inflammation and wounds. Leaves are used in hemorrhage, hemoptysis, cough, fever and asthma (Joshi 2006).	Root extract is antidiarrheal (Mujumdar *et al*. 2000). Root paste is anti-inflammatory (Mujumdar & Misar 2004). Curcin from seed produces deleterious effects to the blood. Plant extract has cytotoxic, antitumor and abortive effects (Goonasekera *et al*. 1995). Latex is a blood coagulant (Osoniyi *et al*. 2003) whereas dilute latex is anticoagulant.
Juglans regia L. Juglandaceae; DBU 099			
Okhar (N), **akshotaka** (S). The bark is used in scabies, allergy and toothaches.	Walnut (E). Bark is used as anthelmintic, and leaves are astringent and tonic in properties (Manandhar 2002). Nut oil is anthelmintic and used in skin diseases (IUCN 2004). Bark and fleshy wall of the fruit are used as hair dye to make hair black and promote hair growth in **amchi** system (Lama *et al*. 2001).	Bark juice is considered as anthelmintic, astringent and tonic. Leaf extract is employed in tuberculosis (Joshi 2006).	Seeds are diuretic and a nervous system depressant. An aqueous extract of leaves is antinociceptive, and an ethanolic extract reveals anti-inflammatory activity (Erdemoglu *et al*. 2003). Napthoquinone is anthelmintic (Nardelli 1987).
Justicia adhatoda L. Acanthaceae; BBU 057			
Vasakha (L), **asuro** (N), **basa**, **brisha** (S). Leaf juice is used to treat diarrhoea and dysentery.	Malabar nut (E). An infusion of dried leaves is used for respiratory problems (IUCN 2004). It is a reputed remedy for respiratory problems and cough and cold (Baral & Kurmi 2006).	Leaves are used for leprosy, asthma, bronchitis, cough and skin diseases. Leaf and root juice possess antiseptic and hemostatic properties (Bajracharya 1979, Dash & Gupta 1994, Joshi 2006).	Leaf extracts are antimycobacterial (Grange & Snell 1996). Methanolic extract of flowers inhibits leukotriene, which causes pain, inflammation and broncho-muscular constriction (Kumar & Muller 1999). Vasicine is a bronchodilator and expectorant (Johri & Zutshi 2000).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
Mallotus philippensis (Lam.) Müll. Arg. Euphorbiaceae; BKU 092			
Rohina (L), **sindure** (N), **kampillak** (S). Fruit are used for scabies.	Kamala (E). Bark decoction is used in typhoid and meningitis (Manandhar 2002). Fruit powder is anthelmintic, purgative and laxative. Bark juice has stomachic effect (Baral & Kurmi 2006).	The plant is useful in bronchitis. The seed are a laxative. Glands and hairs are used as emetic, purgative and anthelmintic and useful in urinary problems (Bajracharya 1979, Joshi 2006).	A methanolic extract is active against herpes simplex virus (Taylor *et al*. 1996). A fruit extract is antibacterial (Kumar *et al*. 2006). A bark extract is both gram positive and negative antibacterial (Taylor *et al*. 1996). A fruit extract is hypoglycemic and anti-cancer (Chandel *et al*. 1996).
Mentha spicata L. Lamiaceae; BKU 058			
Pudina (L), **tulsi pate** (N), **putitha** (S). The plant is used for freshness, asthma and urinary complaints.	Spearmint (E). Leaf juice is taken to treat dysentery and boils (Manandhar 2002).	The leaf oil is antiemetic, antispasmodic, carminative, diuretic and stomachic (Dash & Gupta 1994, Joshi 2006).	An aqueous leaf extract is antimycobacterial (Fitzpatrick 1954). Leaf extract is fungicidal (Sarbhoy *et al*. 1978).
!Moringa oleifera Lam. Moringaceae			
Sahjwan (N), **shigru**, **shobhanjana** (S). Raw fruit is valued for liver disorders.	Drumstick tree, horse-radish tree (E). Roots are purgative. Leaves are a galactogogue. Gum is useful in dysentery (Manandhar 2002). The plant is antispasmodic, expectorant, cardiotonic and diuretic (Baral & Kurmi 2006).	The seeds are used for bronchitis, asthma, and leprosy. Bark and fruit are taken for epilepsy, urinary tract infection, and rheumatism. The plant is astringent, aphrodisiac, carminative and stomachic (Bajracharya 1979, Dash & Gupta 1994, Dey 1998).	A plant extract is considered as a source of anti-cancer compounds (Dhawan *et al*. 1980, Lotufo *et al*. 2005). Plant juice shows liver protective properties (Subramonium & Pushpangadan 1999). A leaf extract possesses hypotensive activity (Faizi *et al*. 1995). Plant root wood extracts reduce the risk of stone formation (Karadi *et al*. 2006).Ethanol root extract are hypocholesterolemic (Mehta et al 2003). Root extract is effective in preventing implantation (Shukla et al 1988). Bark extract has been shown to possess antifungal and antitubercular activities (Bhatnagar *et al.* 1961). Ethanolic extract of stem bark is hypoglycemic (Kar *et al.* 2003).
‡*Mucuna pruriens* (L.) DC. Fabaceae; BKU 059			
Kauchho (N), **kapikachhu** (S). Roots are used as a tonic and stimulant.	Cowhage, velvet bean (E). Seeds are used as an aphrodisiac, purgative and tonic and in scorpion stings (HMG 1970). Pod is most active anthelmintic against tapeworms (Baral & Kurmi 2006).	Roots used for dysentery, fever and urinary troubles. Seeds are aphrodisiac, nerve tonic, anthelmintic, antipyretic and purgative (Bajracharya 1979, Dash & Gupta 1994).	Seed powder has been reported to be anti-diabetic (Dhawan *et al*. 1980, Pant *et al*. 1968) and is useful in Parkinson's disease (Manyam *et al*. 1995). Root juice is a nervous system stimulant (Chandel *et al*. 1996).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
*!*Murraya koenigii* (L.) Spreng. Rutaceae; BBU 091			
Ganiuele, **mechiya sag** (L), **desi neem**, **mitha neem**, **kari patta** (N), **maharista**, **mahanimba** (S). Leaves and roots are used as anthelmintic and in blood disorders. Root extract is applied for skin diseases.	Curry leaf tree (E). Root and bark are carminative, tonic and purgative (IUCN 2004). Leaves are stomachic and used for leprosy, skin diseases and diarrhoea and dysentery (Baral & Kurmi 2006, Manandhar 2002).	Plant used to treat diarrhoea, diabetes, constipation and menstrual troubles. Leaves and bark are tonic, stomachic and purgative (Joshi 2006).	Seed oil is anti-bacterial and anti-fungal. Aqueous leaf extract is hypoglycemic (Kesari *et al*. 2005, Narayan & Shastri 1975) but the effect is promising only for early diabetes (Yadav *et al*. 2002).
*!*Nardostachys grandiflora* DC. Valerianaceae; DBU 060			
Bhulte (L), **jatamansi** (N), **jatanmasi**, **gandhamasi** (S). Oil is used for headaches. Roots and rhizomes are used in epilepsy and mental weakness.	Spikenard, musk root (E). Leaves are taken for altitude sickness, fever and wounds in **amchi** system. Rhizomes are used for healing wounds, cough, high blood pressure, stomach diseases and swelling (Lama *et al*. 2001). Rhizome oil is a well known hair tonic (Watanabe *et al*. 2005).	Plant is useful in epilepsy, hysteria, ulcers, insomnia, blood disorders, digestion and respiratory problems, measles, syncope, mental disorders and skin diseases. It is antispasmodic, carminative, diuretic and sedative (Anonymous 1995, Bajracharya 1979, Dey 1998).	Methanolic rhizome extract is used to treat dementia and increase memory (Vinutha *et al*. 2007). Extract of rhizomes contains hepatoprotective compounds (Ali *et al*. 2000) and it moderates epilepsy with low neurotoxic effects (Rao *et al*. 2005). Rhizome extract shows antibacterial activity (Kumar *et al*. 2006).
**Neopicrorhiza scrophulariiflora* (Pennel) D.Y. Hong Scrophulariaceae; DKU 090			
Katuko (L), **kutki** (N), **aristha**, **katuka**, **matsyapitta** (S). Roots are used for fever and stomachache.	Gentian, hellobore (E). Roots and rhizomes are anthelmintic, antiperiodic, stomachic, purgative, digestive and used in constipation, dyspepsia, colic, cough, asthma, jaundice, diabetes and skin diseases (Baral & Kurmi 2006, IUCN 2004).	Plant used for fever, cough, jaundice, liver and blood disorders and hepatitis (Bajracharya 1979, Dash & Gupta 1994, Dey 1998). Rhizomes and roots are used for bile diseases, high blood pressure, sore throat, cough and cold and gastritis in **amchi** system (Lama *et al*. 2001).	Root powder is active against viral hepatitis (Luper 1999, Subramonium & Pushpangadan 1999). Picroliv and kutkoside are hepatoprotective (Doreswamy & Sharma 1995) and immunostimulatory (Puri *et al*. 1992). Powdered tuberous root relieve bronchial asthma (Rajaram 1976).
**Oroxylum indicum* (L.) Kurz Bignoniaceae; BKU 061			
Sanna, **tatelo** (N), **shyonaka** (S). A root decoction is used in diarrhoea and dysentery. Seeds are a digestive.	Trumpet flower (E). A seed paste is applied to treat boils and wounds (Rajbhandary 2001). The root is astringent, anti-inflammatory, aphrodisiac, expectorant, anthelmintic and tonic. The bark is diuretic and stomachic and useful in diarrhoea and dysentery (Baral & Kurmi 2006).	Root bark and seeds are carminative, stomachic, tonic, diaphoretic and astringent. Root bark is also used to treat bile problems, cough, diarrhoea, and dysentery (Bajracharya 1979, Dash & Gupta 1994, Rajbhandari *et al*. 1995).	The fruit is spasmolytic. The bark is diuretic. The plant extract is considered as a source of anti-cancer compounds (Lotufo *et al*. 2005). An Ethanol extract of stem bark reveals activities against breast cancer (Lambertini *et al*. 2004) and arthritis (Laupattarakasem *et al*. 2003).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
Paris polyphylla Smith Liliaceae; DBU 134			
Satuwa (N), **haimavati**, **satuwa** (S). Roots are used for epilepsy, shock, fever, and vomiting control. Its paste is applied on snake bites.	Love apple, paris (E). Root paste is used as an antidote for insect and snake bites (Rajbhandari 2001). The plant is anthelmintic and tonic (Watanabe *et al*. 2005).	The rhizome is used as an anthelmintic, expectorant, antispasmodic, digestive, tonic and alterative (Bajracharya 1979).	An ethyl acetate extract is antioxidant (Yingming *et al*. 2004) and immunostimulatory (Zhang *et al*. 2007). Diosgenin is renowned for antibacterial and anticancer properties (Zhang *et al*. 2007). A methanolic extract of the plant rhizome is gastroprotective (Matsuda *et al*. 2003).
*!*Phyllanthus emblica* L. Phyllanthaceae; BKU 135			
Aunla (L), **amala**, **rikhiya** (N), **dhatri**, **aadiphala** (S). Fresh fruit is used as a diuretic and laxative and for cold and cough.	Gooseberry (E). The plant is used in hemorrhage, diarrhoea, dysentery, jaundice and dyspepsia (Anonymous 1995). The root is an astringent and the seeds are used in asthma (IUCN 2004). The fruit is diuretic, laxative, ophthalmic and useful in diarrhoea, dysentery, jaundice, ulcer and skin diseases (Baral & Kurmi 2006).	The fruit is an aphrodisiac, diuretic and hemostatic used in anaemia, diarrhoea, dysentery and jaundice. Fruit should be avoided at bedtime to prevent harmful effects on teeth (Dash & Gupta 1994, Dey 1998, Joshi 2006). Fruit are used in blood, liver and spleen disorders (Tibetan). Flowers are used as a hypothermic agent (**unani**).	The fruit possess high levels of potassium and low levels of sodium, suitable for cardiovascular patients (Devi *et al*. 2000). Because of high calcium content in fruit, it is recommended for lactating and pregnant women. It stimulates the immune system, increases interferon and protects against cancer (Xia *et al*. 1997). Fresh fruit juice reduces cholesterol levels. Plant juice is liver protective (Gulati *et al*. 1995, Subramonium & Pushpangadan 1999). A fruit butanol extract relieves gastric ulcers (Bandyopadhyay *et al*. 2000, Maulik *et al*. 1997). A methanolic fruit extract inhibits leukotriene, which causes pain, inflammation and broncho-muscular constriction (Kumar & Muller 1999). A fruit extract is anticarcinogenic (Rajeshkumar *et al*. 2003) and antidiabetic (Sabu & Kuttan 2002). Putranjivein shows inhibition of HIV reverse transcriptase (Mekkawy *et al*. 1995).
**Pinus roxburghii* Sarg. Pinaceae; BBU 062			
Khote salla (L), **rani salla** (N), **sarala** (S). A bark paste is used in burns and scalds. Resin is applied on boils.	Chir pine (E). Resin is used to in relieve cough (Rajbhandari 2001) and gastric troubles (Manandhar 2002).	Wood oil is used as a nerve tonic, hemostatic, expectorant and diuretic. It is used for skin diseases, burns and cracks. Bark is used for skin diseases and ulcers (Bajracharya 1979, Dash & Gupta 1994).	Turpentine oil is antiseptic and used as an expectorant in chronic bronchitis. Needle oil is antibacterial (Chauhan 1999).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
Plumbago zeylanica L. Plumbaginaceae; BBU 089			
Chhittu (N), **agnimata**, **chitrak** (S). Leaf juice treats skin diseases. Root paste is used against scabies.	Ceylon leadwort (E). The plant is used as a stimulant, stomachic, narcotic and irritant in large doses (Rajbhandari *et al*. 1995). The milky juice is applied to skin diseases (IUCN 2004).	Roots are used for indigestion, dysentery, skin diseases and piles. Plant stems are effective as appetizers, and used for skin diseases in **unani** (Anonymous 1995, Bajracharya 1979, Dash & Gupta 1994).	Plumbagin has been reported to have anticancer and antimitotic activity (Purushothaman *et al*. 1983).
Prinsepia utilis Royle Rosaceae; BKU 136			
Dhatyal (L), **dhatelo** (N). The seed oil is used for cough and cold.	The oil cake is used as an anthelmintic (Manandhar 2002). The plant is used in asthma, epilepsy and headaches. The oil has laxative effects and is used in cough, ulcers, skin diseases and amentia (Baral & Kurmi 2006).	The oil is rubefacient and applied for rheumatism and pains (Sapkota & Adhikari 2001).	A leaf extract was found be effective against mycobacterial reactions (Taylor *et al*. 1995). A fresh leaf extract contains cyanogenic glycosides which cause food poisoning (Shrestha & Agrawal 1994).
**!Punica granatum* L. Punicaceae; DKU 088			
Anar, **darim** (N), **dadima** (S). Root and stem bark are anthelmintic and used for tapeworms.	Pomegranate (E). Fruit pulp and seeds are stomachic and cardiotonic (Manandhar 2002). The bark is used as an anthelmintic. Flowers and fruit are employed in cough in **amchi** system (Lama *et al*. 2001). It is good for epitaxis (Baral & Kurmi 2006).	The plant is used in chest pain, sore throat, and bronchitis. It is stomachic, astringent, anthelmintic, antidiarrheal, diuretic, expectorant, hemostatic and aphrodisiac (Anonymous 1995, Dash & Gupta 1994, Joshi 2006).	A methanolic extract is active against herpes simplex virus (Taylor *et al*. 1996) and mycobacteria (Wang 1950). Flowers are anti-diabetic (Jafri *et al*. 2000). A plant extract is resolves allergic symptoms and cardiovascular disorders (Watanabe & Hatakoshi 2002). Juice, peel and oil extracts inhibit pregnancy (anti-implantation) and are anticancerous and anti-inflammatory (Lansky & Newman 2007). Puniclin and punicalagin inhibit HIV reverse transcriptase, and maslinic acid is an antioxidant (Wang *et al*. 2006).
!Rhododendron arboreum Sm. Ericaceae; DBU 063			
Laliguras (N), **pollasa**, **raktakarni yara** (S). Flower juice is used to treat dysentery.	Rhododendron (E). Bark juice is applied to treat cough, diarrhoea and dysentery (IUCN 2004, Rajbhandary 2001). Flowers are used as an appetizer and in menstrual disorders and dysentery (Baral & Kurmi 2006).	The bark is analgesic and used in liver disorders, jaundice, diabetes and obesity. Stems are used in enlargement of liver and root is taken for leukorrhea (Bajracharya 1979).	An alcoholic leaf extract depresses respiration. Flower juice is used for diarrhoea and dysentery (Chauhan 1999).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
**Rubia manjith* Roxb. ex Fleming Rubiaceae; DKU 064			
Majitho (N), **majistha** (S). A fruit and stem decoction is used to treat wounds. The root is used as a digestive and in leprosy.	Indian madder (E). The plant is astringent, antidysenteric and antiseptic in properties (Rajbhandari *et al*. 1995). Stems are used for snake bite and scorpion stings. The plant is used as a blood purifier and against skin and urinary diseases (Baral & Kurmi 2006).	The roots are astringent, digestive, expectorant and hypnotic and used in leprosy, urinary complaints and snakebite (Anonymous 1995, Bajracharya 1979, Sapkota & Adhikari 2001).	A root extract is hepatoprotective (Rao *et al*. 2006) and useful for disintegration and elimination of urinary stones (Mischenko *et al*. 1999). It is anti-proliferative against epidermal keratinocytes (Tse *et al*. 2006). Rubiadin is a potent antioxidant, inhibits lipid peroxidation (Tripathi & Sharma 1998) and is anti-inflammatory and immunomodulatory (Jokharapukar *et al*. 2003)
Sapindus mukorossi Gaertn. Sapindaceae; DKU 087			
Rithha (N), **aristhaka**, **phenila** (S). The fruit is used for snake bites, scorpion stings, and dandruff.	Soap nut (E). The fruit is expectorant, demulcent, emetic, anthelmintic and purgative and used in treating epilepsy and cholera (Baral & Kurmi 2006, IUCN 2004).	The fruit is emetic, laxative and expectorant (Bajracharya 1979).	The plant's saponins are active against *Chlamydia* (Garg *et al*. 2004).
Semecarpus anacardium L.f. Anacardiaceae; BBU 066			
Bheul, **bhalla** (L), **bhalayo** (N), **bhellataka** (S). A mixture of its fruit and cow dung solution keeps snakes out and acts as an ant repellent.	Marking nut (E). The root juice is considered to cause sterility in women (Manandhar 2002). Fruit juice is applied to treat chapped feet (Rajbhandari 2001). Nut is aphrodisiac, astringent, purgative and liver tonic. Nut oil is used externally for rheumatism (Baral & Kurmi 2006).	The plant and its nuts are well known for anti-arthritic and anti-cancer properties. The fruit is astringent, aphrodisiac, nerve tonic, stomachic, digestive and expectorant and used for leucoderma and leprosy (Bajracharya 1979, Dash & Gupta 1994, Joshi 2006).	A methanolic seed extract is used to treat dementia and increase memory (Vinutha *et al*. 2007). It is neuroprotective especially in the hippocampal region (Shukla *et al*. 2000). An ethanolic nut extract is antimicrobial, anti-inflammatory, anthelmintic and anti-amoebic (Singh *et al*. 2006) and antifungal (Tripathi & Singh 2001). A seed extract is anti-inflammatory. An extract is anticarcinogenic (Premalatha & Sachdanandam 1999).
Solanum surattense Burm.f. Solanaceae; DKU 086			
Jhyaure bhanta, **jware baigan** (L), **kantakari** (N), **kantakari** (S). A seed infusion is taken for toothache.	The berries are carminative and expectorant and used for sore throat (Anonymous 1995). Fruit paste is applied to treat toothaches (Manandhar 2002).	The whole plant is used as an antipyretic, analgesic, carminative, diuretic and expectorant (Bajracharya 1979, Dash & Gupta 1994).	A capsule extract is hypoglycemic (Kar *et al*. 2006).
**Swertia chirayita* (Roxb. ex Flem.) Karst. Gentianaceae; DBU 067			
Lek tite (N), **kirat**, **bhunimwa** (S). The whole plant is used for cough and fever.	Plant paste is anthelmintic, stomachic and laxative (Anonymous 1995). It is used to treat skin diseases (IUCN 2004).	The whole plant is used as a laxative, stomachic, febrifuge, anthelmintic and in jaundice, fever and skin diseases (Anonymous 1995, Bajracharya 1979, Joshi 2006).	The plant juice is liver protective (Subramonium & Pushpangadan 1999). Swerchirin significantly lowers blood sugar levels (Saxena *et al*. 1991). An ethanolic plant extract is antibacterial and antifungal (Devkota *et al*. 1999). An aqueous plant extract is anti-inflammatory (Chowdhury *et al*. 1995).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
‡*Syzygium cumini* (L.) Skeels Myrtaceae; BBU 085			
Jamun (N), **brahaspati**, **jambhu** (S). A seed powder and bark decoction is used in diarrhoea, dysentery, diabetes and inflammatory activity.	Black berry, Java plum (E). The leaves are used to help in strengthening teeth and gums. Bark is astringent, carminative, diuretic, anthelmintic, and stomachic. Bark is specially used in dysentery (Baral & Kurmi 2006).	The plant has astringent, carminative, diarrheic, dysenteric and stomachic properties (Dash & Gupta 1994, Dey 1998, Joshi 2006).	A decoction of dry leaves and seeds is hypoglycemic (Grover *et al*. 2000, Prince *et al*. 1998). A plant extract is antibacterial (Shafi *et al*. 2002). An ethanolic extract is anti-inflammatory (Muruganandan *et al*. 2001).
Terminalia chebula Retz. Combretaceae; BKU 068			
Sele, **harado** (L), **harra** (N), **avaya**, **haritaki** (S). An infusion of fruit is used in cough and cold.	Chebulic myrobalan (E). The bark is diuretic and cardiotonic (IUCN 2004). The fruit is alterative, astringent, digestive, and purgative and is used in diabetes, cough, local swelling and eye diseases (Baral & Kurmi 2006). It is used externally as a local application to chronic ulcers and wounds (Anonymous 1995).	The fruit pulp is anti-inflammatory, analgesic, stomachic, laxative, expectorant and diuretic. The plant should be avoided in pregnancy (Anonymous 1995, Bajracharya 1979, Sapkota & Adhikari 2001).	A methanolic fruit extract is antianaphylactic (Shin *et al*. 2001) and an aqueous extract acts against herpes simplex virus (Kurokawa *et al*. 1995). An ethanolic fruit extract is antibacterial and antifungal (Bonjar 2004, Devkota *et al*. 1999). The species' tannins are antibiotic (Tanaka *et al*. 1991). Punicalin, punicalagin inhibit viral adsorption into cells (Mekkawy *et al*. 1995). Chebulin is antispasmodic.
**Valeriana jatamansi* Jones Valerianaceae; DKU 084			
Juge jadi, **simme**, **samayo** (L), **sugandhwal** (N), **tagarah**, **nataha**, **washim** (S). The root is anthelmintic and tonic.	Valerian (E). The rhizome is used for headaches, eye troubles, indigestion and wounds in **amchi** system (Lama *et al*. 2001). It is analgesic, carminative, antispasmodic, antiseptic, expectorant, diuretics and sedative (Anonymous 1995).	The plant rhizome is used for diarrhoea, stomachache, nervous system disorders, and eye problems. It is anthelmintic, an aphrodisiac and applied on arthritis, sore throat, liver and spleen disorders in **unani** system (Anonymous 1995, Bajracharya 1979, Dash & Gupta 1994, Dey 1998).	The root extract is antimycobacterial (Taylor *et al*. 1995) but is chiefly used in insomnia (Chauffard *et al*. 1981). Curcumin is a chief constituent for anti-inflammatory activity (Ammon *et al*. 1993).
‡*Woodfordia fruticosa* (L.) Kurz Lythraceae; DKU 083			
Dhula (L), **dhainyaro** (N), **agnijwala**, **tamra pushpi**, **dhataki** (S). Flowers are used as an antipyretic and for dysentery.	Fire flame bush, shiranjitea (E). Juice from small buds, twigs and leaves is helpful in stomach troubles (IUCN 2004). The flowers and bark are anthelmintic and used in diarrhoea, dysentery, leprosy, skin diseases and diabetes. It is considered as a safe stimulant in pregnancy (Baral & Kurmi 2006).	The plant and fruit are useful in cough, wound and energy recovery. The flowers are astringent, hemostatic, antipyretic and useful in diarrhoea, dysentery and burns (Anonymous 1995, Bajracharya 1979, Dash & Gupta 1994, Joshi 2006).	Ellagic acid, a major flower constituent, inhibits bacterial infections in stomach and arrests ischaemic gastric lesions (Lino *et al*. 2002). Ellagic acid use for gastroduodenal disorders has been patented (Rajagopalan & Khambe 1998). It is also effective for rheumatism (Paper *et al*. 2005) and uterine disorders (Oudhia 2003). It also has promising antitumor and anti-inflammatory activity (Das *et al*. 2007).

Indigenous use (Present study)	Indigenous use (Earlier studies)	Uses in ayurveda*	Pharmacological activity!
**Zanthoxylum armatum* DC. Rutaceae; DKU 069			
Timur (N), **gandhalu**, **tejwobati**, **tumbaru** (S). The fruit are used for colds, cough and toothache. The bark is used to stupefy fish.	Prickly ash peeper, Nepali peeper (E). Essential oil from the fruit has deodorant and antiseptic properties. A fruit decoction is used for abdominal pain (Rajbhandari 2001). Berries are carminative, antispasmodic, and used for rheumatism and skin diseases. Bark is used for cholera, diabetes and asthma. It is used for toothache (Baral & Kurmi 2006).	The plant is used in toothache, headache, skin diseases, indigestion, and diarrhoea. It is employed as a tonic, analgesic, carminative, expectorant, diuretic and used in gastritis, liver problems, blood disorders in **unani** system (Bajracharya 1979, Dey 1998, Sapkota & Adhikari 2001).	Ethanol fruit extract is antibacterial against gram positive bacteria (*Bacillus subtilis*, *Staphylococcus aureus*, *Mycobacterium phlei*) (Taylor *et al*. 2002).
**Ziziphus mauritiana* Lam. Rhamnaceae; BKU 082			
Bewari (L), **bayer** (N), **badar** (S). Root paste is applied for diarrhea, dysentery and vomiting. The fruit are used for fever and digestion.	Chinese date, jujube (E). The fruit are used for as a tonic and aphrodisiac (Joshi & Joshi 2001). They are used in fever and digestion (Manandhar 2002).	Root and fruit are used for thirst, bronchial asthma, diarrhoea and as an aphrodisiac, emetic, carminative and digestive (Bajracharya 1979, Dash & Gupta 1994, Joshi 2006).	Root extract is antimycobacterial (Taylor *et al*. 1995). The plant has antifertility, analgesic and antidiabetic properties (Erenmemisoglu *et al*. 1995). Used for antifertility (Gupta *et al*. 2004). Betulinic acid is an antibiotic and antitumor agent (Maurya *et al*. 1989).

A total 66.66% species and their uses were common between present and earlier study findings. The findings of this present survey was enumerated in Table 1 in order of species name, family name, English, local, Nepali and Sanskrit names and voucher code in column one; earlier findings in column two, Ayurvedic uses in column three, chemical compounds in column four and phytochemical findings in column five.

Based on the criteria stated above, only 48 plant species consisting of 39 families were selected and preceded for comparative analysis of ethnomedicinal and ethnopharmacological properties (Table 1). The families Rutaceae and Euphorbiaceae contributed the most species i.e. each contributed three species.

Discussion

The folk uses identified possess moderate affinity with ayurvedic traditions with 50% of species surveyed sharing at least one common use. This illustrates that the home herbal remedies are an independent health care system of Nepal Himalaya, which are indigenous but influenced by the ayurvedic system. However, the folk uses of the plant species in study area are being changed through perception and social transformation.

The affinity and validity between the indigenous use and phytochemical tests was less significant. 41.66% of the plant species were validated by phytochemical bioassays. Eight species and uses were commonly supported across all earlier studies and this one: *Asparagus racemosus* as a galactogogue, *Berberis asiatica* for treating eye problems, *Mucuna pruriens*, as nerve tonic and stimulant, *Aegle marmelos*, *Bergenia ciliata*, *Holarrhena pubescens*, *Syzygium cumini* and *Woodfordia fruticosa* as antidiarrheal and anti dysenteric.

There are forty-seven medicinal plants found as ethno-antidiabetic drugs worldwide (Marles & Farnsworth 1995). Among them, *Syzygium cumini* is used in six countries, *Phyllanthus emblica* in four countries and *Juglans regia* in three countries. The present study also found the ethnomedicinal use of *Syzygium cumini* as an antidiabetic. Of the forty eight enumerated species in the present survey, sixteen species along with *P. emblica* and *S. cumini* possessed active constituents for hypoglycaemic effect (Table 1) but there were no any phytochemical validations of the antidiabetic property of *J. regia*. The present study found the ethnomedicinal uses of *J. regia* against scabies, allergy and toothache. It is commonly used for arthritis, hair growth and wound healing in mountain districts of Nepal (Kunwar *et al.* 2006). *Ziziphus* species are used for many medicinal purposes in folk medicines all over the world. It is widely used in 10 countries including Nepal

(Anonymous 2006) against skin diseases, diarrhea, fever and insomnia. The study obtained its uses against fever, diarrhea, dysentery and indigestion but the species possesses anti-inflammatory, antibacterial antitumor properties in phytochemical tests (Maurya *et al.* 1989).

The folk uses of some of the species were contradicting to the ayurveda and phytochemical bioassays. *Calotropis* does not act as an antidote for scorpion sting (Uawonggul *et al* .2006) but it was locally used in scorpion sting in study area. *Acorus calamus* was reported to be used as pesticide in study area and anticancer in the ayurveda but the experiment showed its insignificant inhibitory effect (Smit *et al.* 1995). Because of the bitter alkaloids of *Swertia chirayita*, it is beneficial to the indigestion (Reynolds 1982) but it was used only for headache and fever in study area. The indigenous knowledge on uses of plants of *Cinnamomum tamala*, *Datura stramonium*, *Justicia adhatoda*, *Mallotus philippensis*, *Mentha spicata*, *Neopicrorhiza scrophularifolia*, *Paris polyphylla*, *Sapindus mukorossi* and *Semecarpus anacardium* was inconsistent to the earlier studies, the ayurveda and phytochemical bioassays. The detail phytochemical study on those species would be an important line of research. Contradicting uses of the species should be discouraged and further investigation, phytochemical screening and the validity assessments of the species are worthwhile.

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