



Ethno-medicinally used Anti-inflammatory and Pain relieving Plants in the Kaski District, Western Nepal

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ABSTRACT

Modern medicine is based on indigenous knowledge and ethno-pharmacological practices, which have become back bone for noble drug discovery. Inflammatory diseases are the most common problem encountered by people since centuries. This study is focused to find out the plants that are being used traditionally to treat the inflammatory diseases in Kaski district. The field survey of three weeks was done in different areas of Kaski district. Informal discussions and meetings were done with the traditional healers, local herbal traders and general villagers. All together of 93 villagers were interviewed for the information about the local used anti inflammatory herbs and plants. Possible samples of the plants and plant products were framed in camera. This study showed that many people in the studied parts of Kaski district still continue to depend on the medicinal plants at least for the treatment of primary healthcare. We documented 102 plants in our study belonging to 63 families of which major families were Leguminosae, Labiateae, Malvaceae and Compositae. There were altogether 36 herbs, 29 shrubs, 29 trees, 2 ferns and 6 climbers were used ethnomedicinally to treat inflammation and pain. Major parts used were leaves (18.5%), roots (18.5%), barks (14.5%), seeds (15.3%), whole plants (11.5%), rhizomes (10.22%) and others (11.48%). Plants were applied topically (58.6%), orally (27.88%) or both (13.52%) in the form of paste, decoction, juice, infusion and with some solvents such as water, honey, milk, etc. Kaski district has plenty of floras that have been used ethnomedicinally as a treatment of inflammatory conditions. It is of utmost importance to conserve the ethno medicinal knowledge and medicinal plants found in Kaski district. The scientific studies and biological importance of these plants should be established which will aid in commercialization of these plants. A new, potent, safe and economic medicine can be developed through further researches.

Keywords: Anti-inflammatory, Ethnomedicine, Indigenous, Medicinal plants



INTRODUCTION

Since the prehistoric era people are in search of the agents that cure disease and alleviate the pain which would make them live longer and be healthier. Plants and plant products are the major sources of such agents being used traditionally (Bhattarai et al., 2010). Ethnic people use plants or their parts and prepare them as suitable form to be administered. According to WHO, More than 80 % of the population depend on traditional medicine for primary health care. Inflammation is a physiologic defense mechanism of body to protect itself against external agents such as infectious microbes, chemicals or other physical traumas but long term inflammation may be the sign of many diseases such as arthritis, rheumatism, gout, etc.

(Kumar et al., 2004). Inflammation is manifested initially by local vasodilatation, platelet activation and infiltration of the blood and lymph to the site. Then gradually phagocytic cells and leucocytes get infiltrated which produce chronic inflammation and which may cause deterioration of tissue or necrosis (Kolawole et al., 2013). Inflammatory disease has high prevalence in kaski district and NSAIDs covers the 27.8% of the total drugs prescribed (Shankar et al., 2005). Search of the anti inflammatory drug has being carried out since last twenty years by taking traditional and ethno medicinal uses as the references (Nagori et al., 2010). This study is focused to list out the medicinal plants being used traditionally to cure the inflammatory conditions throughout the Kaski district.

MATERIALS AND METHODS

Kaski District (450-8091) is located in Gandaki Zone in the Western Development Region of Nepal lies within 83°40' east to 84°12' east longitude and 28°06' north to 28°36' North latitude. It borders With Lamjung and Tanahu districts in the East; Salyan and Parbat districts in the West; Manang and Myagdi districts in the North; and Syangja and Tanahu districts in the South. Five different types of climate found in this district, sub-tropical, temperate, temperate cold, alpine and tundra climate makes it rich in biodiversity. Total population of Kaski district 492,098 (2011-6-22 central Bureau of statistics) and population density of 244 per sq. km. Main religion of kaski district is Hinduism (82.35%), Buddhism(13.45%) and others(4.2%)

Study area for field survey: Field survey of three weeks was conducted in different areas of kaski districts: Siklesh, Khilang, Ghalekharkha, Lwaang, Gha-chowk, Pumdi, Kristi, Kaskikot, Dhampus, Ghandruk, Taalbesi, Pokhara valley and Lekhnath. Study was conducted during July – August 2013. The study area is shown in Figure 1. Map of the study area (kaski district), Western Nepal.



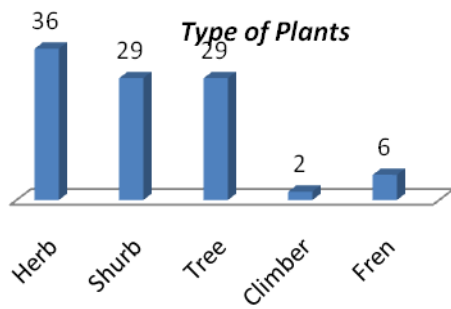
Figure 1: Map of Kaski District

Interviews with villagers and information collection: Species that were used to treat the same illness by several healers and the villagers were selected. The available specimens as well as nomenclature were identified with the help of standard literature. The traditional healers (vaidyas), local healers (priests locally known as 'lamas'), plant traders, and knowledgeable villagers were asked about the medicinal practices in

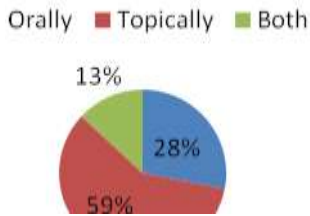
antiinflammatory plants. Walk with healers through the forest was done for plant collection, identification and gathering information. Jaya Bahadur Thapa (herbal trader, Taalbesi), Sahara Pradhan (proprietor and healer of Pokhareli Ayurvedic Ausadhalya Udhyog), Indrashivabhakti (villager, Dhampus), Nar Bahadur Gurung (local traditional healer, Sikles), Chandra Bir Ghale (Lama), Aasman Gurung (herbal supplier), Sushil K. Shrestha (Kirti Ayurvedic Medi Sales), are some of the promising helpers to share their valuable information. Informal meetings, group discussions with local peoples are the main source of information about their local medicinal practices. Informal meetings were held by villagers. Team members stayed with local communities during the study. All species and information about plants encountered during participatory field observations were listed. Further discussions were made about medicinal plant among villagers and samples were displayed to villagers for confirmation. Most of the species were identified in the field using references. Common species that were frequently used, spot-identified were recorded for information. Vernacular names and folk uses of specimens were collected. Information was confirmed from at least three respondents for analysis.

RESULTS AND DISCUSSION

A total of 102 different species belongs to 63 families were indicative of the rich diversity of the plant species found in this area. Study results are presented in the alphabetical order by the family and is then followed by scientific name, Voucher number, Local vernacular names, Phenology and detailed uses including methods of preparation, dosage and administration of the medicines. The largest number of the medicinal plants came from the herbs are widely used in this region. The study of the growth form of the medicinal plants revealed that herbs made up of the highest proportion of medicinal plants represented 36 species followed by 29 shrubs, 29 trees, 2 climbers and 6 ferns. This study recorded that several parts of the medicinal plants are used for the medicines. The most commonly used medicinal parts of plants are roots (19%) and leaves (19%) followed by barks (15%), seeds (15%), rhizome (10%), stem (4%), fruit (3%) and latex (3%). In addition to the above common parts used, whole plant (12%) species are commonly uprooted for different medicinal purposes.



Mode of Use



Plant parts are generally prepared using hot or cold water as the solvent, but occasionally remedies are prepared with the milk, honey, ghee and oil. Water is common, readily available and cheap solvent and the good solubility used in the traditional medicine preparations. Other infusion materials such as milk, honey, oils and ghee are expensive and not always available when needed. In addition milk oils honey and ghee may be used for their properties to dissolve phytochemicals that are not water soluble.

Plants are applied topically (58.6%), orally (27.88%) or both (13.52%) in the form of paste, decoction, juice, infusion and with some solvents such as water, honey, milk, etc. The medicinal plants preparations were applied topically or taken orally or both, In case of this inflammataory disease most commonly used route of administration is applied over topically followed by oral.

The present study indicates that the area harbors a high diversity of medicinal plants. Despite gradual socio-cultural transformation, local communities still posseses substantial knowledge of plants and their uses. The reliance on folk medicines for health care is associated with the lack of modern medicines and medication, poverty and the traditional belief of its effectiveness. Since there is a complete lack of phyto therapeutic evidence for many of species, we recommend that phytochemical and pharmacological studies need to be carried out in order to confirm the validity of properties attributed to these species: this is particularly relevant for species with market potential beyond the district. With setting up management plans for their extraction, these medical resources can provide for both subsistence needs and income. This, however, requires detailed assessment of resource quantities, productivity potential, sustainable harvesting methods, domestication possibilities, and market value of potentially promising species, and importantly, equitable benefit sharing regimes.

Parts Used

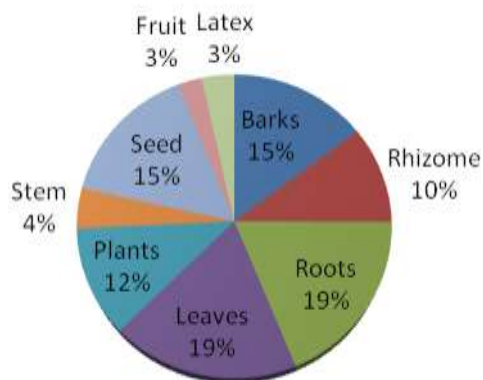


Table 1:List of Plants

S. n o.	Scientific Name	Family	Life form	Local Names	Parts Used	Uses
1.	<i>Abies spectabilis</i>	Pinaceae	T	Gobresalla	Needles	Juice of the needles are used to treat rheumatism
2.	<i>Abrus precatorius</i>	Leguminosae	C	Rattigeri	Roots, Leaf	Applied to foreheads to treat headache Leaf paste applied on swellings boils, Rheumatism
3.	<i>Acacia pennata</i>	Malvaceae	C	Areri	Leaf	Decoction of leaf is taken to relieve body pain, fever and headache.
4.	<i>Achyranthus bidentata</i>	Amranthaceae	H	Datiwan	Leaf, Stem	Leaf paste is used to treat the inflammation associated with cuts and wounds.
5.	<i>Acontitum ferox</i>	Ranunculaceaea	H	Bikh	Tubers	Paste of the plant is used to treat the rheumatism
6.	<i>Acorus calamus</i>	Acoraceae	H	Bhojo	Rhizome	Rhizome paste is used to treat the Rheumatism and infusion for sore throat, bronchitis and chest pain
7.	<i>Aglamorpha coronans</i>	Polypodiaceae	S	Harchur	Rhizome	Paste of rhizome is applied to relief backaches and knee aches.
8.	<i>Aegle marmelos</i>	Rutaceae	T	Bel	Roots, Leaf	Juice of the roots mixed with turmeric and applied over the inflamed area. Wood ash mixed with the water and spread over the inflamed area.
9.	<i>Aeschyonthus parviflorus</i>	Gesneriaceae	H	Thirjo	Leaf, Stem	Powered leaf, along rice flour, is baked and taken to provide relief from backache
10.	<i>Aesculus indica</i>	Hippocastanaceae	T	Pangro	Roots, Bark, Seeds	Barks, roots, seeds paste are used to relief the pain of injuries and rheumatism
11.	<i>Alnus nepalensis</i>	Betulaceae	B	Uttis	Bark	Juice of the bark is boiled, applied to treat swelling and body pain.
12.	<i>Allium sativum</i>	Alliaceae	H	Lasun	Blub	Blub is taken orally to prevent inflammation and fever
13.	<i>Aloe vera</i>	Asphodelaceae	H	Gheukumari	Leaf	Juice of the leaf is used in the treatment of rheumatism and internal inflammation.
14.	<i>Alstonia scholaris</i>	Apocynaceae	T	Palimara	Latex	Latex mixed with mustard oil and applied to treat rheumatic pain
15.	<i>Asparagus racemosus</i>	Asparangaceae	S	Kurilo	Roots	Juice of the roots is used in the treatment of rheumatism.
16.	<i>Astible rivularix</i>	Saxifragaceae	S	Thuloashadhi	Whole plants	Juice of the plant is applied to sprains and muscular swellings.
17.	<i>Berberis chitria</i>	Berberidaceae	S	LekChurto	Bark	Juice of the bark is boiled and filtered and applied over an inflamed area.
18.	<i>Bergenia ciliate</i>	Saxifragaceae	H	Pakhanbedh	Rhizome	Squeezed rhizome is boiled and filtered water is taken for

19.	<i>Betula alnodies</i>	Betulaceae	T	Saur	Bark	gout Bark juice is applied on the cuts, bone fracture, sprains.
20.	<i>Boerhavia diffusa</i>	Nyctaginaceae	H	Aule Sag	leaf	A paste of the plant is applied on forehead to relieve headaches
21.	<i>Callicarpa macropylla</i>	Labiataeae	S	Dahijalo	Leaf	Leaves paste are warmed and applied over inflamed area.
22.	<i>Capparis spinosa</i>	Capparaceae	S	Baghmukhe	Roots	Paste of the roots is used to treat the rheumatism.
23.	<i>Cardiospermum halicacabum</i>	Sapindaceae	C	Keshlahara	Seed	Seed paste are used to control the pain in rheumatism
24.	<i>Celastrus paniculatus</i>	Celastraceae	S	Malkauna	Seed	Seed paste is used for relieving pains caused by cuts and wounds
25.	<i>Cassia fistula</i>	Leguminosae	T	Rajbrikshya	Fruit	Decoction is used as gargle to treat toothache and sore throat.
26.	<i>Centella asaitica</i>	Umbelliferae	H	Ghodtapre	Whole Plant	Paste of the Plant is used to reduce the pain due to inflammation
27.	<i>Cinnamomum glaucescens</i>	Lauraceae	T	Sugandhako kila	Seed	Seed paste is used for muscular swellings.
28.	<i>Cinnamomum tamala</i>	Lauraceae	T	Dalchini	Laef, Bark	Leaf and Bark Juice are used to relief stomach aches
29.	<i>Coelogyne flavida</i>	Orchidaceae	H	Thurgauga	Bulb	A paste of the pseudo blub is applied to treat headaches
30.	<i>Coix lachrymal-jobi</i>	Gramineae	H	Bhirkaulo	Grains	Grains paste is taken for the treatment of rheumatism and throat ache
31.	<i>Crotalaria prostrata</i>	Leguminosae	S	Sano bokshijhar	Whole plants	Paste of the plants is applied on the inflamed regions.
32.	<i>Crucuma angustifolia</i>	Zingiberaceae	H	Kalobesar	Rhizomes	Rhizomes are applied over the inflamed skin.
33.	<i>Crucuma domestica</i>	Zingiberaceae	H	Haledo	Rhizomes	Rhizomes are applied over the inflamed skin.
34.	<i>Cuscuta reflexa</i>	Convolvulaceae	H	Aakashbeli	Whole plants	Paste of the plant is used to reliever in rheumatism
35.	<i>Dactylorhiza hatagiera</i>	Orchidaceae	H	Panchaule	Roots	Powered root is applied in inflamed area.
36.	<i>Dalbergia sisso</i>	Leguminosae	T	sissau	Bark	Bark is boiled and applied over swelled surface.
37.	<i>Diplokenma butyraceae</i>	Saptoaceae	T	Chiuri	Bark	Bark juice is applied over the swelling and inflamed regions
38.	<i>Datura metal</i>	Solanaceae	S	Dhatura	Leaf, Seeds	Paste of the leaf is used to treat rheumatic swellings by inflammations.
39.	<i>Drynaria propinqua</i>	Polypodiaceae	F	Kammari	Rhizome	A paste of the plant is applied to treat backache and dislocated bones, and is applied for fore head to relieve headaches
40.	<i>Eclipta prostrata</i>	Compositae	H	Bhrinjraj	Leafs	Leaf paste is used to treat the cuts, wounds and inflammation
41.	<i>Entada phasioloides</i>	Leguminosae	C	LekPangro	Fruit	The fruit paste is used to cure arthritis, swelling, due to coldness
42.	<i>Equisetum diffusum</i>	Equisetaceae	H	Annkhle	Whole Plant	Paste of the plant is used over the inflamed and swelled

43.	<i>Euphorbia royleana</i>	Euphorbiaceae	S	Syuri	Latex	fingers. Latex is warmed and applied over the swelled part.
44.	<i>Ficus benghalensis</i>	Moraceae	T	Bar	latex	Milky applied to rheumatism and bruises, swelling of gums
45.	<i>Ficus semicordata</i>	Moraceae	T	Khanya	Latex	Juice of roots is used to treat headaches. About 5 drops of latex is mixed with milk and given to children suffering from fever.
46.	<i>Garuga pinnata</i>	Rubiaceae	T	Dabe-Dabe	Bark	Juice of the bark is used to treat pain associated with the dislocation of bones.
47.	<i>Jatropha curcas</i>	Euphorbiaceae	T	kadam	Bark	Paste of the bark is applied over for sprains and injuries
48.	<i>Inula cappa</i>	Compositae	S	Gai-Tihare	Root ,Flowers, leaf	Bathed with the decoction to treat the body ache and swellings. Flower juice,Root juice is applied over the joints to treat pain caused gout.
49.	<i>Ipomoea carnea</i>	Convolvulaceae	S	Ajamari	Leaf	Juice of the plants applied over the inflammation and pain caused by the prolong walking.
50.	<i>Hedyotis scandens</i>	Rubiaceae	C	Annkhlejhar/ dudhelahara	Roots	Paste of the root is applied externally in gout.
51.	<i>Hyptis suaveolens</i>	Labiatae	H	Ban bawari	Leaf	Leaf decoction is used to treat rheumatism
52.	<i>Lantana camara</i>	Verbenaceae	S	SitajiPhul	Leaf	Leaves is boiled with the water and filtered and water is taken orally to treat rheumatism.
53.	<i>Lillium wallichiamum</i>	Laliaceae	H	Hadelasun	Blub	Decoction is used to cure the joint pain, backache problem and kidney problem.
54.	<i>Litsea cubeba</i>		T	Siltmur	Fruits	Fruits directly or its decoction is used to cure of fever, cough and to control toothache.
55.	<i>Lobelia pyramidalis</i>	Campanulaceae	H	Eklebir	Whole plant	Plant applied in water in 10 mins and strained water about 4 teaspoons ,3 times a day
56.	<i>Lycopodium clavatum</i>	Lycopodiaceae	H	Nagbeli	Fruit	Fruit is used to treat the rheumatism
57.	<i>Lygodium japonicum</i>	Lygodiaceae	F	Lute jhar	Plant	The plant is used for the relieving of the pains and joints.
58.	<i>Melaia azedarach</i>	Meliaceae	T	Bakino	Bark	Paste of the barks is applied to relieve headaches and rheumatic pains.
59.	<i>Mescua ferrea</i>	Guttiferae	T	Nagkeshar	Flower, Fruits	Flower is astringent and stomachic. Seed oils are used to prevent the inflammations of cuts and wounds.
60.	<i>Michelia champaca</i>	Magnoliaceae	T	Champ	Barks, Flowers	Bark juice are used in rheumatism and gout
61.	<i>Mimosa pudica</i>	Leguminosae	H	Lajawati	Whole	Paste of the plant is applied

62.	<i>Myrica esculenta</i>	Myricaceae	T	Kaphal	plants Bark	for the gout Bark juice is used for headaches and rheumatism.
63.	<i>Nardostachys grandiflora</i>	Valerianaceae	H	Jatmansi	Rhizome, Leaf	Rhizome and leaf paste is applied over the inflamed area.
64.	<i>Nyctanthes arbortritis</i>	Oleaceae	T	Parijat	Bark, Leaf	Bark and leaves is boiled and filtered water is taken to treat rheumatism and gout.
65.	<i>Ocimum tulsiflorum S</i>	Labiatae	S	Tulsi	leaf	Fresh leaves are chewed or boiled for cough, colds and bronchial infections.
66.	<i>Parnassia nubicola</i>	Parnassiaceae	H	Nirmansi	Root	Juice of the rhizome is used to treat wounds and inflammations.
67.	<i>Paris pollyphyta</i>	Trilliaceae	H	Satuwa	Rhizome	Paste of the plants is applied on the cuts and wound to relief pains.
68.	<i>Phyllanthus emblica</i>	Euphorbiaceae	T	Amala	Seeds	Warm juice is rubbed to treat inflammations.
69.	<i>Picrorrhiza scrophulariiflora</i>	Scrophulariaceae	H	Kutki	Rhizome	Juice of the rhizome is taken orally. Paste of rhizome is applied over inflamed area
70.	<i>Piper longum</i>	Piperaceae	H	Pipla	Fruits	Boiled with water and water is consumed to relief inflammation.
71.	<i>Plumbago zeylanica</i>	Plumbaginaceae	S	Chitu/Setokura	Roots	Paste of the plants is used for the rheumatism.
72.	<i>Plumeria rubra</i>	Apocynaceae	T	Galaincho	Bark	Bark paste is warmed and applied over the swelling
73.	<i>Polygonum plebejum</i>	Polygonaceae	H	Bethe	Plants	Paste of the plants is used is applied over the cuts ,wounds and inflammation
74.	<i>Portulaca oleracea</i>	Portulacaceae	H	Nundhiki /PaiteJhar	Whole plant	Dried plant used for relieving pains.
75.	<i>Prinsepia utilis</i>	Rosaceae	S	Dhatelo/Kukurpaile	Seed	Oil from the seed is rubefiacant and for the rheumatism and muscular pain
76.	<i>Prunus cerasoides</i>	Rosaceae	T	Paiyun	Bark	coughs and colds. Decoction of bark is used to remove body ache
77.	<i>Psidium guajava</i>	Myrtaceae	T	Aamba	Leaf	Twinges are chewed and leaves paste are applied for the reliving of the pain associated with the rheumatism
78.	<i>Rheum austral</i>	Polygonacea	H	Padamchal/ Akashechuk	Rhizome	Rhizome and paste is applied over the sprains.
79.	<i>Rhododendron arboretum</i>	Ericaceae	T	Laligurans	Flowers, Bark	Bark juice is used to prevent the inflammation over the cuts and wounds
80.	<i>Rumex nepalensis</i>	Polygonaceae	H	Hasaag le Hale	Roots, Leaf	Paste of the leaves is applied to treat swellings of gums. Plant is boiled in water about 10 min and filtered water to wash the body to alleviate body pain.
81.	<i>Sciendapsus</i>	Araceae	S	SikariLahara	Leaves and	Dried leaves and stems are for

82.	<i>offcinalis Selinum tenuifolium</i>	Umbelliferae	H	Bhutkesh	stem Roots	relieving backaches. Decoction of the roots is used to cure rheumatism. Root paste is used to relief the body pain and fever.
83.	<i>Sida cordata</i>	Malvaceae	H	BishKhapre	Root	Paste of root is applied for the treatment of swelling, injuries and sprains.
84.	<i>Solanum nigrum</i>	Solanaceae	H	Kaligedi	Fruits	Seed paste is mixed with piper nigrum and applied over the inflamed area
85.	<i>Solanum virginiamum</i>	Solanaceae		Kanthagiri	Seeds	Roasted seeds are kept on the infected teeth during the tooth ache
86.	<i>Spondias pinnata</i>	Anacardiaceae	T	Amara,amro	Bark	Juice of the bark is given for rheumatism
87.	<i>Tagetes erecta</i>	Composiatae	S	Sayapatri	Whole plant	Juice of the plant is used in case of swellings ,injuries and inflammation
88.	<i>Tamarindus indica T</i>	Leguminosae	H	Tate amilo	Leaves	Paste of the young leaves is used for rheumatism and inflammation
89.	<i>Teucrium quadrifarium</i>	Labiatae	H	Kalo rudilo	Plant	Juice of the plants is applied to wounds between toes to prevent inflammation.
90.	<i>Thespesia lampas</i>	Malavaceae	S	Baan kapas	Stem, Roots	Roots and stem are used to reduce joint pain, backache and to make the strong bone.
91.	<i>Trichosanthes tricusipdata</i>	Cucurbitaceae	C	Inddrayani	Root	Root juice is used in abdominal pain. Root and fruit paste is applied to cure boils.
92.	<i>Trigonella foenum- gracecum</i>	Leguminosae	H	Methi	Seeds	Seeds mixed with mustard oil and rubbed over the inflamed area.
93.	<i>Urena lobeta</i>	Malvaceae	S	Bherejhar/ch iple	Plants	Paste of the plant is used for rheumatism. Leaf paste is applies to sprains and bruises. Boiled juice of leaf is taken for to prevent the inflammation of intestine and bladder.
94.	<i>Urtica diocia</i>	Uticcaceae	S	Sisnu	Leaf	Paste of the plants is boiled and water treats the pain caused by injuries and rheumatism.
95.	<i>Valernia jatamansaii</i>	Valerancaeae	H	Sugandhawa l	Root	Root is used for the rheumatism.
96.	<i>Viscim album</i>	Viscaceae	S	Harchur	Roots	Paste of the root is used to treat sprain, bruises, muscular swelling and boils.
97.	<i>Vitex negundo</i>	Labiatae	S	Simali	leaves	Juice of the leaves is applied to rheumatic swelling of the joints. Leaves are boiled in water and filter. Water is taken orally
98.	<i>Woodfordia fruticosa</i>	Lythraceae	S	Dhayparo/A nnarephul	Bark	Paste of the bark is externally to treat angular stomatitis.

99.	<i>Zanthoxylum armantum</i>	Rutaceae	S	Timur	Seeds, Barks, Branches	Bark decoction is applied to sprains and swellings Branches are used as brush to treat toothaches. Paste of the fruits applies over the wounds and inflammations
100	<i>Zephyranthes carinata</i>	Amyrallidaceae	H	Bhuichampa	Rhizome	Rhizome is used to cure back bone, joint pain and fracture
101	<i>Zingiber officinale</i>	Zingiberaceae	H	Adahuwa	Rhizome	Paste of the plants is applied over the rheumatic inflammation
102	<i>Ziziphus mauritiana</i>	Rhamnaceae	T	Bayer	Roots	Decoction of the roots is used in fever and inflammation.

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