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Diversity of ethno-medicinal plant: A case study of Bageshwar district Uttarakhand

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Abstract

The Indian Himalayan region has a wide range of traditionally used medicinal plants. The study was conducted with the help of Participatory Rural Appraisal (PRA) technique to document the ethno-medicinal use of plants from Bageshwar district of Uttarakhand. The present study of Bageshwar district shows distribution and traditional uses of the 144 ethno-medicinal plants, comprises of 64 families (62- Angiosperms, 2-Gymnospermes), different habitats such as herbs (56%), shrubs (22%), tress (15%), climbers (7%), which were further classify according to plants parts used such as: leafs (29%), root (27%), bark (11%), whole plant (9%), rhizomes (5%), fruits (5%), tubers/bulb (4%), seeds (4%), flowers and inflorescences (3%), resin/latex/ oil (2%), heart wood (1%). It was found that 144 plant species were used by local people for curing 49 diseases such as cough, fever, jaundice, arthritis, asthma, cuts and wounds etc.

Keywords: Diversity, ethno-medicinal plant, Bageshwar, ailments

1. Introduction

The magnificent Himalaya is well recognized for its bio-physical diversity and socio-cultural heritage, unique physical and ethnic diversity, traditional systems and an ample quantity of indigenous knowledge or tribal wisdom [17, 18]. It forms one of the Global Biodiversity Hotspots- the Himalayan Biodiversity Hotspot (HBH) and comprises approximately 1,748 plant species of known medicinal value [19]. The region also comprises habitat for some tribal communities *i.e.* Bhotias, Boaxas, Tharus, Jaunsaries, Shaukas, Kharvar and Mahigiri, which use medicinal plants for curing the diseases and ailments [20].

The state of Uttarakhand encompasses an area of 53,485 sq. km., which has around nearly 15.5 per cent of the total geographical area of Western Himalayas [5]. Inhabitants of this region have gradually become familiar with the healing properties of available plants [9]. Most people reside in rural areas and thus depend on small-scale agriculture system for survival. Medicinal and aromatic plants are the integral parts of the rural communities. Many studies have been conducted on the use of medicinal plants in the Uttarakhand region but documentation of indigenous knowledge among women is still lacking [24, 25, 26].

Ethno-botanical information on medicinal plants and their uses by indigenous cultures is useful not only for the conservation of traditional knowledge and biodiversity, but also to promote community health care, and might serve in drug development. The information can provide a guide for drug development, assuming that a plant that has been used by indigenous people over a long period of time may well have an allopathic application [4].

The aim of the present study is to document the various plant species to treat prevalent ailments of Bageshwar district of Uttarakhand with authentic scientific name, vernacular name, and family and accession number for further research. The main objectives of the study are

1. To Document the ethno-medicinal plants of the area and to collect information regarding ethno-medicinal uses of plants and availability of ethno-medicinal plants.
2. To make a platform for further research with sustainable utilization of the resources.

2. Material and Methods

2.1 Geographical description of study area

The study was performed at Bageshwar district (during March 2014- March 2015) lies between 29.85° North latitude and 79.77° East longitude, covering an area of 2,302Km² with

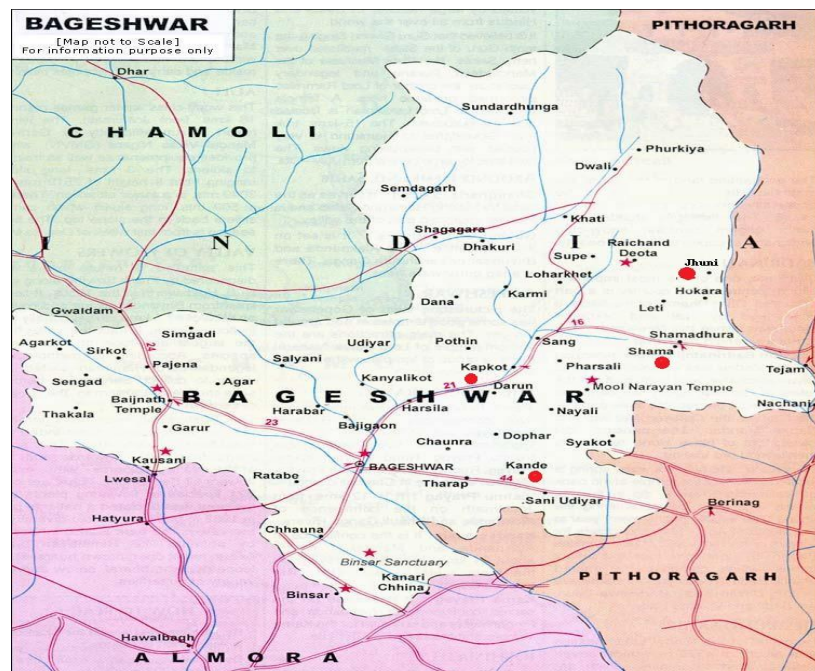
an average elevation of 1,004 m (3,294ft), on the confluence of Gomti and Sarayu rivers. The district is situated in the eastern Kumaun, bounded by Pithoragarh district on the east, Chamoli district on the west, and Almora district on the South (Fig:1).

3. Methodology

3.1 Data Collection and Sample identification

The study was conducted in four villages of Bageshwar district viz. Jhuni, Shama, Kanda and Kapkote. The use of Participatory Rural Appraisal (PRA) tools [15] was done to perform the study. The study is based on ethno-medico botanical survey, identification of ethno-medicinal plants and

documentation of traditional medicines with the help and participation of local/ rural peoples, farmers, traditional knowledge holders / local healers (Vaidhyas-Traditional medical practitioners) to know the local names and medicinal importance of the mentioned plants. The information was collected with the help of structured questionnaire. In study area 10 percent of total households (People of different genders and age groups) were interviewed. Specimens of all the plants were collected and identified with the help of relevant floras and herbaria [12, 11, 6]. The well preserved plant specimens were deposited in the Herbarium of RARI, CCRAS, Ranikhet with acronym (RKT).



(Source-<http://www.euttaranchal.com/>)

Fig 1: Study area Bageshwar District

4. Results

The present study compiles 144 ethno-medicinal plant species belonging to 64 families used by local people for their various ethno-medicinal purposes (Table:1). Out of 64 families recorded, ten dominant families are Liliaceae, Euphorbiaceae (8 species each), Lamiaceae, Solanaceae, Asteraceae (7 species each), Rosaceae (6 species), Apiaceae, Orchidaceae (5 species each), Rutaceae, Urticaceae (4 species each) (Figure: 2). Within the documented species, herbs (56%) cover the maximum number of species and climbers (7%) covers the minimum number of species (Figures: 3). In the various formulations leaves (29%) were most commonly used ingredient, followed by root (27%), bark (11%), whole plant (9%), rhizomes and fruits (5% each), tubers/bulb and seeds (4% each), flowers and inflorescences (3%) resin/latex/ oil (2%), heart wood (1%)(Figures: 4).

There were total 49 diseases recorded which are cured by 144 plant species. The highest numbers of medicinal plant species were documented to cure cough, fever (24 species, 14%), followed by stomach-ache (20 species, 12%), asthma, cuts and wounds (18 species, 11%), dysentery (16 species, 9%), jaundice, skin diseases (14 species, 8%), diarrhea (12 species, 7%), urinary disorders, head ache (11 species, 6%), general debility, toothache (10 species, 6%), arthritis, cold, swelling (9 species, 5%), bone fracture, gastric (8 species, 5%), itching, head ache, bronchitis (7 species, 4%), insect sting,

conjunctivitis, ulcer (6 species, 4%), earache, intestinal worm infestation, joints pain, leprosy, piles, cholera, bleeding (5 species, 3%), leucoderma, menstrual disorders, diabetes (4 species, 2%), leucorrhoea, scrofula, stone, epilepsy, body ache, boils (3 species, 2%), burns, cataract, indigestion, pneumonia, sinus (2 species, 1%), anaemia, pregnancy, pyorrhea, digestive and respiratory disorders, constipation (1 species, 1%).

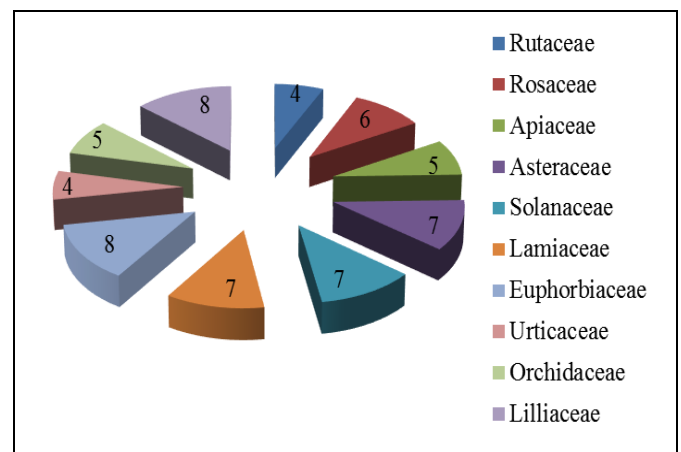


Fig 2: Top ten families supporting Ethno-medicines in Bageshwar district.

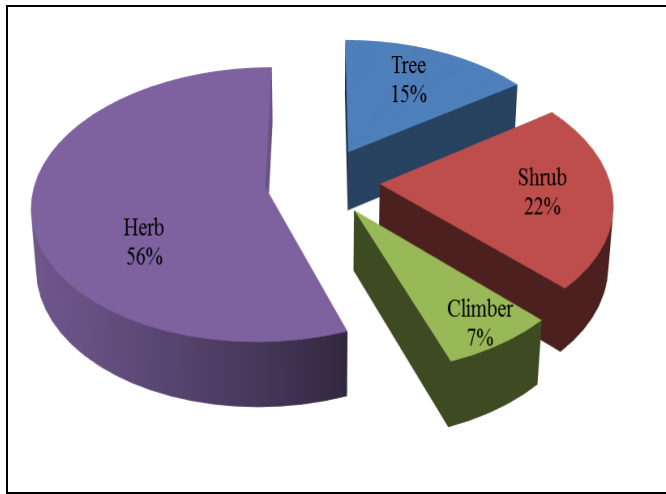


Fig 3: Habit of plants used in Ethno-medicines in Bageshwar district.

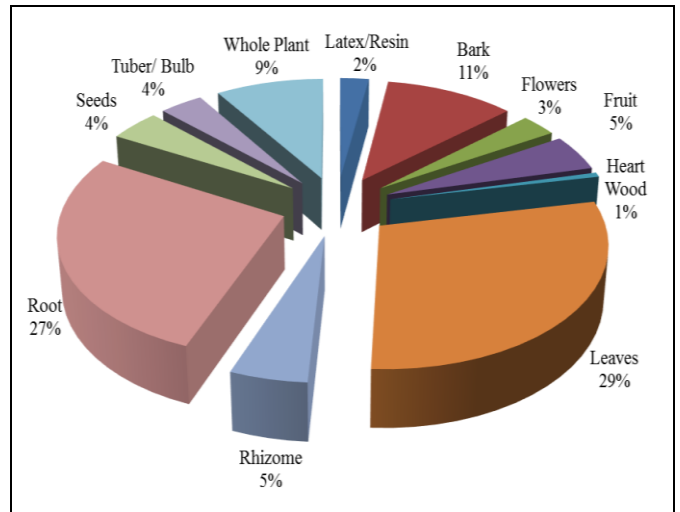


Fig 4: Plant parts used in preparing ethno- medicines

Table 1: Ethno-medicinal plants of Bageshwar district

S. No.	Local Name	Botanical Name	Family	Life form	Part use	Ethno-medicinal uses	Accession Number (RRIHF)
1.	Atis	<i>Aconitum heterophyllum</i> Wall. ex Royle.	Ranunculaceae	Herb	Root	Root paste given orally to cure chronic fever and stomach-ache.	RKT 26231
2.	Angeli	<i>Anemone rivularis</i> Ham.	Ranunculaceae	Herb	Rhizome	Decoction / powder of rhizomes are given orally to cure bronchitis.	RKT 26197
3.	Mamiri	<i>Thalictrum foliolosum</i> DC.	Ranunculaceae	Herb	Root	Two to three drops of root infusion is dropped in eyes to cure conjunctivitis. Root juice is given in jaundice and stomach-ache.	RKT 25101
4.	Chandrayan	<i>Paeonia emodi</i> Wall.ex Royle.	Paeoniaceae	Herb	Leaf	Leafs are eaten raw or as vegetable in dysentery and diarrhoea.	RKT 26481
5.	Pari	<i>Cissampelos pareira</i> L.	Menispermaceae	Climber	Leaf, Root	Leaf paste is applied over eyelids to cure conjunctivitis. Root juice is given to the infants to cure diarrhoea.	RKT 23068
6.	Ganjaroo	<i>Stephania glabra</i> (Roxb) Mierr.	Menispermaceae	Climber	Root	Crushed roots are dipped in water and the filtrate is given orally to cure diabetes. Decoction of root is given in asthma, dysentery and fever. Roots are also used as fragrance stick to fumigate.	RKT 22998
7.	Giloe	<i>Tinospora sinensis</i> (Lour.) Merr.	Menispermaceae	Climber	Bark	Bark decoction is used to cure various diseases such as fever, malarial fever, arthritis, jaundice and diabetes.	RKT 16877
8.	Pitpapara	<i>Fumaria parviflora</i> Lam.	Fumariaceae	Herb	Whole Plant	The whole plant is boiled in water and used in itching, skin diseases.	RKT 25406
9.	Ban Kakari	<i>Podophyllum hexandrum</i> Royle.	Podophyllaceae	Herb	Root	The root paste is applied on ulcers, cuts and wounds. Decoction of root is given in cough, fever and gastric and skin diseases.	RKT 26483
10.	Kilmora	<i>Berberis aristata</i> DC.	Berberidaceae	Shrub	Root	Paste of bark is applied over eyelids to cure conjunctivitis. Root powder mixed with honey is given orally to cure jaundice and dysentery. The roots are used in treating ulcer, jaundice and fever.	RKT 26535
11.	Banafsa	<i>Viola biflora</i> L.	Violaceae	Herb	Whole Plant	Decoction of whole plant is used during cold, cough and	RKT 26092

						fever.	
12.	Banafsa	<i>Viola serpens</i> Wall.	Violaceae	Herb	Whole Plant	Whole plant decoction is used to cure cough, fever, head ache and jaundice.	RKT 25120
13	Badyalu	<i>Stellaria media</i> (L.) Vill.	Caryophyllaceae	Herb	Whole Plant	Plant paste is externally applied on burns, cuts and wounds.	RKT 22823
14.	Denusha	<i>Sida cordifolia</i> L.	Malvaceae	Shrub	Stem bark, Root	Stem bark or root powder is given in general debility. Root powder is useful in asthma. Infusion of root is beneficial in urinary disorders, dysentery.	RKT 24954
15.	Semal	<i>Bombax ceiba</i> L.	Bombacaceae	Tree	Root	Root decoction of <i>Bombax ceiba</i> and <i>Curculigo orchoides</i> is filtered and given to the patient twice a day for period of 10-15 days to cure leucorrhoea.	RKT 25408
16.	Piuli	<i>Reinwardtia indica</i> Dumort.	Linaceae	Herb	Whole Plant	Poultice made through bark is plastered on fractured bones.	RKT 26412
17.	Laljari	<i>Geranium nepalense</i> Sweet.	Geraniaceae	Herb	Root	Root extract used in jaundice, ulcer and stomach-ache.	RKT 23605
18.	Chalmori	<i>Oxalis corniculata</i> L.	Oxalidaceae	Herb	Leaf juice	Leaf juice is instilled in eyes to cure cataract. Juice is also instilled to cure toothache and earache in respective organs.	RKT 26387
19.	Pisumar	<i>Boennighausenia albiflora</i> (HK) Reichb. ex Meissn.	Rutaceae	Herb	Leaf	Leaf paste is applied on cuts and wounds.	RKT 25202
20.	Karipatta	<i>Murraya koenigii</i> (L.) Spr.	Rutaceae	Shrub	Leaf, Bark	Extract of leaf and bark used as health tonic and also used in leprosy and skin diseases. Branches uses as tooth brush.	RKT 25169
21.	Ner-Pati	<i>Skimmia laureola</i> (DC.) Siebold & Zucc. ex Walp.	Rutaceae	Shrub	Root, Leaf	Paste of root is used as antidote against insect sting. Dried leafs are burnt and inhaled to cure sinus under nasal tract.	RKT 25159
22.	Timur	<i>Zanthoxylum armatum</i> DC.	Rutaceae	Shrub	Leaf, Fruit	Leafs and fruits chewed for mouth wash, toothache, head ache and asthma.	RKT 26396
23.	Batain	<i>Melia azedarach</i> L.	Meliaceae	Tree	Bark, Leaf, Seeds	Bark and leaf powder is used internally and externally in leprosy and scrofula. Decoction of leaf and bark is used to cure swelling. Seed oil is used for earache, piles and blood purifier.	RKT 26343
24.	Ber	<i>Ziziphus mauritiana</i> Lam.	Rhamnaceae	Shrub	Fruit	Fruit juice is given in diarrhoea.	RKT 25317
25.	Tang	<i>Rhus parviflora</i> Roxb. ex DC.	Anacardiaceae	Shrub	Leaf	Leaf decoction used in treatment of cholera.	RKT 25151
26.	Chamlai	<i>Desmodium elegans</i> DC.	Fabaceae	Shrub	Root	Root juice is given in cholera. Root decoction is given in urinary disorders.	RKT 24105
27.	Salprani	<i>Flemingia bracteata</i> (Roxb) ex Aiton	Fabaceae	Herb	root	Powder or decoction of root is administrated orally to cure asthma.	RKT 25113
28.	Malujhan	<i>Bauhinia vahlii</i> (Wt.& Arn.) Benth.	Caesalpinaceae	Climber	Bark	Stem bark is pasted and applied on skin diseases.	RKT 25573
29.	Kanchnar	<i>Bauhinia variegata</i> L.	Caesalpinaceae	Tree	Bark	Bark decoction is used to cure leprosy, leucoderma, asthma and ulcers.	RKT 24056
30.	Banar	<i>Cassia tora</i> L.	Caesalpinaceae	Shrub	Seed	Seed paste is used in skin diseases and bone fracture.	RKT 24638
31.	Siris	<i>Albizia chinensis</i> (Osbeck) Merrill in Amer.	Mimosaceae	Tree	Stem bark	Fresh bark decoction is used three times daily in stomach-ache and dysentery.	RKT 24454
32.	Lajvanti	<i>Mimosa pudica</i> L.	Mimosaceae	Herb	Leaf	Leaf paste is used in cuts and wounds. Leaf juice is used in dressing for sinus and also for piles.	RKT 26783

33.	Bani	<i>Cotoneaster microphyllus</i> Wall. ex Lindl.	Rosaceae	Shrub	Root	Root paste is applied on cuts and wounds.	RKT 21860
34.	Bhikafal	<i>Fragaria indica</i> Wall.	Rosaceae	Herb	Leaf	Leaf extract used in gastric, ulcer, diabetes.	RKT 24958
35.	Bajardantii	<i>Potentilla fulgens</i> Wall. ex HK.f.	Rosaceae	Herb	Root, Leaf	Root and leaves decoction is useful in teeth cleaning, toothache and pyorrhoea, dysentery, stomach-ache.	RKT 25209
36.	Bhekal	<i>Prinsepia utilis</i> Royle.	Rosaceae	Shrub	Root	Root extract is taken orally as an antidote to neutralize the effect of insect sting. Root paste after heating at low temperature in an earthen pot is applied on cuts and wounds.	RKT 26394
37.	Padam	<i>Prunus cerasoides</i> D. Don	Rosaceae	Tree	Bark	Decoction of bark is given to decrease the joint pain and swelling.	RKT 26886
38.	Hisalu	<i>Rubus ellipticus</i> Sm.	Rosaceae	Shrub	Fruit	Juice of fruits is administered orally in cholera.	RKT 24623
39.	Silphora	<i>Bergenia ligulata</i> Engl.	Saxifragaceae	Herb	Rhizome	Decoction of rhizome is given orally to cure kidney stone. Rhizome powder is mixed with honey is used cure chronic cough and asthma.	RKT 26215
40.	Siplphra	<i>Bergenia stracheyi</i> (Hk.f. & Th.) Engl.	Saxifragaceae	Herb	Rhizome	Fresh rhizome are removed and washed thoroughly, cut in to pieces and chewed like candy to cure urinary and kidney stone, cough, asthma and toothache.	RKT 26114
41.	Jamun	<i>Syzygium cumini</i> (L.) Skeel.	Myrtaceae	Tree	Leaf	Tender leafs are chewed to cure bleeding piles. Powder of leaves with honey useful in diarrhoea and dysentery.	RKT 26041
42.	Mahandi	<i>Lawsonia inermis</i> L.	Lythraceae	Shrub	Leaf	Leaf paste used in cuts and wounds.	RKT 22439
43.	Kurz	<i>Woodfordia fruticosa</i> (L.) Kurz.	Lythraceae	Shrub	Root, Flower	Root paste is applied over burn scars. Infusion of flowers is given to cure urinary disorders.	RKT 26377
44.	Gandhrayan	<i>Angelica glauca</i> Edgew.	Apiaceae	Herb	Root	Decoction of root is given in urinary disorders, gastric, stomach-ache and bronchitis.	RKT 26233
45.	Jangli Jira	<i>Carum carvi</i> L.	Apiaceae	Herb	Seed	Seeds are boiled with roots of <i>Bergenia stracheyi</i> , and the decoction is given in gastric and stomach-ache.	RKT 26571
46.	Brahmi	<i>Centella asiatica</i> (L.) Urban.	Apiaceae	Herb	Leaf	Decoction of leaf is used in leprosy. Leaf juice is used in fever, cough, diarrhoea and dysentery.	RKT 26220
47.	Bazeer	<i>Pimpinella diversifolia</i> DC.	Apiaceae	Herb	Leaf, root, flower	Leaf, root and flower paste is taken with water to relieve form gastric, stomach-ache and leucorrhoea.	RKT 27459
48.	Bhootkeshi	<i>Selinium tenuifolium</i> Wall.	Apiaceae	Herb	Root	Decoction of root is given in cough and asthma. Roots are also used as fragrance stick to fumigate.	RKT 23323
49.	Padera	<i>Leptodermis lanceolata</i> Wall.	Rubiaceae	Shrub	Leaf	Leaf juice is also instilled in ear to cure earache. Leaf paste applied externally on head-ache.	RKT 25116
50.	Ghari	<i>Randia tetrasperma</i> (Wall. ex Roxb.) Benth. & Hook.f. ex Brandis	Rubiaceae	Shrub	Root	Root extract used in treatment of jaundice and stomach-ache.	RKT 24157
51.	Majethi	<i>Rubia cordifolia</i> L.	Rubiaceae	Climber	Whole Plant	Root decoction is used as blood purifier. Whole plant paste is applied over joints pain, leucorrhoea. Leaf paste is applied on cuts, wounds and insect sting.	RKT 26308
52.	Jatamasi	<i>Nordostachys grandiflora</i>	Valerianaceae	Herb	Root	Roots are dipped in mustard oil	RKT

		DC.				and oil is messed over joints affected by arthritis.	25817
53.	Sameo	<i>Valeriana hardwichii</i> Wall. ex Roxb.	Valerianaceae	Herb	Whole plant	Leaf juice is given to infants to cure diarrhoea. Whole plant decoction is used to cure old fever.	RKT 24744
54.	Sameo	<i>Valeriana wallichii</i> DC.	Valerianaceae	Herb	Root	Root decoction is given in urinary disorders, epilepsy and cholera. Roots also act as insecticide.	RKT 25138
55.	Poth	<i>Anaphalis adnata</i> DC.	Asteraceae	Herb	Whole plant	Whole plants is pasted and applied on cuts and wounds.	RKT 23997
56.	Pati	<i>Artemisia nilagirica</i> (Cl.) Pamp.	Asteraceae	Shrub	Root, Leaf	Fresh and washed root/leaf are dipped overnight in cold water and drunk for 5-6 days before meal to cure intestinal worm infection.	RKT 24767
57.	Pati	<i>Artemisia maritima</i> L.	Asteraceae	Shrub	Root	Fresh root juice is applied externally on skin to cure boils.	RKT 23793
58.	Arka-Jhar	<i>Bidens bipinnata</i> L.	Asteraceae	Herb	Leaf	Leafs crushed and juice rubbed on itching feet during rainy season.	RKT 25663
59.	Kantela	<i>Echinops cornigerus</i> DC.	Asteraceae	Herb	Root	Root juice is taken in urinary disorders and fever.	RKT 26874
60.	Pushkar-mool	<i>Inula cappa</i> (Buch.-Ham. ex D.Don) DC.	Asteraceae	Herb	Root	Root decoction is given in gastric, indigestion. Root paste is applied externally on skin disease.	RKT 24729
61.	Kuth	<i>Saussurea lappa</i> C. B. Clarke	Asteraceae	Herb	Root	Root paste/ decoction is used to cure asthma. Root paste is applied in swelling.	RKT 24285
62.	Anyar	<i>Lyonia ovalifolia</i> (Wall) Drude.	Ericaceae	Tree	Leaf	The extracts of leafs are rubbed on itching area.	RKT 21160
63.	Burans	<i>Rhododendron arboreum</i> Sm.	Ericaceae	Tree	Flower, Leaf, Stem, Bark	Decoction of corolla mixed with 1 table spun sugar is used to cure digestive and respiratory disorders. Dried flower powder is given in dysentery. Leaf paste is applied on forehead in head ache.	RKT 26108
64.	Chitrak	<i>Plumbago zeylanica</i> L.	Plumbaginaceae	Shrub	Root	Powdered root is given with milk in body ache. Decoction of root is given in intestinal worm infection, dysentery and leucoderma.	RKT 26414
65.	Lodh	<i>Symplocos crataegoides</i> Buch.-Ham.exD. Don	Symplocaceae	Tree	Bark	Decoction of bark is given in dysentery, leucoderma, leprosy and bleeding.	RKT 24596
66.	Harsingar	<i>Nyctanthes arbor-tristis</i> L.	Oleaceae	Shrub	Leaf	Young leafs of <i>Nyctanthes arbor-tristis</i> and <i>Zingiber officinale</i> are taken together in equal quantities, boiled with water and taken twice a day for three days to cure cold and cough.	RKT 22283
67.	Dudhi-Bel	<i>Cryptolepis buchanani</i> Roem. & Schult.	Asclepiadaceae	Climber	Bark, Leaf	Extract of bark and leaf used in cough, cold and fever.	RKT 25160
68.	Chirayita	<i>Swertia angustifolia</i> Buch.-Ham. ex D. Don	Boraginaceae	Herb	Whole plant	Decoction of whole plant is used to cure pneumonia, cold and cough and chronic fever.	RKT 25110
69.	Aakashi-bel	<i>Cuscuta reflexa</i> Roxb.	Cuscutaceae	Climber	Whole Plant	Paste of the plant applied on joints pain.	RKT 26140
70.	Dhatura	<i>Datura metal</i> L.	Solanaceae	Herb	Whole Plant	Decoction of whole plant is given to cure fever. Paste of root bark is applied over eyelids to cure conjunctivitis.	RKT 25186
71.	Kala Dhatura	<i>Datura stramonium</i> L.	Solanaceae	Herb	Flower, Seed	Juice of flowers is dropped in ear during earache. The paste prepared from roasted	RKT 23384

						seeds of drug in mustard oil is applied on skin diseases, itching, and bronchitis.	
72.	Rosbhari	<i>Nicandra physaloides</i> Gaertn.	Solanaceae	Herb	Leaf	Leaf paste is applied on body-ache and swelling.	RKT 24045
73.	Makoi	<i>Solanum nigrum</i> L.	Solanaceae	Herb	Whole Plant	Juice of whole plant is administered orally during intermittent fever and to cure jaundice.	RKT 27452
74.	Barhanta	<i>Solanum indicum</i> L.	Solanaceae	Herb	Fruit	Fruit are used in cough, asthma, and fever.	RKT 24309
75.	Kantkari	<i>Solanum xanthocarpum</i> Sch. & Wendl.	Solanaceae	Herb	Fruit	Smoke of fruit is inhaled to cure toothache.	RKT 24965
76.	Asgandha	<i>Withania somnifera</i> (L.) Dunal.	Solanaceae	Herb	Leaf, Root	Decoction of the leaf is taken as remedy for intestinal worm infestation. The Root powder mixed with black pepper used in rheumatic swellings.	RKT 24970
77.	Kutki	<i>Picrorhiza kurrooa</i> Benth.	Scrophulariaceae	Herb	Root	Root powder is given orally in fever and stomach-ache.	RKT 25822
78.	Akulbir	<i>Verbascum thapsus</i> L.	Scrophulariaceae	Herb	Flower, Leaf	Powder of flowers mixed with mustard oil is applied on boils. Leaf juice is dropped in eyes to cure cataract.	RKT 26450
79.	Basing	<i>Adhatoda vasica</i> Nees.	Acanthaceae	Shrub	Leaf	Leaves are boiled with Jiggery and decoction is given to cure asthma and chronic cough.	RKT 15375
80.	Jhinti	<i>Barleria cristata</i> L.	Acanthaceae	Herb	Leaf	Leaf paste is applied externally on cuts and wounds for healing purpose. Decoction of the leaf in given once a day to alleviate headache.	RKT 26327
81.	Kawgori	<i>Dicliptera bupleuroides</i> Nees.	Acanthaceae	Herb	Leaf	Leaf extract also used as an ear drop in conjunctivitis.	RKT 26954
82.	Daiya	<i>Callicarpa macrophylla</i> Vahl.	Verbenaceae	Shrub	Seed, leaf, fruit	Seeds are chewed to cure stomach-ache. Leaf paste is applied on body ache and swelling. Fruits are eaten in urinary disorders.	RKT 25188
83.	Siwain	<i>Vitex negundo</i> L.	Verbenaceae	Shrub	Leaf	Leaf juice is instilled in nostril to cure headache. Leaf decoction is used to cure arthritis.	RKT 25171
84.	Ratpati	<i>Ajuga parviflora</i> Benth.	Lamiaceae	Herb	Root	Root decoction is given orally to cure headache, fever. Root infusion is given orally in stomach-ache.	RKT 26408
85.	Ratpatiya	<i>Ajuga bracteosa</i> Wall.ex Benth.	Lamiaceae	Herb	Leaf	The decoction of leaves is given to regulate menstrual disorders.	RKT 25182
86.	Bursong	<i>Colebrookia oppositifolia</i> J. E. Sm.	Lamiaceae	Shrub	Root	Root paste mixed with cow's urine is applied on cuts and wounds. Root is used in epilepsy.	RKT 26358
87.	Pathar Choor	<i>Coleus forskohlii</i> (Willd.) Briq.	Lamiaceae	Herb	Root	Root juice is administered orally in constipation and intestinal worm infection.	RKT 24499
88.	Ban Tulsi	<i>Origanum vulgare</i> L.	Lamiaceae	Herb	Whole plant	Leaves used as tea to cure cold and cough. Decoction of whole plant is given orally in urinary disorders.	RKT 25103
89.	Podina	<i>Mentha arevensis</i> L.	Lamiaceae	Herb	Leaf	Leaf juice is given to infants during high fever.	RKT 4353
90.	Pipswas	<i>Leucas lanata</i> Benth.	Lamiaceae	Herb	Leaf	Leaf paste is applied on cuts, wounds and also to check bleeding.	RKT 20538
91.	Banajwayan	<i>Thymus serpyllum</i> L.	Lamiaceae	Herb	Whole plant	Whole plant paste is applied to cure swelling. Infusion of leaf is used for itching and skin	RKT 25435

						diseases. Decoction of leaf is given in cough, epilepsy and menstrual disorders.	
92.	Lahuryia	<i>Plantago major</i> L.	Plantaginaceae	Herb	Seed	The husk of the Seeds yields colloidal mucilage, used to cure gastric and dysentery.	RKT 26201
93.	Punarnava	<i>Boerhaavia diffusa</i> L.	Nyctaginaceae	Herb	Root	Root juice is administered orally in asthma and urinary disorder. Watery extract of the root is given orally in jaundice.	RKT 26895
94.	Apamarg	<i>Achyranthus aspera</i> L.	Amaranthaceae	Herb	Root	Decoction of roots is used in stomach-ache and an aqueous extract for stones in the bladder.	RKT 26313
95.	Apamarg	<i>Achyranthus bidentata</i> Blume.	Amaranthaceae	Herb	Root, Seed	Decoction of root and seed is used in conjunctivitis, cough, asthma, fever, bronchitis, headache, pneumonia, piles.	RKT 26251
96.	Bhilmora	<i>Rumex hastatus</i> D. Don	Polygonaceae	Herb	Leaf	Leaf's paste is applied on cuts and wounds, insect sting and to check bleeding.	RKT 26804
97.	Jangli Palak	<i>Rumex nepalensis</i> Spr.	Polygonaceae	Herb	Leaf	Leaf paste is applied on cuts, wounds, insect sting, urinary disorder and swelling.	RKT 24084
98.	Chirar	<i>Litsea umbrosa</i> Nees.	Lauraceae	Tree	Bark	Bark paste is applied over bone fracture to set it.	RKT 20781
99.	Amla	<i>Emblica officinalis</i> Gaertn.	Euphorbiaceae	Tree	Fruit	Fruit juice is given to increase the flow of urine, act as diuretic, also given in diarrhoea, dysentery and to cure jaundice.	RKT 21022
100.	Dudhi	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Herb	Latex	Latex of plant is dropped on the root of tooth during toothache.	RKT 26907
101.	Suin	<i>Euphorbia royleana</i> Boiss.	Euphorbiaceae	Shrub	Stem	The latex obtained from fresh stem is used in earache and toothache.	RKT 7511
102.	Choti Dudhi	<i>Euphorbia thymifolia</i> L.	Euphorbiaceae	Herb	Whole Plant	Whole plant is crushed with water and taken in diarrhoea and cholera.	RKT 24286
103.	Safed Arand	<i>Jatropha curcas</i> L.	Euphorbiaceae	Shrub	Latex, Seed	Milky latex of plant is applied on affected part to check bleeding. Paste of seed is applied on arthritis and itching.	RKT 26903
104.	Kmbhal	<i>Mallotus philippinensis</i> (Lamk) Muell.-Arg.	Euphorbiaceae	Tree	Fruit	Fruit extract used in ulcers, cough and skin diseases.	RKT 26752
105.	Bhumiamla	<i>Phyllanthus urinaria</i> L.	Euphorbiaceae	Herb	Whole Plant	Whole plant powder is given to cure stomach-ache and jaundice.	RKT 23026
106.	Arandi	<i>Ricinus communis</i> L.	Euphorbiaceae	Shrub	Leaf	Few drops of oil mixed with milk relieves from constipation. To cure arthritis, leaves are heated over utensil and fastened around affected joints.	RKT 24626
107.	Satpura	<i>Sarcococca saligna</i> (D.Don) Muell.-Arg.	Buxaceae	Shrub	Leaf	Leaf paste is applied on bone fracture.	RKT 26707
108.	Gheti	<i>Boehmeria rugulosa</i> Wedd.	Urticaceae	Tree	Bark	Bark paste is applied over boils. Bark paste is applied over bone fracture to set it.	RKT 27432
109.	Kandeli	<i>Gerardinia heterophylla</i> Decne.	Urticaceae	Shrub	Leaf	Decoction of leaf is given in fever. Leaf paste is applied on swelling.	RKT 22919
110.	Bichhu-ghas	<i>Urtica dioca</i> L.	Urticaceae	Shrub	Leaf	Flogging of leaf is done during bone fracture.	RKT 25889
111.	Bichhu-ghas	<i>Urtica parviflora</i> Roxb.	Urticaceae	Shrub	Leaf	Flogging of leaf is done during bone fracture.	RKT 25808
112.	Bedu	<i>Ficus palmata</i> Forsk.	Moraceae	Tree	Latex	Milky latex is applied on cuts and wounds.	RKT 26372
113.	Pipal	<i>Ficus religiosa</i> L.	Moraceae	Tree	Stem bark	Bark grounded with turmeric powder is applied externally on cuts, wounds and skin diseases.	RKT 7193
114.	Akhrot	<i>Juglans regia</i> L.	Juglandaceae	Tree	Bark,	Bark paste is applied on itching, scrofula and bone fracture. The bark is boiled in water.	RKT 26532

						After filtration it is used as mouthwash, very useful in toothache.	
115.	Kaphal	<i>Myrica esculenta</i> Buch.-Ham. ex D. Don	Myricaceae	Tree	Bark	Bark paste is inhale to cure cold and headache. Bark decoction is used as mouth freshener and to cure toothache.	RKT 24288
116.	Bhojpatra	<i>Betula utilis</i> D. Don	Betulaceae	Tree	Resin	Resin and seed kernels of <i>Prunus persica</i> and <i>Betula utilis</i> ground into paste, mixed with milk and drunk to conceive pregnancy and for general debility.	RKT 23134
117.	Banj	<i>Quercus leucotrichophora</i> A. Camus	Fagaceae	Tree	Leaf, Bark, Seed	Seeds are roasted on fire and given to cure cold and cough. Stem bark juice of is used in toothache. Leaf and fruit extract used in asthma and diarrhoea.	RKT 27416
118.	Hatazari	<i>Dactylorhiza hatagirea</i> (Don.) Soo.	Orchidaceae	Herb	Tuber	Tuber fried in cow's ghee is given to cure menstruation problems and general debility after delivery.	RKT 26089
119.	Jivak	<i>Malaxis acuminata</i> D. Don	Orchidaceae	Herb	Tuber	Powder of tuber is used as tonic in general debility and bronchitis. Used as an ingredient of Chyawanprash.	RKT 25177
120.	Rsabhak	<i>Malaxis muscifera</i> (Lindl.) Kuntze.	Orchidaceae	Herb	Tuber	Powder of tuber is used as tonic in general debility. Used as an ingredient of Chyawanprash.	RKT 21447
121.	Ridhi	<i>Habenaria edgeworthii</i> Hook. f. ex Collet	Orchidaceae	Herb	Tuber	Tuber extract used as nervine and cardiac tonic and also used in fever, cough, asthma and skin diseases.	RKT 9065
122.	Vridhi	<i>Habenaria intermedia</i> D. Don	Orchidaceae	Herb	Tuber	Tuber extract used as health tonic and also used in fever, cough, asthma and skin diseases.	RKT 24504
123.	Kevkand	<i>Costus speciosus</i> (Koenig) J. E. Sm.	Zingiberaceae	Herb	Rhizome	Roasted roots are ground and mixed with <i>Piper nigrum</i> , made into tablets and taken orally to cure arthritis. Cooked rhizomes are used as vegetable and ease in cough, cold and stomach-ache.	RKT 25180
124.	Ban Haldi	<i>Hedychium spicatum</i> Ham. ex Sm..	Zingiberaceae	Herb	Rhizome	Powder of rhizome is used in asthma, headache and stomach-ache.	RKT 25881
125.	Kakoli	<i>Roscoeia procera</i> Wall.	Zingiberaceae	Herb	Root	Decoction of root used in jaundice.	RKT 25112
126.	Kali Musali	<i>Curculigo orchoides</i> Gaertn.	Hypoxidaceae	Herb	Rhizome, Leaf	Powder of rhizome used in urinary disorder, diarrhoea, jaundice, aphrodisiac tonic and piles.	RKT 25350
127.	Rambans	<i>Agave americana</i> L.	Agavaceae	Shrub	Leaf, Root	Leaf and root extract used as diuretic and purgative and also used in syphilis, scrofula, menstrual disorders, jaundice and insect sting.	RKT 940
128.	Gethi	<i>Dioscorea bulbifera</i> L.	Dioscoreaceae	Climber	Rhizome	Rhizome are roasted in hot ash and given with salt to cure old cough.	RKT 24963
129.	Tarur	<i>Dioscorea deltoidea</i> Wall. ex Kunth.	Dioscoreaceae	Climber	Rhizome	Powder of rhizome used in dysentery, fever. Dry rhizome paste is applied on skin diseases.	RKT 26518
130.	Jambu	<i>Allium stracheyi</i> Baker	Lilliacae	Herb	Leaf	Leaf decoction is given to cure indigestion, jaundice, cold and cough.	RKT 25040
131	Shatavar	<i>Asparagus adscendens</i>	Lilliacae	Herb	Root	Root pounded in water and	RKT

		Roxb.				administered orally in dysentery.	25155
132.	Kariu, Shatavar	<i>Asparagus curillus</i> Buch.-Ham.ex Roxb.	Lilliaceae	Herb	Leaf	Leaf decoction is given to cure diarrhoea and gastric.	RKT 24658
133.	Kalihari	<i>Gloriosa superba</i> L.	Lilliaceae	Herb	Root	Paste of root is applied externally on joints to cure rheumatoid arthritis.	RKT 23912
134.	Satua	<i>Paris polyphylla</i> Sm.	Lilliaceae	Herb	Root	Root powder with cow's milk is given to cure general debility and stomach-ache.	RKT 25460
135.	Meda	<i>Polygonatum cirrhifolium</i> (Wall) Royle.	Lilliaceae	Herb	Root	Root boiled with cow's milk is given to the patient suffering from anaemia. Roots are used in fever, bronchitis and general debility. Used as an ingredient of Chyawanprash.	RKT 26144
136.	Mahameda	<i>Polygonatum verticillatum</i> (L.) Allioni	Lilliaceae	Herb	Root	Roots are used as tonic and also used in fever, general debility. Used as an ingredient of Chyawanprash.	RKT 25894
137.	Ban Pyaj	<i>Urginea indica</i> (Roxb.) Kunth.	Lilliaceae	Herb	Bulb	Paste of bulb fried in mustard oil is applied over arthritis.	RKT 7657
138.	Kukurdar	<i>Smilax aspera</i> L.	Smilacaceae	Climber	Stem bark	Stem bark is burnt with mustard oil and applied in arthritis and skin diseases.	RKT 26417
139.	Vacha	<i>Acorus calamus</i> L.	Araceae	Herb	Root	Root powder used in children in Intestinal worm infection. Root powder is given with milk in stomach-ache, cough, bronchitis and general debility.	RKT 26329
140.	Sanpka Bhuta	<i>Arisaema tortuosum</i> (Wall.) Schott	Araceae	Herb	Root	Paste of root is applied on cuts and wounds. Decoction of root is used in head ache, stomach-ache.	RKT 7801
141.	Doob	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Herb	Whole Plant	The expressed juice of plant act as astringent and is applied to bleeding cuts and wounds to stop bleeding. Decoction of root and leaves is used in dysentery, diarrhoea and general debility.	RKT 26038
142.	Thuner	<i>Taxus baccata</i> L.	Taxaceae	Tree	Leaf, Bark	Decoction of Leafs and bark is used as tea to cure general debility and stomach-ache. Decoction of stem bark is administrated orally to cure cough.	RKT 22855
143.	Ragu	<i>Abies spectabilis</i> Spach.	Pinaceae	Tree	Leaf	Juices of fresh Leafs are administered orally to get rid of fever and asthma.	RKT 26095
144.	Deodar	<i>Cedrus deodara</i> Loud.	Pinaceae	Tree	Heart Wood	Oil extracted from heart wood is massaged over joints pain, leucoderma and itching.	RKT 26285



Aconitum heterophyllum Wallich ex Royle



Adhatoda vasica Nees



Asparagus curillus Buch-Ham. ex Roxb.



Berberis aristata DC.



Bergenia ligulata Engl.



Cissampelos pareira L.



Coleus forskohlii (Willd.) Briq.



Costus speciosus (Koenig) J. E. Sm.



Gloriosa superba L.



Litsea umbrosa Nees



Malaxis acuminata D. Don



Murraya koenigii (L.) Spreng.

Photo Plate : 01



Paris polyphylla Smith



Polygonatum verticillatum (L.) Allion.



Polygonatum cirrhifolium (Wallich) Royle



Rhododendron arboreum Smith



Ricinus communis L.



Rubia cordifolia L.



Solanum nigrum L.



Taxus baccata L.



Thymus serpyllum L.



Tinospora sinensis (Lour.) Merr.



Woodfordia fruticosa (L.) Kurz.



Zanthoxylum armatum DC.

Photo Plate : 02

5. Discussion

The geographical peculiarities make the Himalayan region a very diverse system subtending a wide range of vegetation types. The biodiversity of this region is severely threatened by natural and anthropogenic disturbances. Local populations use these plants for curing the different diseases by traditional knowledge and also used as food and other purposes. Present study showed there are 144 ethno-medicinal plant species are documented with the help and participation of local/ rural peoples, farmers, traditional knowledge holders / local healers (Vaidhyas-Traditional medical practitioners). Among these species some are recorded under various threat categories by ^[7] viz. *Aconitum heterophyllum* Wall.ex Royle, *Taxus baccata* L., *Zanthoxylum armatum* DC., *Bergenia ligulata* Engl., *Valeriana hardwichii* Wall.ex Roxb. *Malaxis acuminata* D.Don *Habenaria edgeworthii* Hook. f. ex. Collet, *Habenaria intermedia* D. Don, *Costus speciosus* (Koenig) J. E. Sm., *Curculigo orchiooides* Gaertn., *Dioscorea deltoidea* Kunth., *Paris polyphylla* Sm., *Gloriosa superba* Linn., *Polygonatum cirrhifolium* (Wall) Royle, *Polygonatum verticillatum* (L.) Allioni., *Acorus calamus* L.. All the species used to treat health problems, are extracted and exploited unscientifically from the natural habitat by the local traders and healers, which causes remarkable destruction in the natural population of the flora. Attempts have been made to explore, identify and prepare and inventory of plant resources of this region ^[16, 23]. Habitat degradation, unscientific harvesting and over exploitation to meet the demands of illegal trade in medicinal plants have led to the extinction of more than 150 plant species in the wild ^[22, 1, 10]. The Himalayan range is rich in endemic and medicinal plant diversity ^[3] with many protected areas (PAs) across but not a single PA has been specifically established to ensure the conservation of medicinal plants. Due to the heavy exploitation, a few species like *Taxus baccata*, *Dactylorhiza hatagirea*, *Aconitum heterophyllum* and *Picrorhiza kurroa* etc. have witnessed rapid decline during recent decades ^[21]. Several studies have been carried out on the use of the medicinal plants in the Indian Himalayan region in general and Uttarakhand state in particular ^[8, 13, 22, 2, 14]. The present study is step forward to document the traditional knowledge along with the conservation of local flora by creating the awareness among farmers and local inhabitants with their participation in cultivation of important medicinal plants at least on their barren and fallow land.

Another way to conserve the bio-diversity is to preserve the traditional health care systems which are prevailing in the local community. Promotion of cultivation strategies of such medicinal herbs in villages may reduce the anthropogenic pressure on wild habitats. The main focus of this study was to gather the different ethno-medicinal plants used to cures various diseases by the rural communities of the Bageshwar District. These people are highly dependent on plant products. In certain areas, these folk medicinal prescriptions are endemic and have survived over hundreds of years. These ethno-medicinal plants are also a source of income for the local communities. In this region, many local people collect these medicinal plants from the wild and sell them in the local markets.

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Picture of some important ethno-medicinal plants is given in Photo plate: 1 and 2.

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