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Studies on ethno-veterinary usages of medicinal plants by people in Garhwal Himalayan region-A boon to animal husbandry

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Abstract

The Uttarakhand Himalyan region has a great wealth of medicinal plants and traditional medicinal knowledge. Garhwal Himalaya (29°45'N-31°27'N latitude and 77°45'E-80°7' E longitudes) has been known as source of variety of shrubs, healing herbs, and other medicinal plants. Geographically, Garhwal region of Uttarakhand represent enormous diversity of flora and fauna due to variations in topography, altitude and climate. It includes seven districts-Dehradun, Haridwar, Pauri, Chamoli, Tehri, Uttarakashi and Rudraprayag representing mountains, lower hills, Tarai-Bhabar belt and plain area. There have been only few studies on the ethano-botanical usages of the plants for the treatment of livestock which may boost the new drug research by employing modern biotechnological tools and techniques.

Current study was conducted with the sole purpose of eliciting the precious wealth of information on the ethno-veterinary uses of medicinal plants practices by the local people of Garhwal region. Field surveys were conducted in the various thickly populated live-stock rich places of Garhwal region during 2012-18. Information on ethanobotanical uses of the medicinal plants was gathered by interviewing key informants of the community using a semi structured open ended questionnaire. Usually, the elderly and experienced members of the society, locally known as 'Vaidya', were interviewed on uses of various parts of plants. Often, they were accompanied to the field for the identification of plant species used and their preferred habitats. All the relevant information, in particular the mode of preparation, method of use and dosage of each medicinal plant species were recorded. In nutshell present study deals with the traditional uses of 46 plant species which are being often used in ethno-veterinary practices by people of Garhwal Himalyan region.

The primary and outmost objective of current study is to document all collected information in tabulated form, by the local people for the treatment of various livestock including poultry in different parts of Garhwal, Himalayan region of Uttarakhand state. Further research in this area is need of hour as these documented findings may help to counter the needs of inhabitants during emergent situations.

Keywords: Ethano-botanical, Livestock, Traditional knowledge, Ethno-veterinary

Introduction

Plants are the backbone of life on this earth and are central to livelihood of human being. People in different parts of the world depend on plants and its parts to fulfill their daily needs and developed unique knowledge and practice of their utilization (Kala *et al.*, 2006) [5]. The recent return to natural drugs throughout the planet has emphasized the importance of gathering information about various medicinal plant traditionally used by indigenous people of remote areas like Garhwal Himalyan region. There are only few studies on the ethano medicinal properties of the plants that are used for the treatment of livestock.

The documentation of biodiversity and its medicinal use by the ethanic community of this region have assumed priority because of the rampant loss of biodiversity and increasing patent wars on bio-resources (Baba *et al.*, 2012) [1]. Traditional use of medicinal plants and its resources is rapidly increasing due to having no side effects, easily available at affordable prices and sometime only available to the poor people particularly in remote areas of Garhwal region. Mc Corkle *et al.* (1989) [8] define Ethno-veterinary Medicine (EVM) as dealing with the folk belief, skills, knowledge, practices and methods pertaining to the health care of animals. Proposal of United Nations University defines Traditional Knowledge System (TKS)

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as “Traditional Knowledge or, “Local Knowledge” is a record of human achievement in comprehending the complexities of life and survival in often unfriendly environments (Kumari et al., 2009) [7]. The Traditional Himalyan Medicine System (THMS) is a living example of TKS where small communities fight even incurable disease in their animals through the traditional methods by using herbal products like resins, bark, root, leaves and fruits etc. In certain regions these folk medical prescriptions are endemic and have survived through ages from one generation to the next through the word of mouth. They do not exist as written knowledge. Generally these systems of medicine depend on old people's experiences. Indigenous systems of medicine are specially conditioned by the cultural heritage and myths.

So the priority should be given to the documentation of traditional knowledge and conservation of existing plant species and their habitats. Therefore there is an urgent need of systematic documentation of biota related medicinal knowledge of the Garhwal Himalyan region of Uttarakhand state. Keeping this in mind, an attempt has been made to explore and compile the exhaustive knowledge of plants and plant parts used in veterinary practices by people living in Garhwal Himalaya region.

Materials and Methods

The study was conducted in seven districts (Dehradun, Haridwar, Pauri, Chamoli, Tehri, Uttarakashi and Rudraprayag) covering different agro-climatic zones between 2012-2018. The over all present study has been conducted in three steps:

- **Step1:** The data was collected from at least 280 people (40 from each district) from different villages representing different geographical locations through participatory rural appraisal (PRA) technique that included conversations, key informant interviews, group discussions, and observations. The methods of preparing the medicine and mode of application were also noted.
- **Step 2:** Plants pointed out by local inhabitants were collected and botanically identified with the help of flora-forest flora of the Chakrata and Dehradun (Kanjilal, 1928) [6], Herbaceous flora of Dehradun (Babu, 1977) [2], Flora of District Garhwal: North West Himalaya (Gaur, 1999) [4], Flora of Chamoli (Naithani, 1984 & 1985) [9].
- **Step 3:** The identified practices were then documented after being scientifically validated with the help of books on medicinal plants (Warrier *et al.*, 1993; Bhattacharjee, 1998) [12, 3] drug index, and consultation with Ayurvedic doctors. Secondary information were also collected by reviewing numerous published research papers, reports, records, documents, articles, books and journals related to present study.

Results and Discussion

Garhwal Himalyan region has tremendous potential for medicinal plants cultivation and it may be one of the important options for sustainable livelihood for the hilly area. This outcome of the study is expected to be useful for a wide range of workers like phyto-chemists, social scientists, anthropologists etc. and will provide basic information for further research on new drugs. A well thought-out evaluation of indigenous medicinal plants of Garhwal region has a tremendous scope to enhance poultry productivity, nutritional status and economic potentials of poultry productivity. The disappearance of this traditional indigenous knowledge will not only affect poor villagers and their livestock but will also

be a permanent loss of our culture, heritage and biodiversity. New modern approaches of biotechnology, conservation strategy and protection of traditional rights of these people on community basis can help to preserve and utilize this invaluable indigenous traditional knowledge of medicinal plant for mankind. For underdeveloped regions especially hilly area of Uttarakhand, there is an urgent need to identify at least the existing biodiversity and traditional wisdom to prevent bio-piracy and building up capabilities to harness the potential of ITK through Intellectual Property Rights (IPRs) in the form of royalties to whole society like Farmers' Rights for developing plant varieties.

A total of 280 people were interviewed in various villages of different seven districts on the basis of their indigenous knowledge of the surrounding medicinal plants. Out of these plants some are herbs, some are shrubs, climbers, and some are trees. Herbs are the most common medicinal plants. It was observed that people of Garhwal region use single plant or mix different plants as a medicine in a single disease. It is also found that a single plant is used in different diseases. Among the respondents mostly are educated while few were illiterate but majority of them were keen interest to provide the information and transferring the indigenous traditional knowledge of using these plants from one generation to other.

Medicinal plant species used against various livestock ailments and diseases:

It was also revealed that people of Garhwal region of Uttarakhand have very rich traditional herbal medicinal system providing primary healthcare and treatment to their livestock for a long period. The people of this region have full faith upon their old treatise and traditions. The first hand information on the medicinal plants used by the traditional livestock keepers of Garhwal region is tabulated. Some important plants used in ethano-veterinary practices are given in Table 1.

Old people, both men and women, are custodians of ethno-veterinary practices and pass it by oral suggestions to the younger generation (Singh *et al.*, 2008) [11]. The use of the traditional medicine is widespread in this region with higher percentage of population relying on it. This is due to non-availability of modern medical facilities available particularly in hilly terrain of Garhwal region and the expensive modern medicine system cannot be afforded by people of this region.

Medicinal plant species used for chick productivity

It was observed that large numbers of medicinal plants found in the study area also enhance chickens productivity (Table 2). These plants appear to improve egg and poultry function owing to one or more of their following biological actions.

- Improve digestive function.
- Improves feed utilization and feed conversion efficiency.
- Provide nutrients.
- Reduce or prevent pro-catabolic effects of stress.
- These plants may be broadly categorized as feed additives, anti-stress agents, repartitioning agents, egg productivity promotants and possesses immunomodulatory effects (Zafar, 1994) [13].

Our study clearly shows that Garhwal Himalya has great wealth of ethno veterinary knowledge. But in the process of modernization this undocumented knowledge is vanishing very rapidly. Actually this information survived by being passed from one generation to next but now a days young generation is not taking in the animal husbandry practices. Due to this apathy the valuable knowledge about EVM is

disappearing. The Governemnt of Uttarkhand should recognize EVM and set up enabling legal frameworks that facilitate the use and integration of EVM and healers in to animal health care provision and consider the joint delivery of human and animal health care in pastoral areas. Documentation of plants and there uses will be very useful for inventing new pharmaceutical research in the field of veterinary medicines.

Conclusion

The survey indicated that the study area has a number of medicinal plants treat a wide spectrum of livestock ailments and diseases. The people of Garhwal have a rich and age-old plant related culture and knowledge base. In general bleeding, foot and mouth disease, gastrointestinal helminthiasis, mange, myiasis, pain, pediculosis, pneumonia, tick infestation and uterine prolapsed were ten common conditions/ailments of animals for which traditional ethno-veterinary prescriptions are usually being used in the area. The data obtained by this study will be helpful for making sustainable use of medicinal plants resources. The disappearance of these practices will not only affect poor villagers and their livestock but also be a permanent loss of our culture, heritage and biodiversity.

It is finally hoped that ethno-veterinary practices will be useful and boon to the Department of Animal Husbandry, extension workers, scientists, and policy makers in their efforts towards sustainable livestock farming system and might be able to offer a broader range of animal healthcare

options in the different regions of Garhwal Himalaya.

Recommendations

The Indigenous Traditional Knowledge (ITK) and practices of the people of Garhwal region on the utilization of plant resources as medicine should be well documented and preserved before they get lost and disappeared due to increasing migration. Indicators for development in Garhwal, Himalaya regions should include various factors related to the status of ITK among the rural population. Government should implement a scheme in Garhwal based in sustainable production of raw materials and will rejuvenate indigenous knowledge should be to serve the under-privileged, submerged, illiterate and marginalized people of this region. Phyto-chemical investigation on these plants in Uttarakhand should receive institutional support for research from government organizations. Market access for traditional knowledge of Garhwali people should be created by concerned department of State and Central Government.

"Jadibuti" processing should be prioritized by the concerned authorities. Orientation about all the useful medicinal plants should be given to people of young generation people by experts time to time. Innovative approaches for the revitalization of knowledge base should be involve youth. Legal authority/license should be given by the Government to local healer and plant explorers to promote trade/business to improving their economic condition.

Table1: List of medicinal plant species used against various livestock ailments and diseases

S. No.	Plant name	Ethno-veterinary practices and mode of applications
1.	Kattha (<i>Acacia katechu</i>)	<ul style="list-style-type: none"> A mixture prepared from kattha (<i>Acacia katechu</i>) powder 30 gm, kharia powder 60gm, belgiri (<i>Aegle marmelos</i>), afeem (<i>Opium popy</i>) 6gm and sounth (<i>Zingiber officinalis</i>) powder 30 gm. Only 30 gm dose of this mixture drench to the affected animal with 2 liter rice (<i>Oryza sativa</i>) starch water twice daily to cure dysentery. Kattha (<i>Acacia katechu</i>) 100gm dissolves in one-litre water and given orally three times after 6 hours interval to poisoning from unconventional feed.
2.	Harjozan (<i>Aanthus illicifoliosus</i>)	A paste prepared from harjozan (<i>Acanthus illicifoliosus</i>) is applied on the fracture area. Affected body part tide to make immovable.
3.	Ghrit kumara (<i>Aloe barbadensis</i>)	Fresh leaves of ghrit kumari (<i>Aloe barbadensis</i>) and whole plant of ishwari (<i>aristolohia bracteata</i>)
4.	Shatawari (<i>Asparagus racemosus</i>)	<ul style="list-style-type: none"> Paste prepared by equal quantity of fresh roots of shatawari (<i>Asparagus racemosus</i>), ashwagandha (<i>Withania somenifera</i>), ambe haldi (<i>Curcuma amada</i>) and fresh leaves of tulsi (<i>Ocimum sanctum</i>) is applied locally on udder and teat swelling twice daily for ten days. Shatawari (<i>Asparagus racemosus</i>) root powder 100 gm and ghrit kumari (<i>Aloe barbadensis</i>) pulp 50 gm offer once a day after mating for na week to increase the chance of conception.
5.	Neem (<i>Azadirecta indica</i>)	Resin of neem (<i>Azadirecta indica</i>) 50 gm and molasses 50 gm fed once daily for a week to cure teat block, hardness of teat and udder.
6.	Kilmori (<i>Barberis aritata</i>)	<ul style="list-style-type: none"> Root extract of kirmori chotru (<i>Berberis aristata</i>) used as eye drop 2 to 3 times daily for one week to cure eye ailments. Clarified buffer 250 gm fed to the animal and their stomach (bai-kokh) beaten gently by the green spiny branch of kilmora (<i>Berberis sp</i>) for 10-15 minutes to cure poisonous grasses effect.
7.	Sarson (<i>Brassica compestris</i>)	Sarson oil 500 ml mixed with turpentine oil 50 ml and drench to the animal to cure timpanists
8.	Torighash (<i>Capsella bursapastoris</i> , Moench)	Two palful whole plant decoction in water given two times for Sikka rog
9.	Ajwaine (<i>Carum copticum</i>)	<ul style="list-style-type: none"> A bolus prepared from ajwaine (<i>Carum copticum</i>) seed 30 gm, jeera (<i>Cuminum cyminum</i>) 15 gm, dry ginger (<i>Zingiber officinale</i>) powder 15 gm, black salt 100gm and jiggery 250 gm. Bolus given daily to the animals twice daily for three consecutive days to cure bloat problem. Fumigation of ajwaine (<i>Carum copticum</i>) seeds near the mouth of animals affected bbhakani/galghontu to pull off cough and provide relief in respiration.
10.	Brahmi (<i>Centella asiatica</i> Linn)	Apply paste of green leaves on forehead during fever
11.	Neebu (<i>Citrus limon</i>)	<ul style="list-style-type: none"> If bloat is caused due to feeding young leaves of banj (<i>Quercous leucotrichophora</i>), juice of neebu (<i>Citrus limon</i>) fruit 250 ml drench to the animals as antidote at 6 hours intervals up to their requirement. Lal mirch/red chillies (<i>Capsicum annum</i>) powder 50 gm put on half neebu (<i>Citrus limon</i>) fruit and rubbed inside the swelled throat of affected animal by hand to cure bhakani/galghontu.

12.	Haldu (<i>Curcuma longa</i>)	<ul style="list-style-type: none"> • Haldu (<i>Curcuma longa</i>) ground with water applied over udder and teats for one week to overcome the problem of udder swelling and mastitis. • Teats wash with warm water after milking and apply haldu (<i>Curcuma longa</i>) with makkhan/loni-ghee on the teat for controlling cracks. • Prepared paste from haldu powder (<i>Curcuma longa</i>) 10 gm and mustard oil (<i>Brassica spp.</i>) 10 ml applied on naval cord for quick healing.
13.	Baans (<i>Dendrocalamus spp</i>)	Young leaves of bamboo (<i>Dendrocalamus spp.</i>) Fed to cows/buffaloes after calving for easy expulsion of placenta.
14.	Mandua (<i>Eleusine coracana</i>)	The seeds of mandua (<i>Eleusine coracana</i>) boiled and add juggary offered to the cows/buffaloes after calving for easy expulsion of placenta.
15.	Timul (<i>Ficus roxburghii</i>)	<ul style="list-style-type: none"> • Seed of timul (<i>Ficus roxburghii</i>) 10 gm grinded in the form of powder and given orally with lukewarm water twice daily for 7 consecutive days to cure fever. • Fruits of timul (<i>Ficus roxburghii</i>) 250 grinded and dissolved in one litre water, add 10 gm salt and drench to the animal to cure acute dysentery.
16.	Van haldi (<i>Hedichium spicatum</i>)	Powder of van haldi/kapur kachari (<i>Hedichium spicatum</i>) and 100gm drench with 1 litre lukewarm water twice daily for one week period to cure respiratory ailments and pneumonia.
17.	Amesh (<i>Hippophae rhamnoides</i>)	Juice of amesh (<i>Hippophae rhamnoides</i>) ripe fruits used as an antidote agent if poisonous grass eaten by domestic animal.
18.	Akhrote (<i>Juglans regia</i>)	Extract of akhrote (<i>Juglans regia</i>) leaves applied thrice daily on cleft of the hooves to cure FMD. Fine powder of dry leaves also used/sprinkled for the purpose.
19.	Alsi(<i>Linum usitalissimum</i>)	<ul style="list-style-type: none"> • Alsi (<i>Linum usitalissimum</i>) oil 500 ml drench to the animal immediate after poisoning. • Kamphur 10 gm dissolves in alsi(<i>Linum usitalissimum</i>) oil and massaged on chest and neck area to relief in respiration during pneumonia.
20.	Vantulsi(<i>Ocimum americanum</i>)	Whole plant of van tulsi (<i>Ocimum americanum</i>) and tulasi (<i>Ocimum sanctum</i>) are crushed and their juice 100ml drench to the animal suffered from respiratory ailments/pneumonia twice a day for one week.
21.	Satti/dhan(<i>Oryza sativa</i>)	<ul style="list-style-type: none"> • Rice (<i>oriza sativa</i>) flour or madira (<i>Eleusine coracana</i>) husk less seeds cooked and make it as apaste.Paste is applied over the bone fracture and tide by the help of tusyar wood splinters and bandage. • Seeds of satti(<i>Oryza sativa</i>, jau (<i>Hordium vulgare</i>) 2 kg is offered to the cattle after calving to help expel the placenta after calving
22.	Chalmuda(<i>Oxalis corniculata</i>)	<ul style="list-style-type: none"> • Green leaves of chalmuda (<i>Oxalis corniculata</i>) 10gm powder,common salt 10 gm and wheat (<i>Triticum aestivum</i>) flour 500 gm mixed with 2 litre water,offer to the affected animals twice daily for a week a cure diarrhoea. • Green leaves of chamoree (<i>Oxalis corniculata</i>) crushed and some drops of their juice put in the affected eyes twice daily for 3-4 days.
23.	Bhangjira (<i>Perilla frutescens</i>)	Bhangjira (<i>Perilla frutescens</i>) seeds are grinded with water and fed to affected animals for the cure of diarrhea.
24.	KalaHisalu(<i>Rubus paniculatus</i>)	Two palm full leaves's decoction in ½ liter water is useful in pregnancy pain of ruminant animals
25.	Rekhu(<i>Saccharum officinarum</i>)	<ul style="list-style-type: none"> • Young leaves of rekhu(<i>Saccharum officinarum</i>) fed to cows/buffaloes after calving for easy expulsion of placenta. • A handful of rekhu (<i>Saccharum officinarum</i>) leaves rubbed inside the throat on swelling(swelling just like bhikani) to easy respiration in case bhikani/galghontu/hs disease
26.	Semal (<i>Salmelia malabarica</i>)	An infusion of the safed semal (<i>Salmelia malabarica</i>) bark is fed to cattle after calving for easy expulsion of placenta.
27.	Kut(<i>S asurea costus</i>)	Powder of kut (<i>Sasurea costus</i>) root 100gm and wheat (<i>Triticum aestivum</i>) flour 150 gm mixed and fed to animal affected with respiratory ailments and pneumonia for 10 days.
28.	Cheed(<i>Pinus roxburghii</i>)	Cheed oil (<i>Pinus roxburghii</i>) /turpentine oil 5 ml pored in one tub boiled water to offer vapour treatment to the sick animal to cure pneumonia.
29.	Chirayata (<i>Swertia chirayita</i>)	Chirayta chirayta (<i>Swertia chirayita</i>) whole plants dried in shade and make a fine powder. Powder 100gm drench with 1 litre lukewarm water or fed with 200 gm juggary twice daily for 5 consecutive days to cure fever.
30.	Methi(<i>Trigonella foenumgraecum</i>)	Methi (<i>Trigonella foenumgraecum</i>) seed 250 gm, rice (<i>Oryza sativa</i>) 1 kg and urd dal (<i>Vigna mungo</i>)
31.	Chai (<i>Thia synensis</i>)	Chai/tea (<i>Camelia synesis or Thia synensis</i>) 100 gm groun with water and make the volume one liter given orally thrice a day at the interval of 6 hours save animals of poisoning from unconventional feed.
32.	Kandali/bicchu ghas (<i>Urtica dioica</i>)	<ul style="list-style-type: none"> • Bioled kandali/sisond/bichu ghas (<i>Urtica dioica</i>) is fed to lactating animals commonly for buffaloes to enhance milk production. • Sisond/ kandali/bicchu ghas (<i>Urtica dioica</i>) 500 gm mesh and collect their juice.100ml juice drench twice daily for five days to cure urinary disorders/problems.
33.	Banpansa (<i>Viola biflora</i> ,Linn)	Two palful whole plant two times a day for heart attack in calf
34.	Pasanbhedshilphora (<i>Verginia ciliate</i>)	Powder of pashanbhed/s hilphora (<i>Verginia ciliate</i>) root 100gm drench with one litre lukewarm water once daily for 15 consecutive days to cure urinary disorders/problems.
35.	Aadu/adruk,(<i>Zngiber officinalis</i>)	Powder of dry ginger (<i>Zingiber officinalis</i>) 30 gm, kali mirch (<i>Piper nigrum</i>) 20gm and heing 10 gm mixed with 250 ml local liquor when drench to the animals, it acts as a purgative

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