Traditional resources and use of aromatic and ethnomedical plants in Uttarakhand: Compliment of nature

Divya Jain, Navendra Uniyal, Debasis Mitra and Pracheta Janmeda

Abstract
Medicinal plants are considered as a rich resource of ancient medicines and so many of them are used as a major ingredient of today’s panacea that can be pharmacopoeic, non-pharmacopoeic, or synthetic drugs. They have been used to cure health disorders for the past thousand years. The ubiquitous use of folk remedies and health preparations is outlined in the Vedas and the Bible. Plant safety, quality, and efficacy assurance has now become a major issue in developing and developed countries. Cultural consequence and importance showing great demand for herbal and aromatic plants and following highlight point needed for the immense response in this field like encouraging the cultivation of medicinal plants having large market prospects. Research and evolution need to stand together for improving the manufacturing and efficiency of plants by establishing massive outcome through expanding collaboration between farmers and researchers.

Keywords: Traditional medicinal plants, chemical constituents, herbal remedies, poverty alleviation, Uttarakhand

1. Introduction
Every living creature depends on nature for their necessary requirements like medicines, wood, shelters, food, fertilizers, clothing, tonics and means of transportation over centuries [1,2]. Their extreme modifications of human life-style and food habits escort to the exposure of various clinical pathologies [3]. Drugs, toxins present in food, chemicals, and residues of pesticides are common carcinogenic agents which are responsible for polluting our environment and increasing the rate of cancer in the human population. All over the globe, there is a visible phenomenon called ‘Renaissance’ which has been suggested two-thirds part of the world’s plant species having medicinal values [5]. Constituents like carotenoids, cinnamic acids, tannins, flavonoids, benzoic acids, ascorbic acid, saponin, tocopherols, alkaloids, folic acid, and tocochromanols, etc showing beneficial therapeutic potential produced by the plant [6,7]. The traditional medicine practice is widespread in China, Sri Lanka, India, Japan, Thailand, and Pakistan [8]. Forty percent of the total medicinal expenditure is credited to patronimonial alone by China [9]. The Caesalpiniaceae, Fabaceae, and Mimosaceae make use of legumes in Thailand while in Japan herbal remedies are in demand than the mainstream pharmaceutical products [10].

1.1. Indian traditional Ayurvedic system
India sits on a gold mine of such countless species and traditionally holds a strong knowledge of herbal medicines with an abundance of medicinal plants generally of prevailed ecosystems. Around 17000 higher plants species approximately out of which 8000 species are taken into consideration. India is one among in 12 mega diversity countries of the world. The principal repository of a huge number of aromatic plants is forests in India. They are practicing a different medical system based on Ayurveda, Siddha, and Unani system. Among these Ayurveda is the oldest medicinal system using approximately 2000 plants species [11]. Plant contribution is remarkable such as fine chemicals, cosmetics and industrial raw materials for making extracts of active compounds which used in different drugs synthesis. Some plants are considered as a significant source of nourishment which makes their therapeutic values recommended, which play a vital role in the human culture development around the whole world. In spite of the current state of the art, we now have an urgent need to identify and develop new healing agents for modern drugs. Medicinal plants used not only for the treating diseases but also as a prospective source for building good health and maintaining conditions. Herbal medicines provided mankind a large variety of potent drugs to alleviate or eradicate infections and suffering from diseases [12].
Modern allopathic medicine has its roots in ancient medicine that may have many new remedies will be come across and profit-oriented in future. Since, today having a better knowledge and understanding towards how different organs can work together to perform a common function. We are also in a superior post to fully appreciate the relieve power of plants and their future for treating intricate health conditions. Synthetic materials are deemed insecure and products of the plant appear to represent security. Few clinical trials and legal proceedings of high quality to ensure the safety and effectiveness of herbal medicines have yet been conducted. Ordinary therapies are certainly needed in the form of dosage because the plant material could be harmful due to the presence of naturally occurring toxic constituents, heavy metals, pesticides and bacteria. Peculiarly and particularly without side effects has been realized that the herbal drugs immunes the system of human body.

Around the world, about 21,000 plants listed by World Health Organization (WHO) which are used for health resolution. Out of which 2500 plant species are delineated from India and 150 species are used profitably and economically on wide-reaching for drugs manufacturing. For curing various disorders in India, central company’s states like Madhya Pradesh, Jharkhand, Chattisgarh, Orissa and Maharashtra adopted herbal medicinal practices. Infinite wild plants are used by local people of this region are Baiga, Bhil, Khairwar, hill, Rawat, Bhariya, Sahariyas, Gond, Korwa and Birhorfor their good physical condition and fitness. The Indian Himalayan Region (IHR) is the natural territory of major ancestral communities such as Bhotias, Khavar, Baiga tribe, Bhoksa, Tharus, Chenchu people, Shaukas, gurjar, jarawas, Jaunpies and Mahigeria, which use medicinal plants for curing the diseases and ailments through the use of natural medicine. Total plants of red data book of IHR also maintaining unique diversity of traditional folk plants in the region demonstrated by the manifestation of a number of native (31%) and Endemic (15.5%) where threatened elements remains only 14%.

1.2. Uttarakhand: Indian Heritage

It is a hilly state, located between 77°34’27” to 81°02’22”E longitude and 28°53’24” to 31°27’50”N latitude. About 17.3% of India’s total land area is occupied with 53,483 km² of which 92.57% and 7.43% under hills and plains having international borders of state touched with China (Tibet) and Nepal in the north and east. On its north-west lies Himachal Pradesh and while on the south is Uttar Pradesh. It is geographically diverse from the snow-covered mountain summit to the Subtropical Teri region with the giant Nanda Devi (7,817m). Uttarakhand has a potential to become an herbal state by using trump card of comparatively higher erudition and literacy rates. Many new advanced approaches of Biotecnology and conservation strategy plans can help in preserving and utilizing the aboriginal understanding of traditional plants for humanity. Thus, their command must be examined as a key element of all attempts for conserving and developing pastoral rural areas. Few studies show that locals still rely on various plants inherent their daily requirements, particularly for medicinal products. In low rainfall and moisture state, many traditional plants can be grown on low-grade soils, where other crops don’t cultivate. A total of 964 species of herbal plants are known to occur in this Himalayan state of India. Herbs dominate the pool of medicinal plant species, as out of total medicinal plant species, 614 are herbs, 190 are shrubs and 160 are trees distributed over 158 families. Various plant species parts like flower, wood, fruit, leaf, roots, gum, tuber, resins, fatty oil, bark, stem, aerial part, and essential oil are used for preparing herbal formulations and herbal drugs as shown in Table 1.

<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Family</th>
<th>Local name</th>
<th>Habit</th>
<th>Part used</th>
<th>Indigenous uses/ Medicinal uses</th>
<th>Mode of use</th>
<th>Native</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aconitum heterophyllum</td>
<td>Ranunculaceae</td>
<td>Atis</td>
<td>Herb</td>
<td>Root</td>
<td>Stomachache, fever, cough, diarrhea, vomiting</td>
<td>Dried root powder is taken after meals</td>
<td>HR</td>
<td>31</td>
</tr>
<tr>
<td>Angelica glauca</td>
<td>Apiaceae</td>
<td>Choraka/choru</td>
<td>Herb</td>
<td>Root</td>
<td>Stomach troubles, bilious complaints, menorrhagia, infantile atrophy and as a stimulant</td>
<td>-</td>
<td>HR</td>
<td>32, 33, 34</td>
</tr>
<tr>
<td>Arnebia benthamii</td>
<td>Boraginaceae</td>
<td>Balchhari</td>
<td>Herb</td>
<td>Root and bark</td>
<td>Piles, hair tonic, antiseptic and in throat problems.</td>
<td>Root powder with butter given in piles</td>
<td>-</td>
<td>35</td>
</tr>
<tr>
<td>Asparagus racemosus</td>
<td>Liliaceae</td>
<td>Shatavari</td>
<td>Herb</td>
<td>Root</td>
<td>Female tonic</td>
<td>Root decoction used</td>
<td>IO, Australia, Africa</td>
<td>36</td>
</tr>
<tr>
<td>Berberis aristata</td>
<td>Berberidaceae</td>
<td>Kingor</td>
<td>Shrub</td>
<td>Root, Bark</td>
<td>Fever, eye complaints</td>
<td>Root decoction mixed with rose water is useful during eye infection</td>
<td>HR</td>
<td>37</td>
</tr>
<tr>
<td>Eclipta alba</td>
<td>Asteraceae</td>
<td>Bhringaraj/kehraj</td>
<td>Herb</td>
<td>Stem, leaves, seeds and roots</td>
<td>Treatment of liver cirrhosis, jaundice, gall bladder problems and hepatitis.</td>
<td>-</td>
<td>-</td>
<td>38</td>
</tr>
<tr>
<td>Ficus palmate</td>
<td>Moraceae or Urticaceae</td>
<td>Bedu/wild fig</td>
<td>Shrub or small tree</td>
<td>Treatment of diabetes, digestive disorders and small tumors</td>
<td>Fruit paste is used externally for boils and small tumors. Latex for removal of warts and spines from skin.</td>
<td>IO</td>
<td>39</td>
<td></td>
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<tr>
<td>Nardostachys grandiflora</td>
<td>Valerianaceae</td>
<td>Jatamansi</td>
<td>Herb</td>
<td>Root</td>
<td>Treatment of digestive system, circulatory system, nervous system, respiratory system, urinary system, reproductive system and skin</td>
<td>-</td>
<td>HR</td>
<td>40</td>
</tr>
<tr>
<td>Plant Name</td>
<td>Family</td>
<td>Common Names</td>
<td>Part Used</td>
<td>Diseases</td>
<td>Region</td>
<td>Page</td>
<td>Item</td>
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<tr>
<td>Prunus cerasoides</td>
<td>Rosaceae</td>
<td>Cherry</td>
<td>Bark, fruit</td>
<td>Cut, wounds, muscular pain and body swellings</td>
<td>HR 41</td>
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<td></td>
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<tr>
<td>Rubus ellipticus</td>
<td>Rosaceae</td>
<td>Hisalu</td>
<td>Root</td>
<td>Skin diseases</td>
<td>IO 35</td>
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<tr>
<td>Sausurea obvallata</td>
<td>Asteraceae</td>
<td>Brahma Kamal</td>
<td>Leaf, flower, root and seed</td>
<td>Wounds, cuts, cardiac disorder, reproductive disorder, mental disorder, headache and body pain</td>
<td>HR 42</td>
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<tr>
<td>Zanthoxylum armatum</td>
<td>Rutaceae</td>
<td>Timroo</td>
<td>Bark and fruits</td>
<td>Toothache</td>
<td>Tropical</td>
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<tr>
<td>Taxus baccata</td>
<td>Taxaceae</td>
<td>Thuner</td>
<td>Leaf, fruit</td>
<td>Cancer</td>
<td>Europe, Africa, Asia</td>
<td>37</td>
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<tr>
<td>Rubus niveus</td>
<td>Rosaceae</td>
<td>Kali-hisole</td>
<td>Leaf</td>
<td>Headache</td>
<td>IO 44</td>
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<tr>
<td>Berberis asiatica</td>
<td>Berberidaceae</td>
<td>Kilmora</td>
<td>Roots and stem</td>
<td>Used for curing diabetes, jaundice and rheumatism</td>
<td>- HR 45</td>
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<tr>
<td>Carum carvi</td>
<td>Apiaceae</td>
<td>Kala zeera</td>
<td>Fruit and seed</td>
<td>Fever, headache, stomachic, carminative, uterine complaints, swelling of breast, testicles and muscular</td>
<td>- HR 46</td>
<td></td>
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<tr>
<td>Bombax ceiba</td>
<td>Bombacaceae</td>
<td>Semal</td>
<td>Flower and leaf</td>
<td>Cutaneous troubles, digestive disorders and snake bite</td>
<td>Australia</td>
<td>46</td>
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<tr>
<td>Perilla frutescens</td>
<td>Lamiaceae</td>
<td>Bhanjiri</td>
<td>Leaf</td>
<td>Earache and arthritis</td>
<td>Eastern Asia</td>
<td>47</td>
<td></td>
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<tr>
<td>Melia azedarach</td>
<td>Meliaceae</td>
<td>Daikan</td>
<td>Leaf, seeds, bark and root</td>
<td>Itching and treating skin disease</td>
<td>Asia and Australia</td>
<td>48</td>
<td></td>
<td></td>
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<tr>
<td>Origanum vulgare</td>
<td>Lamiaceae</td>
<td>Jungali tulsi</td>
<td>Whole plant</td>
<td>Respiratory disorder, urinary disorders, bronchitis, diarrhoea, cystitis, skin diseases, insect bite, earache, cough and cold</td>
<td>- 49</td>
<td></td>
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<tr>
<td>Prunus armeniaca</td>
<td>Rosaceae</td>
<td>Choole</td>
<td>Fruit</td>
<td>Stomachache fever and body pain</td>
<td>Caucas</td>
<td>41</td>
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<tr>
<td>Pyrus pashia</td>
<td>Rosaceae</td>
<td>Molu</td>
<td>-</td>
<td>Gastrointestinal disorders, fever and headache, sweating of body (diaphoretic), hysteria and epilepsy</td>
<td>- HR 50</td>
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<tr>
<td>Quercus leucotrichophora</td>
<td>Fagaceae</td>
<td>Baanj</td>
<td>Seed</td>
<td>Gonorrhoeal, asthma, hemorrhages, diarrhoea, dysentery, digestive disorder and urinary disorder</td>
<td>- 51, 52</td>
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<tr>
<td>Bergeinia ciliata</td>
<td>Saxifragaceae</td>
<td>Silphodi</td>
<td>Rhizome and leaves</td>
<td>Cough, cold, kidney and gall bladder stone</td>
<td>HR 53</td>
<td></td>
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<tr>
<td>Butea monosperma</td>
<td>Leguminosae</td>
<td>Dhak / palas</td>
<td>Flowers</td>
<td>Eye disease, chronic fever, enlargement of spleen, leucorrhoea, epilepsy, leprosy, anti fungal activity, anti inflammatory activity, liver disorders anti fertility activity and gout</td>
<td>- 54</td>
<td></td>
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<tr>
<td>Callicarpa macrophylla</td>
<td>Verbenaceae,</td>
<td>Daiya</td>
<td>Root, bark, leaves</td>
<td>Tumour, polydipsia, diarrhoea, dysentery, diabetes, fever,</td>
<td>- 55</td>
<td></td>
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<tr>
<td><strong>Plant Name</strong></td>
<td><strong>Family</strong></td>
<td><strong>Common Name</strong></td>
<td><strong>Type</strong></td>
<td><strong>Parts Used</strong></td>
<td><strong>Uses</strong></td>
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<tr>
<td><em>Cassia tora</em></td>
<td>Leguminosae</td>
<td>Chakunda</td>
<td>Shrub</td>
<td>Leaves, seed, and root</td>
<td>Treatment of leprosy, ringworm infection, ophthalmic, skin diseases and liver disorders. Several chemical compounds such as anthraquinone glycosides, naphthopyrone glycosides, phenolic compounds, flavonoids etc. Have been isolated from the plant. The powdered root bark of <em>C. tora</em> is used in treatment of malaria.</td>
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<tr>
<td><em>Celastrus paniculatus</em></td>
<td>Celastraceae</td>
<td>Malkangi/jyotishmati</td>
<td>Tree</td>
<td>Root, stem, leaves, fruits, seeds</td>
<td>Dried leaves and bark of this plant were prescribed for fever, anemia and seeds were crushed and mixed with honey or sugar and administered to children for dysentry or cough.</td>
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<tr>
<td><em>Centella asiatica</em></td>
<td>Apiaceae</td>
<td>Brahmi</td>
<td>Herb</td>
<td>Whole plant</td>
<td>Asthma, skin disorders, ulcers, dysentery and body aches</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cinnamomum tamala</em></td>
<td>Euphorbiaceae</td>
<td>Dalcheenee</td>
<td>Bark, leaf and seed</td>
<td>Rheumatism, colic, diarrhea, nausea, bronchitis, vomiting, fever, anemia, body odor, dysentery, cough</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><em>Cleome viscosa</em></td>
<td>Capparidaceae</td>
<td>Jakhya</td>
<td>Herb</td>
<td>Leaves and seeds</td>
<td>Gastrointestinal disorders, gastrointestinal infections, ringworm, flatulence, colic, dyspepsia, cough, bronchitis, cardiac disorders, rheumatism, fever and headache</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><em>Cucumis sativus</em></td>
<td>Cucurbitaceae</td>
<td>Kheera/kakdi</td>
<td>Fruit</td>
<td>Removal of dead skin and urinary problem</td>
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</tr>
<tr>
<td><em>Glycine max</em></td>
<td>Fabaceae</td>
<td>Kala bhatt</td>
<td>Herb</td>
<td>Seeds</td>
<td>Cholesterol, cancer and useful in eyesores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Syzygium cumini</em></td>
<td>Myrtaceae</td>
<td>Jamun</td>
<td>Tree</td>
<td>Seeds and bark</td>
<td>Sore throat, bronchitis, diabetes, excessive menstruation, asthma, stone, thirst, biliousness, dysentery and ulcers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Tinospora cordifolia</em></td>
<td>Menispermaceae</td>
<td>Giloy/ guduchi</td>
<td>Shrub</td>
<td>Stem</td>
<td>Diabetes, arthritis, allergy, ulcer and malaria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Acorus calamus</em></td>
<td>Araceae</td>
<td>Vacha/ baij</td>
<td>Herb</td>
<td>Leaves and root</td>
<td>Appetite loss, bronchitis, chest pain, colic, cramps, diarrhea, digestive disorders, flatulence, gas, indigestion, nervous disorders, rheumatism, sedative, and vascular disorders</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><em>Betula utilis</em></td>
<td>Betulaceae</td>
<td>Bhojpatra</td>
<td>Tree</td>
<td>Bark, resin</td>
<td>Wound healing, skin disinfectant, cancer, jaundice, bronchitis, convulsions, leprosy and diseases of the blood and the ear</td>
<td></td>
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<tr>
<td><em>Aegle marmelos</em></td>
<td>Rutaceae</td>
<td>Bell/bael</td>
<td>Tree</td>
<td>Leaf, root and fruit</td>
<td>Melancholy, intermittent fevers, cold, palpitation, eye disorders, stomachache, ulcer, dysentery and diarrhea</td>
<td></td>
<td></td>
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<tr>
<td><em>Phyllanthus amarus</em></td>
<td>Euphorbiaceae</td>
<td>Tamalki</td>
<td>Herb</td>
<td>Leaf</td>
<td>Skin allergy, diarrhea, dysentery, dropsy, jaundice, intermittent fevers, urogenital disorders, scabies and wounds</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><em>Ziziphus mauritiana</em></td>
<td>Rhamnaceae</td>
<td>Jujab</td>
<td>Tree</td>
<td>Seed</td>
<td>Chest pain in patient with cough and cold</td>
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<tr>
<td><em>Bauhinia variegata</em></td>
<td>Caesalpinaceae</td>
<td>Karal/ kachnar</td>
<td>Tree</td>
<td>Flower, leaf and bark</td>
<td>Constipation, skin diseases and blood pressure.</td>
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</tbody>
</table>

**Medicinal Uses:**
- **Cassia tora**: Used in treatment of leprosy, ringworm infection, ophthalmic, skin diseases and liver disorders. Chemical compounds such as anthraquinone glycosides, naphthopyrone glycosides, phenolic compounds, flavonoids etc. Have been isolated from the plant. The powdered root bark of *C. tora* is used in treatment of malaria.
- **Celastrus paniculatus**: Dried leaves and bark of this plant were prescribed for fever, anemia and seeds were crushed and mixed with honey or sugar and administered to children for dysentry or cough.
- **Centella asiatica**: Used in asthma, skin disorders, ulcers, dysentery and body aches. Leaf extract is taken orally to cure dysentery.
- **Cinnamomum tamala**: Used in rheumatism, colic, diarrhea, nausea, bronchitis, vomiting, fever, anemia, body odor, dysentery, cough.
- **Cleome viscosa**: Juice removes dead skin from the face and seed paste mixed with water is useful in urinary problem.
- **Cucumis sativus**: Powder used orally for diabetes, bark with milk is used for curing of excessive menstruation and ripe fruits are useful for stone.
- **Glycine max**: Used in cholesterol, cancer and useful in eyesores.
- **Syzygium cumini**: Powder used orally for diabetes, bark with milk is used for curing of excessive menstruation and ripe fruits are useful for stone.
- **Tinospora cordifolia**: Decoction is given orally.
- **Acorus calamus**: Decoction is given orally.
- **Betula utilis**: Fruit pulp is useful in chronic cases of stomachache and dysentery, dried fruit is mixed with sugar and taken orally during fever and cold.
- **Phyllanthus amarus**: The crushed leaves are made into paste and applied externally on skin allergy.
- **Ziziphus mauritiana**: Chest pain in patient with cough and cold with roasted seed powder’s paste.
- **Bauhinia variegata**: Flowers used orally for constipation, leaf paste is used in skin diseases and bark powder is used for internal use.
1.3. Characteristics of Medicinal plants
Medicinal plants have many characteristics when used as a treatment such as (i) Synergic medicines depend on their action enhanced by the activity of the constituent which can interact at the same time and actually responsible for the effect (ii) Preventive medicine its goals is to promote, protect and well-being to prevent the occurrence of a disease, any disability and death.  

1.4. Impact of Ethnopharmacology in western medicine
For biological activities, herbal medicines are strong and solid origin sources, based on bioactive compounds present in plants. They run through by various ethnic categorized groups having a little access to western medicines. It is not just a science of the past for using an outmoded approach. Their urge to western medicine can lead to establishing many useful drugs, but 21st century latest and traditional herbal uses may be exclusively unique. The analysis showed that in the modern armament system, the proportion of natural products is substantial, with approximate ranging from 35 to 50%. Virtually almost every class of drug contains a replica structure obtained from nature, showing the long-established effects of that particular pharmacological category. Ethnopharmacology endmost ultimate aim is the acceptance of traditional composing, either through the isolation of bioactive compounds or by uncovering pharmacological properties. The uncovering of new biological chemical structures depends to a large extent on chance. In recent years, the screening of human receptors was built on biochemical tests and receptor line binding studies with an increasing molecular cloning availability. Compounds could be tested for direct linkage with the suspected health giving target protein. Non-western societies having a great interest in long-established system of medicines obtain from medicinal plants.

1.5. Contribution and involvement of medicinal plants in poverty easement
Inheritor medicinal and aromatic plants kindness is widely spreading between different stakeholders having quite interests which are dispensed off-site and on-site both. Gardeners and collectors are the main collaborators, commonly called as the poor man helping in reducing poverty in local areas and community. Meanwhile, farmers may be revitalizing for growing aromatic plants which help in increasing yield and strengthen their income but the current scenario is medicinal plants farming. Which are being managed, controlled on a small platform and constricted in the state up to few hectares. Identify an investor or a shopper in the market who can ensure that the entire product is purchased at an economical rate with a higher profit as other crops. The millennium ecosystem assessment has highlighted for paying attention towards the wellbeing of the global poor, whose livelihoods are often directly dependent on services nearby to their environment.

1.6. Conservation inventiveness for sustainable cultivation
Agriculture and processed food products development government authorized setting two phases which are promoting by Agri Export Zones. In the first, phase 6 districts are covered Chamoli, Hardiwar, Uttarkashi, Pithoragarh, UdhamSingh nagar, and Dehradun, where 10 high-value plant species will be cultivated. In district Chamoli the herbal research and development institute is established at Gopeshwar for monitoring, inventorisation developmental issues of medicinal plants in the state.

1.7. Ex-situ conservation
Developing measures is needed in the mentioned time period to encircle the activities like identification and engrossment for conservation. For maintaining ex situ plant populations, number of institutes are includes like Forest research institute (FRI), Botanical gardens, and Agricultural research centers, which are attempting and practicing following methods such as:
- Gene banks are collection and accumulation of very different plant varieties of genetic diversity of particular area for characterization, evaluation and utilization when needed. Freezing cuttings from the plant parts and stocking the seeds which are collected, and conserved for breeding, history study, research, and other motivational purposes. This method is convenient for trees and shrubs long living enduring.
- Botanical gardens customized for the collection, safeguarding, maintenance, displaying, cultivating wide range of plant species. They help in preserving endangered plant species.
- Seed bank is the reservoir of viable seeds or vegetative propagator. They are well organized, potent and constructive for sexually reproducing seeds for preserving genetic diversity for long term storage depends on firm power supply, accurate monitoring and testing of seed capability. Living seeds can be found in or on the soil in different durations, seasons, depths, quantities and states of dormancy or procession to germination. Seed life is very unstable and based on several factors, they can be found in. There are a number of seed banks in the world with differentiation in the nature of the collections, geographical area and taxonomic groups, etc.
- In vitro storage refers to the conservation of all tissues, cells, genomes, genes, and germplasm through meristem tissues in test tubes under controlled environmental conditions.

1.8. Depletion of medicinal plant bio-diversity
There are many factors affecting depletion of medicinal plant.
of bio-diversity such as
1. high demand for raw plant parts causing immense threat on natural habitat for herbal products used in medicines and cosmetics,
2. the decline of medicinal plants due to the increase in human population and other developmental actions and activities,
3. over exploitation and aimless target from natural sources,
4. no serious attempt for trading scale cultivation and lack of agro-technology for highly required traditional plants,
5. Forest fire burn trees and plants that prevented erosion and also play a very disastrous role in the demolition of medicinal plants,
6. commercialization of prohibited herbal plants illegally,
7. large browsing and over grazing by domestic as well as wild animals can have an intense impact on the physiognomy profile, soil composition and vegetative function without sufficient recovery periods,
8. Trees cutting down for day to day uses and do not plant new ones, it can affect the discovery of new herbal medicines,
9. immense change in climate and weather pattern.

1.9. Untimely reactions and safety in herbal medicines
One common dispute in favor of herbal medicinal products is that such products have a long history and lead to extensive understanding, information and experience regarding their desired and undesirable effects. Traditional encounter is an energetic stalwart for identifying adverse effects in the majority of users and for rapid development at the beginning of treatment. It can highlight such dose dependence and can help in detecting treatment methods that lessen the risk of acute problems.

2. Ethnobotanical route of medicinal plants
It is mandatory to confirm and certify that the traditional medicinal plants knowledge has been correctly passed from one generation to another one. Moreover, it must be recalled that the ethno-pharmacological inspection and analysis may conduct uncovering of unfamiliar biological activities and their individual eccentric chemistries, which may lead to the evolution and blooming of equivalent fitting for pharmaceutical development. Various strategies for the discovery of drugs from natural resources described by Mukherjee, 2002 [28].

2.1. Medicinal plant education
Spreading knowledge of medicinal plants in the state can produce new implementation in the areas such as plant science, diseases and their herbal treatments, food science, agronomy, horticulture, agribusinesses and a particularly noteworthy provision have passed to educate children in schools. The children’s recognition, awareness and understanding of our ecosystem are vitally important for ensuring the future of our biodiversity is in safe hand. This can become the foundation of high-spirited medicinal plants businesses [29].

2.2. Modes of action of secondary metabolites
Plant drugs also known as phytomedicines which are derived from plants that consist of many different chemicals and bioactive compounds called secondary metabolites. They act independently or in composition of two or more on the human body for maintaining health and to intercept disorders which interfere with a particular organ, group of cell, tissue and eventually with a molecular target site. Generally they occur in complex mixtures. A medicinal plant extract influences more than one molecular objective, which is likely to be pretentious by several targets in phytomedicines simultaneously. The application of such extracts increases the chances of “hitting” one or several relevant targets. Every small change in chemistry can be the basis for a new pharmacological activity. This aspect is important for quality control in phytotherapeutics. In conclusion, phyotherapy is a traditional approach to use the right plants in the right concentrations to restore health or to relieve symptoms of disorders and disturbances [30].

2.3. Future prospects
Around the world there are more than half million medicinal plants with hidden potential of medicinal properties which are not investigated yet. Progressing and developed countries of the world facing high demand, excessive use of herbal medicines and rapidly spreading of healthcare green products which may lead with confirmation of safety, effects and quality on high public demand. Consequences are herbal medicine trails remain embracing in progressing countries while in developed countries interdependent substitute medicine showing immense response day by day. Few medicinal plants have many bad impacts and drawbacks as they had a long history on their use of specific part and whole plant. Which include many factors like changes in climate may lead to changes in compounds present in plant, drastic modification in bioactivity due to the lacking uniformity, assembling, preparing, stockpiling, and maintenance of plant raw material.

3. Conclusion
Treating disease is not only the main aspect in the research sector but also for maintaining health. Human lifestyle is now moving towards technology, in other words, we abandon from nature. There is a requirement to stand for promoting them worldwide to save human lives because we are part of nature. However, with all protection, welfare and assured future people are coming back to nature by getting over from synthetics products.

4. Disclosure statement
The authors confirm that this article content has no conflicts of interest.

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