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PLANTS IN ETHNOVETERINARY PRACTICES IN DHENKANAL DISTRICT OF ODISHA, INDIA

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ABSTRACT

Ethnoveterinary medicine provides traditional medicines which are locally available and cheaper as compared to modern standard treatments. The present study was conducted to document the indigenous knowledge of ethnoveterinary practices in Dhenkanal district of Odisha. Farmers staying in remote areas of this district still depend upon native plants for curing various animal diseases. Plants of ethno-veterinary importance have been recognized by the rural folk by a process of experience over hundreds of years. The present communication deals with the indigenous knowledge of rural communities on medicinal plants used for curing various veterinary diseases in Dhenkanal district of Odisha. Information collected are based on interview with the herbal healers, tribal medicine men and knowledgeable persons of the locality, and cross-checked with other herbal practitioners. Shabar, Kolha, Munda, Khond, Santal, Bhumij, Dehuri and Lodha are the chief ethnic groups in this area. The uses of plant parts along with the mode of administration revealed that 187 plant species were used for curing over 30 types of diseases. The plant parts used for livestock health treatment were mainly leaves and the preparations were administered mainly through oral. Ailments covered in the paper include anorexia, bronchitis, cold and cough, colic pain, conjunctivitis, constipation, cracks in palate, cracked nipples, diarrhoea, dysentery, dyspepsia, fever, filariasis, flatulence, foot and mouth disease, galactorrhoea, mastitis, mump, scabies, stomachache, throat infection, yoke wound, swellings, etc. Plants increasing the milching capacity as well as those adding to the strength and vigour of the animals have also been included.

Key words : Indigenous knowledge, Medicinal plants, Veterinary diseases, Dhenkanal, Odisha.

Introduction

Agriculture and animal husbandry is the main income source of rural Indians. Domestic animals play vital role in agricultural economy of developing country like India. Livestock are regarded as major asset of rural people and are means of reducing poverty. Cattle and poultry birds are common livestock, occupy prominent position and their products are indispensable in daily life. So, it is essential to take care of the health of domestic animals. Due to poor economic condition and inaccessibility to reach modern health care system, livestock owners use indigenous traditional health care system to take care of their domestic animals. This traditional health care practice for treatment of domestic animals is known as ethnoveterinary that has evolved by trial-and-error method

over centuries and transmitted across generations by oral tradition. Ethnoveterinary medicine is a traditional knowledge, folk beliefs, skills, and practices used for the treatment of livestock diseases (Mathias-Mundy and McCorkle, 1989; Tabuti *et al.*, 2003). Farmers in various developing countries of the world still use medicinal plants for treatment of livestock diseases (Harun-or-Rashid *et al.*, 2010; Satapathy, 2010; Satapathy and Panda, 1992) due to lack of access to modern veterinarians and high price of modern medicines. Ethnoveterinary traditional practices are still continuing, since animal growers believe that medicinal plants are more efficacious for treatment of livestock ailments than modern medicines (Harun-or-Rashid *et al.*, 2010). It is presumed by several researchers that traditional veterinary medicinal

knowledge may be lost due to rapid socioeconomic, environmental, technological changes and as a result of the loss of cultural heritage under the guise of civilization (Mathias-Mundy and McCorkle, 1989; Satapathy, 2010). This suggests documenting and conserving this invaluable knowledge through ethnoveterinary studies before it is lost forever. The documentation of traditional knowledge on the medicinal uses of plants has already provided clues for the discovery of many important drugs of modern day (Balick and Cox, 1996).

The use of plants and animals as a source of medicine has been continued since ancient time for curing diseases of man and animals. About 25% of the therapeutic drugs are obtained from plants and some of the plants are still to be explored and observed (Kumar *et al.*, 2003). The information available on herbal veterinary medicine in India so far includes Pal (1980, 1981), Sebastian (1984), Sebastian and Bhandari (1984), Reddy and Sudarshanam (1987), Sensarma (1989, 1991), Jha *et al.* (1991), Sikarwar (1996), Borthakur and Sarma (1996). To date, some workers (Sarangi and Sahu, 2004; Satapathy, 2010; Mishra and Patro, 2010; Mallik *et al.*, 2012; Panda and Dhal, 2014; Adhikary, 2015; Mishra *et al.*, 2015; Panda and Mishra, 2016; Lenka *et al.*, 2018) have studied and gathered information in the field of ethnoveterinary

medicines in the state of Odisha. However, there is no report on traditional veterinary medicines from Dhenkanal district of Odisha. The present survey was undertaken in remote rural areas of Dhenkanal district of Odisha. The aim of the study was to record the herbal drugs being used in the treatment of different ailments and injuries of cows, buffaloes and goats in the study area.

Materials and Methods

Study area

Dhenkanal is one of the centrally located districts of Odisha with a total geographical coverage of 4595 sq. km. (Fig. 1). The district is lying between longitude 85° 58' to 86° 20' East and Latitude 20° 29' to 21° 11' North and bounded by the Keonjhar district at north, Cuttack district at south, Jajpur at the east and Angul in the west. Out of the total coverage of 4595 sq. km. of the district, a major part comprising of 1737.62 sq. km. includes forest area which is scattered throughout the district. The principal species is *Shorea robusta* with other associates mostly bamboos. According to 19th livestock census (2012) there was 14561 cattle, 25448 buffalo, 161919 goat, 27926 sheep, 1216 pig, 1226991 poultry birds in Dhenkanal district. Monsoon generally commences from second week of June every year. The rainfall during June to December constitutes at least 75% of the annual rainfall



Fig. 1 : Map of Dhenkanal district of Odisha.

of the district. On an average there are 73 rainy days in a year in the district.

The climate of the Dhenkanal district is hot and dry sub-humid type with an average annual rainfall of 1696 mm. The average minimum and maximum temperatures are 19.6°C and 33.3°C, respectively. The relative humidity generally varies from 31 to 88%.

Odisha holds third largest tribal population among the states of India. About 62 distinct tribal groups of indigenous people are inhabited in Odisha. They constitute more than one quarter of the state's population. Dhenkanal district has 25 different tribes of which Shabar, Kolha, Munda, Khond, Santal, Bhumij, Dehuri and Lodha are numerically rich.

Although, some ethnobotanical work relating to this area has been already carried out, the ethnobotanical knowledge and practices on medicinal plants for animal diseases have still not been comprehensively documented. An attempt has been made to enumerate the species, which are being used by the local people to cure animal diseases. The area under study exhibits great ethnic and cultural diversity. Agriculture is the predominant occupation of the villagers, while cows, buffaloes, goats and pigs are the common household livestock.

Methodology

Various tribal and a tribal villages of the district were identified and field trips were conducted during 2018-2022 at regular intervals in different seasons to collect ethnoveterinary uses of plants. Farmers, cattle growers, herbal healers and local traditional ethnoveterinary practitioners were interviewed to collect information about traditional uses of plants for treatment of different animal diseases. The data are based on first-hand information, gathered from the above group of people and through personal observation of authors on the use of remedies. The detailed information about the plants, dosages, duration, method of preparation, mode of administration, precautions to be taken etc. was recorded. The ethnobotanical data were recorded according to standard procedure (Jain, 1987). Care was taken to prioritize vulnerable areas for immediate attention especially forest pockets, which are under intensive mining activity. Folklore claims were documented along with voucher specimens. As different species come to flowering and fruiting at different seasons, field surveys were executed in such a way as to accommodate relevant information in different stages of their life history. The supportive plant specimens of folklore claims were collected, processed, critically studied, identified and preserved in the Herbarium. Different Herbaria of Bhubaneswar that held the

specimens of earlier workers were visited and checked their identity. Voucher specimens were identified by referring standard local floras (Saxena and Brahmam, 1994-1996; Haines, 1921-1925). An effort was made to cross check the folklore claims. This study involved checking and rechecking of particular folklore claims by the different dwellers of the same tribe in different forest pockets. This had cleared many doubts regarding the use and identity of plant specimens. A brief but crisp note about the uses of the plants by the local inhabitants is given. Every care is taken to avoid ambiguity as regards to plant part, quantity, dosage, method of preparation and mode of administration of the drug. The livestock diseases are determined by the veterinary experts of Orissa University of Agriculture and Technology, Bhubaneswar, Odisha.

Results and Discussion

The records of collected plants are enumerated with their scientific name, family, local name, part(s) used and methods of application (Table 1). Information was collected from among Shabar, Kolha, Munda, Khond, Santal, Bhumij, Dehuri and Lodha communities. The study also indicated variations regarding traditional knowledge and use of plant parts among the tribes. The medicinal plants or their parts are usually collected by the males and medicines prepared by the females. Majority of the respondents were older than 50 years; very few youths were involved in traditional livestock treatment in the study area showing consistency with the previous report (Satapathy, 2010). In this study, 187 plant species belonging to 171 genera and 72 families were found to be used as medicine to treat over 30 different kinds of ailments of domestic animals. A total 198 prescriptions were recorded. The most commonly used plant parts for herbal preparations in the area were leaf followed by root and bark. The ethnoveterinary medicinal plant preparations were administered mainly through oral and dermal routes. This finding is in consistent with the findings of Satapathy (2010) in which leaf was reported to be the major plant part used for livestock remedy preparation and oral application of remedies was found the highest. Crushing, squeezing and grinding were observed to be the main methods of ethnoveterinary medicine preparation in the area. Ailments covered in this article include anorexia, bronchitis, cold and cough, colic pain, conjunctivitis, constipation, cracked nipples, diarrhoea, dysentery (including blood dysentery), dyspepsia, dysuria, fever, filariasis, flatulence, foot and mouth disease, galactorrhoea, indigestion, mastitis, mump, peptic ulcer, scabies, stomach-ache, throat infection, yoke-wound and swellings etc. Plants enhancing the milching capacity as

Table 1 : Ethnoveterinary uses of plants in Dhenkanal district of Odisha.

S. no.	Botanical name & family	Local name	Part(s) use	Use(s)
1.	<i>Abelmoschus manihot</i> (L.) Medic. [Malvaceae]	Janglibhendi	Root and seed	Root paste or powder with whey given orally to animals against dysentery. Seed paste or powder applied externally to kill maggots in wound.
2	<i>Abrus precatorius</i> L. [Fabaceae]	Runja	Seed and leaf	Paste of seeds (10-12 nos.) along with jaggery is fed orally to cattle against retention of placenta after delivery. Paste of leaves is applied externally on the affected neck of oxen to treat wound caused by ploughing.
3	<i>Abutilon indicum</i> (L.) Sweet [Malvaceae]	Pedipedika	Leaf, seed and root	Decoction of leaves topically applied on sores for killing maggots; also used to wash the sores. Decoction of leaves poured inside the hole of horn to cure microbial infections. Leaf paste is useful in tail gangrene. Roots are mixed in fodder to feed milching animals to enhance lactation.
4	<i>Acacia catechu</i> (L.f.) Willd. [Mimosaceae]	Khaira	Bark	Bark of this plant along with the bark of <i>Ficus religiosa</i> (Peepal) boiled in water, cooled and used in washing oral cavity and hoof of cattle in foot and mouth disease.
5	<i>Acacia leucophloea</i> (Roxb.) Willd. [Mimosaceae]	Gohira	Gall of tree	Insect gall of tree is powdered and applied on wounds in foot and mouth disease.
6	<i>Acacia nilotica</i> (L.) Delile Mimosaceae	Babul	Bark	Decoction of bark is applied over the hooves to cure foot and mouth diseases.
7	<i>Acampe praeorsa</i> (Roxb.) Blatter & McCann. [Orchidaceae]	Lambdi.	Whole plant.	Entire plant is chopped with normal fodder and given to cattle against flatulence.
8	<i>Acanthospermum hispidum</i> DC. [Asteraceae]	Chhota gokhru.	Leaf	Leaf ash mixed with coconut oil applied around broken horns of animals to prevent microbial infections.
9	<i>Achyranthes aspera</i> L. [Amaranthaceae]	Apamaranga	Leaf	Paste of leaves is applied on body of animals to remove ectoparasites and bandaged on broken horns.
10	<i>Acorus calamus</i> L. [Araceae]	Ghoda-bacha	Rhizome	500g rhizome of this plant and 50g cardamom (<i>Elettaria cardamomum</i>) are made into paste; this paste is given to cattle in indigestion and flatulence.
11	<i>Ageratum conyzoides</i> L. [Asteraceae]	Pokasungha	Whole plant	Whole plant is made into paste and rubbed on affected skin to remove eczema.
12	<i>Ailanthus excels</i> Roxb. [Simaroubaceae]	Mahala	Leaf and stem.	Leaf juice mixed with castor oil and applied on swollen neck of bullocks. Stem bark powder is mixed with jaggery and paddy husk is given to animals to improve strength and vigour.
13	<i>Alangium salvifolium</i> (L.f.) Wang. [Alangiaceae]	Ankula, Dhalanku	Stem bark	Stem bark juice is mixed with equal amount of <i>Citrus limon</i> (lemon) juice given orally, 2-3 times a day to cure cough and sneezing in cattle.
14	<i>Albizia procera</i> (Roxb.) Benth. [Mimosaceae]	Siris	Fruit	Fruits are fed to increase milk production.

Table 1 continued....

Table 1 continued....

15	<i>Allium cepa</i> L. [Amaryllidaceae]	Piyaja	Bulb	200 g bulb crushed and mixed with mustard oil applied on udder in mastitis.
16	<i>Allium sativum</i> L. [Amaryllidaceae]	Rahsuna	Bulb	Bulbs are fed daily to cattle to cure cough and cold.
17	<i>Aloe vera</i> (L.) Burm. f. [Amaryllidaceae]	Chee-kuanri	Leaf	Fresh leaf pulp is applied on skin to kill ticks and other ectoparasites. Leaves crushed and mixed with butter milk is given thrice a day for 4 days indysentery.
18	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC. [Amaranthaceae]	Madaranga	Whole plant.	Whole plant (500 g) or 100 ml of leaf juice is given twice a day for 7 days to cattle as galactagogue.
19	<i>Amaranthus spinosus</i> L. [Amaranthaceae]	Kantamarisha	Whole plant.	Paste of the whole plant is applied externally for quick healing of wounds. Entire plant is chopped and mixed with fodder is given to cows after delivery for increasing lactation.
20	<i>Amorphophallus bulbifer</i> (Roxb.) Bl. [Araceae]	JangaliOlua	Corn	Corn paste is applied on swelling throat of cattle. Corn paste (50 g) mixed in flour of <i>Triticum aestivum</i> (wheat) or <i>Sorghum vulgare</i> (jowar) to prepare chapattis. These are fed to milching animals to enhance milk yield.
21	<i>Ampelocissus latifolia</i> (Roxb.) Planch. [Vitaceae]	Kanjia-lai	Root	Crushed roots are given to cattle for the treatment of bloody dysentery.
22	<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees [Acanthaceae]	Bhuin-nimba	Whole plant	Decoction of the whole plant is given to treat any type of fever.
23	<i>Anisomeles indica</i> (L.) Kuntz Lamiales	Rama tulsi	Whole plant	Plants are chopped with normal fodder and fed to cattle to treat indigestion and flatulence. Plant twigs are spread over floor of cattle-shed to cure foot and mouth disease in cattle.
24	<i>Annona squamosa</i> L. [Annonaceae]	Atua	Leaf	Leaf juice is given orally to cattle in ascariasis.
25	<i>Anogeissus latifolia</i> (Roxb. ex DC.) Wall. ex Guill. & Perr. [Combretaceae]	Dhaura	Stem bark	Decoction of 100g stem bark is prepared in 1 litre water and given orally to treat diarrhoea.
26	<i>Apluda mutica</i> L. [Poaceae]	Phuli	Whole plant	Plant paste along with boiled small fish is given to cattle in treatment of flatulence.
27	<i>Argemone mexicana</i> L. [Papaveraceae]	Kanta-kusuma	Flower	Flowers paste mixed with mustard oil is applied over cut and wounds.
28	<i>Argyrea nervosa</i> (Burm.f.) Boj. [Convolvulaceae]	Bruddhadaruka	Whole plant.	Paste of entire plant is applied over fractured bone of cattle and bandaged.
29	<i>Aristolochia indica</i> L. [Aristolochiaceae]	Hansalata	Leaf	Poultice of leaves applied on wounds for killing maggots in sores.
30	<i>Asparagus racemosus</i> Willd. [Asparagaceae]	Shatavari, Chhatuari	Root	Roots mixed with fodder given to the milching animals to increase lactation.

Table 1 continued....

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31	<i>Arylosia scarabaeoides</i> (L.) Benth. [Fabaceae]	Banakolathia	Whole plant	50 g plant paste is given with butter milk twice a day for 3 days to cure diarrhoea in cattle.
32	<i>Azadirachta indica</i> A. Juss. Meliaceae	Neema, Nimba	Seed	Seed oil or decoction of leaves is applied on hooves of cattle in foot and mouth disease.
33	<i>Baliospermum montanum</i> (Willd.) Muell.-Arg. [Euphorbiaceae]	Dantigachha	Root	The roots are crushed and given orally to animals against food poisoning.
34	<i>Bambusa arundinacea</i> (Retz.) Willd. [Poaceae]	Kanta-baunsa	Leaf	Finely cut leaves (about 250 g) is fed to cattle twice a day for 3 days against blood dysentery
35	<i>Bambusa tulda</i> Roxb. [Poaceae]	Delingi-Baunsa	Leaf	Young leaves are given as fodder to cow or buffalo after delivery to hasten removal of placenta.
36	<i>Barleria prionitis</i> L. [Acanthaceae]	Vajradanti, Dasakeranta	Leaf	Leaves of the plant with that of <i>Plumbago zeylanica</i> (Chitrak) are crushed and given with fodder in fever.
37	<i>Bauhinia purpurea</i> L. [Caesalpiniaceae]	Kaluri saga	Leaf	Fresh leaves fed to cattle as galactagogue.
38	<i>Bauhinia variegata</i> L. [Caesalpiniaceae]	Kanchan	Flower	Dried flower powder is given twice a day for a week to remove intestinal worms.
39	<i>Biophytum sensitivum</i> (L.) DC. [Oxalidaceae]	Lajwanti, Chui mui.	Seed	Seeds are pounded to prepare powder and this is fed to animal to treat against neck swelling.
40	<i>Blumea lacera</i> (Burm.f.) DC. [Asteraceae]	Poka-sungaha	Leaf	Leaf paste is given to accelerate dentition of calves.
41	<i>Boerhavia diffusa</i> L. [Nyctaginaceae]	Puruni saga	Leaf	Infusion of leaves is applied on eyes of cattle to treat watering of eyes.
42	<i>Bombax ceiba</i> L. [Malvaceae]	Simili	Flower	Flowers mixed with the stem bark powder of <i>Alangium salviifolium</i> (Ankol) is given to cattle for expulsion of placenta.
43	<i>Boswellia serrata</i> Roxb. [Bursaraceae]	Salai	Leaf	Leaf paste is placed over eye lids of cattle against burning sensation. Crushed leaves are applied on scorpion sting.
44	<i>Bothriochloa pertusa</i> (L.) A. Camus [Poaceae]	Phulera	Whole plant	Plants are fed to cattle against general debility and to increase yield of milk.
45	<i>Brassica campestris</i> L. [Brassicaceae]	Kala sorisa	Seed	Seed oil along with leaf paste of <i>Limonia acidissima</i> (Kaith) and <i>Ficus religiosa</i> (Peepal) is applied to treat wounds of animals.
46	<i>Brassica juncea</i> (L.) Czern. & Coss. [Brassicaceae]	Rai	Whole plant	Whole plant is fed to treat diarrhoea. Seed oil is applied externally for massage to treat inflammation.

Table 1 continued....

Table 1 continued....

47	<i>Brassica rapa</i> L. [Brassicaceae]	Soris	Seed oil	Seed oil is warmed with young floral buds of <i>Syzygium aromaticum</i> (Lavang) and filtered ointment is used to treat joint pain. Seed's oil is dropped into the nasal cavity of animal to open the blockage during severe cold and cough.
48	<i>Buchanania lanzan</i> Spreng. [Anacardiaceae]	Chara	Gum	Gum is applied on the affected part against bone fracture of animals, where plaster cannot be tied.
49	<i>Cajanus cajan</i> L. [Fabaceae]	Harada	Fruit	Green pods (100 g) crushed and mixed with cold water and is administered twice daily against dysentery.
50	<i>Calotropis gigantea</i> R.Br. [Asclepiadaceae]	Arakha	Root, leaf	Root is kept in nostrils for few minutes to get relief from running nose. Leaves are crushed in mustard oil and applied over body against shivering and fever.
51	<i>Canna indica</i> L. [Cannaceae]	Sarvojay	Rhizome	Paste of rhizome with that of <i>Piper nigrum</i> (Kalimirch) is given to cattle against poisoning effects due to fungus infected grasses.
52	<i>Capparis zeylanica</i> L. [Capparaceae]	Asadhua	Leaf	Leaves are crushed in castor oil and mixed with yolk of egg. This paste is mixed in fine soil and plastered around fractured bone and bandaged with the help of hairs and bamboo splints.
53	<i>Capsicum annuum</i> L. [Solanaceae]	Lanka maricha	Fruit.	Dried fruit powder mixed with <i>Allium sativum</i> (garlic) bulb, <i>Piper nigrum</i> , (kalimirch) and <i>Trachyspermum ammi</i> (ajwan) in water is given orally against urine obstruction.
54	<i>Cardiospermum halicacabum</i> L. [Sapindaceae]	Phutiputika, Kanphuti	Leaf	Decoction of leaves in whey is given orally twice a day to cure tympany.
55	<i>Careya arborea</i> Roxb. [Lecythidaceae]	Kumbhi	Stem.	Stem bark and leaves of <i>Annona squamosa</i> (Sitaphal) are crushed and spread on the floor of the cattle shed and also the hooves of cattle is covered with it against foot and mouth disease.
56	<i>Carica papaya</i> L. [Caricaceae]	Ambruta-bhanda	Seed	10-40g crushed seeds are given to remove worms.
57	<i>Carissa spinarum</i> L. [Apocynaceae]	Khira koli	Fruit.	40 g of dried fruit powder is given every morning for 3 days to cattle in fever.
58	<i>Cassia angustifolia</i> Vahl. [Caesalpiniaceae]	Sun amukhi	Leaf	Leaves are fed with fodder to cattle to treat dysentery and flatulence.
59	<i>Cassia fistula</i> L. [Caesalpiniaceae]	Sunari	Fruit	Dried powder of pods is given orally to animal for asthma and pneumonia.
60	<i>Cathartus roseus</i> (L.) G. Don [Apocynaceae]	Sadabihari, Ainsakati	Flower	Flower extract is used in eye infections.
61	<i>Catunaregam spinosa</i> (Thunb.) Tirr. [Rubiaceae]	Mahana, Madanaphala	Fruit	Fruits or leaves are boiled in water, cooled and applied on wounds of cattle.

Table 1 continued....

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62	<i>Cayratia trifolia</i> (L.) Domin [Vitaceae]	Bana-angur	Root	Root-paste after warming is used for treatment of sores of bullocks.
63	<i>Ceiba pentandra</i> (L.) Gaertn. [Bombacaceae]	Simili	Flower	Flowers are fed with fodder to buffaloes for disposal of placenta after delivery.
64	<i>Celastrus paniculata</i> Willd. [Celastraceae]	Jyotismati	Seed.	Equal quantity of seed oil of the plant and sesamum seed oil are mixed and applied against any type of skin diseases.
65	<i>Celosia argentea</i> L. [Amaranthaceae]	Lahanga	Root	Powder of roots of this plant and seed powder of <i>Tectona grandis</i> (Teak) are mixed with water given to treat urinary stones or problem in urination.
66	<i>Cheilocostus speciosus</i> (J. Koenig) C. Specht [Costaceae]	Gaigobara, Kebuka	Root	Root paste is given against rheumatic pain of cattle.
67	<i>Chenopodium album</i> L. [Chenopodiaceae]	Bathuasaga	Root	20g roots and 5 pepper seeds are grinded and given before delivery for easy detachment of placenta.
68	<i>Chrozophora rottileri</i> (Geisel) Juss. [Euphorbiaceae]	Gandhi	Leaf.	Leaf paste with whey, applied on wounds to kill worms.
69	<i>Cicer arietinum</i> L. [Fabaceae]	Buta	Seed	Grains mixed with salt and water is given to cattle as tonic.
70	<i>Cissus auriculata</i> Wall. [Vitaceae]	Jangli Angur	Root.	Paste of roots mixed in alitre butter milk is given orally to animals three times a day in bloody dysentery.
71	<i>Cissus quadrangularis</i> L. [Vitaceae]	Hada-joda, Hadabhanga	Stem	Paste of stem is applied on fractured-bone of cattle and tied with the help of bamboo strips and a piece of cloth.
72	<i>Cleome viscosa</i> L. [Cleomaceae]	Anasorisha	Leaf	Leaf paste mixed with tobacco leaves is applied to remove ectoparasites from the skin of animals.
73	<i>Clitoria ternatea</i> L. [Fabaceae]	Aparajita	Root.	Root powder is applied locally on scorpion stings.
74	<i>Coccinia grandis</i> (L.) Voigt [Cucurbitaceae]	Kunduri	Leaf	Leaves are grinded with ghee and extract obtained poured into nostrils to cure running nose.
75	<i>Cocculus hirsutus</i> (L.) Diel. [Menispermaceae]	Dahidaha, Muskani	Leaf	Leaf paste mixed in water is given orally to cattle to cure foot and mouth disease.
76	<i>Colocasia esculenta</i> (L.) Schott [Araceae]	Saru	Corn	Corn is crushed into pulp and applied externally as antidote against the stings of scorpion, honey bee and wasp.
77	<i>Combretum decandrum</i> Roxb. [Combretaceae]	Atundi	Root	Root bark decoction is used for washing septic wounds of cattle.
78	<i>Commelina benghalensis</i> L. [Commelinaceae]	Kanasiri	Whole plant	Whole plant paste applied on wounds to kill worms; also plant paste is given orally against mastitis.

Table 1 continued....

Table 1 continued....

79	<i>Commiphora caudata</i> (Wight & Arn.) Engl. [Bursaceae]				Stem		Smoke of stem bark is fumigated to remove ectoparasites.	
80	<i>Coriandrum sativum</i> L. [Apiaceae]	Dhania			Fruit		Fruits are powdered and given after immediate pregnancy for 3-4 times to prevent miscarriage, if any.	
81	<i>Crinum defixum</i> Ker-Gawl. [Amaryllidaceae]	Pani-kenduri			Root		Juice of bulbous root is given to cattle in fever.	
82	<i>Crotalaria juncea</i> L. [Fabaceae]	Chhanapata			Seed		Boiled seeds are ground and applied on affected part of the body twice for three days to dissolve or remove tumour.	
83	<i>Curculigo orchitoides</i> Gaertn. Hypoxidaceae	Talamuli.			Root		Fresh root paste is applied on cuts of animals to stopped bleeding.	
84	<i>Curcuma amada</i> Roxb. [Zinziberaceae]	Amba haldi, Amba ada			Rhizome		100 g of dried rhizome is mixed with black salt, 100 g of <i>Piper nigrum</i> (Kalimirsch), 100 g seeds of <i>Trachyspermum ammi</i> (Ajwain), 250 g of Jaggery, 100 gghee and is given once a day for easy removal of placenta after delivery.	
85	<i>Curcuma longa</i> L. [Zinziberaceae]	Haldi.			Rhizome.		Paste of rhizome and leaves of <i>Azadirachta indica</i> (Neem) is applied on the broken horn and banded.	
86	<i>Cuscuta reflexa</i> Roxb. [Convolvulaceae]	Nirmuli			Whole plant.		Decoction of plant and paste of inflorescence of <i>Mangifera indica</i> (Mango) are boiled and poured into the hole created in horn against horn cancer.	
87	<i>Cyathocline purpurea</i> (Buch.-Ham. ex D. Don) Kuntze [Asteraceae]	Rangabhag			Whole plant		Plant paste prepared in whey is given orally to reduce internal heat of animals.	
88	<i>Cymbopogon martini</i> (Roxb.) Wats. [Poaceae]	Rusia ghash			Whole plant.		Whole plant paste is given once for five days in flatulence and constipation.	
89	<i>Cynodon dactylon</i> (L.) Pers. [Poaceae]	Dubba, Duba ghasa			Whole plant		Paste of plant is applied on the udder in mastitis.	
90	<i>Cyperus rotundus</i> L. [Cyperaceae]	Mutha			Tuber		Tuberous root powder is given with fodder in intestinal worms.	
91	<i>Dalbergia sissoo</i> Roxb. [Fabaceae]	Sisoo			Bark		Bark powder is dusted on skin to treat eczema.	
92	<i>Datura metel</i> L. [Solanaceae]	Kala Dudura			Leaf		Warm paste of leaves mixed with <i>Curcuma longa</i> (Turmeric) is applied on udders to cure mastitis.	
93	<i>Dendrocalamus strictus</i> (Roxb.) Nees [Poaceae]	Baunsa			Leaf		Paste of young leaves is applied on affected parts of cattle in rinderpest disease.	
94	<i>Dendrophthoe falcata</i> (L.f.) Etting [Loranthaceae]	Madanga			Stem bark		Decoction of fresh stem bark is used for washing septic wounds of cattle.	
95	<i>Desmodium gangeticum</i> (L.) DC. [Fabaceae]	Salaparni			Root		50 ml root decoction is given to cattle for preventing immature death of foetus.	

Table 1 continued....

Table 1 continued....

96	<i>Desmodium oojainensis</i> (Roxb.) Ohashi [Fabaceae]	Tinasa	Bark	Bark paste is used on cuts to check haemorrhage in cattle.
97	<i>Dioscorea bulbifera</i> L. [Dioscoreaceae]	Gathalu, Kanda.	Tuber	25-30 g of tuber paste is given to cattle once a day to cure mastitis.
98	<i>Diospyros melanoxylon</i> Roxb. [Ebenaceae]	Kendu	Fruit	Paste of unripe fruits is applied on wounds of animals for quick healing.
99	<i>Diplocyclos palmatus</i> (L.) Jeffrey [Cucurbitaceae]	Shivlingi, Indrayan		Seed Seeds are grinded and mixed in ghee. The mixture is drenched to animal to check abortion.
100	<i>Dolichos biflorus</i> L. [Fabaceae]	Kolatha	Seed	150-200g seeds soaked in water is given with fodder everyday as a tonic to bull to improve fertility
101	<i>Echinopse chinatus</i> Roxb. [Asteraceae]	Untkatara, Goma Gokhru	Whole plant	Whole plant is chopped fine and mixed with fodder is given to cows and buffaloes for improving milk yield.
102	<i>Eclipta prostrata</i> (L.) [Asteraceae]	Kesadura	Leaf	Leaf paste applied externally for curing injury caused by iron metal.
103	<i>Erythrina varietaga</i> L. [Fabaceae]	Paladhua	Bark	Leaf paste is applied on neck to cure yoke sore of bullocks.
104	<i>Eucalyptus citriodora</i> Hook. [Myrtaceae]	Nilgiri	Leaf and oil	Oil and leaf paste are applied on swollen joints of cows.
105	<i>Eulophia nuda</i> Lindl. [Orchidaceae]	Kukdikand	Bulb	Bulb crushed in whey and lukewarm water is given to cattle for treatment of inflammation and constipation.
106	<i>Euphorbia antiqorum</i> L. [Euphorbiaceae]	Deulia-siju	Latex	Latex is applied on the affected part to heal yoke wounds.
107	<i>Euphorbia hirta</i> L. [Euphorbiaceae]	Chitakuti, Hariharika	Seed	Seeds are crushed, mixed with whey are given for 8 days continuously to cattle against antifertility.
108	<i>Euphorbia thymifolia</i> L. [Euphorbiaceae]	Khadi-siju.	Whole plant	Fresh plant used as a fodder when cattle stop mastication.
109	<i>Ficus benghalensis</i> L. [Moraceae]	Bara, Bata	Root	Decoction of root mixed with salt is given orally after delivery for removal of placenta.
110	<i>Ficus racemosa</i> L. [Moraceae]	Bai-dimiri	Leaf	Finely chopped leaves are fed to cattle to cure blood dysentery.
111	<i>Ficus religiosa</i> L. [Moraceae]	Peepal, Aswatha	Bark	Bark paste is applied around the tail and bandaged to cure tail gangrene.
112	<i>Gloriosa superba</i> L. [Colchicaceae]	Pancha-angulia, Agnisikha	Tuber.	Tubers are crushed and paste is applied over the hooves of cattle to cure foot and mouth disease.
113	<i>Gmelina arborea</i> Roxb. [Verbenaceae]	Gambhari	Leaf	Leaf juice is given orally to treat bloodin urine.
114	<i>Gossypium herbaceum</i> Mast. [Malvaceae]	Kapa	Fruit	Decoction of unripe fruit fed to cows to help in expulsion of placenta after delivery.

Table 1 continued....

Table 1 continued....

115	<i>Grewia tiliifolia</i> Vahl [Malvaceae]	Dhamana, Dhau	Bark	Stem bark paste is applied for setting up dislocated joints of cattle.
116	<i>Haldina cordifolia</i> (Roxb.) Ridsd. [Rubiaceae]	Kuruma	Bark.	Stem bark and fruit of <i>Tamarindus indica</i> (Imli) along with 'anthill' soil are grinded and applied as a plaster over fractured limb.
117	<i>Helicteres isora</i> L. [Malvaceae]	Modaphala	Whole plant	Twigs are chopped with fodder and given to cattle in flatulence and hyperacidity.
118	<i>Hemidesmus indicus</i> (L.) R.Br. [Asclepiadaceae]	Anantamula	Root	Crushed roots are fed to milching animals to increase milk.
119	<i>Hibiscus rosa-sinensis</i> L. [Malvaceae]	Mandara	Leaf	Leaves are mixed with fodder given to cattle to treat urinary disorders.
120	<i>Holarrhena pubescens</i> (Buch.-Ham.) Wall. ex G Don [Apocynaceae]	Korei	Root	Root bark paste mixed equally with fruit pulp of <i>Punica granatum</i> (Anar) and apinch of salt is given orally for controlling diarrhoea.
121	<i>Hygrophila auriculata</i> (Schum.) Heine [Acanthaceae]	Koilikhia	Whole plant.	Plant ash mixed in mustard oil is applied on injured shoulder of oxen to heal the wounds.
122	<i>Hyptis suaveolens</i> (L.) Poit. [Lamiaceae]	Ganga-tulasi, Ban tulsi	Leaf	Leaf juice is dropped in eyes to treat conjunctivitis.
123	<i>Ipomoea aquatica</i> Forssk. [Convolvulaceae]	Kalama-saga	Leaf	Leaves (50 g) or tender stems bearing leaves (100 g) is given once daily for 15 days against blood urine.
124	<i>Jatropha gossypifolia</i> L. [Euphorbiaceae]	Nali-baigaba	Seed	Decoction of seeds is given in constipation.
125	<i>Justicia adhatoda</i> L. [Acanthaceae]	Basanga	Leaf and stem	100 ml decoction of the leaves and stem is given orally to cattle twice a day in fever and cold.
126	<i>Lagenaria siceraria</i> (Molina) Standley [Cucurbitaceae]	Laoo	Seed	Seeds are pulverized and given with water in bloat.
127	<i>Lagerstroemia parviflora</i> Roxb. [Lythraceae]	Patali	Twig	Powder of tender twigs and fruits are powdered mixed with bark powder of <i>Ailanthus excelsa</i> (Mahaneem) is applied on the hooves of cattle suffering from foot and mouth disease.
128	<i>Lannea coromandelica</i> (Houtt.) Merr. [Anacardiaceae]	Jivala, Mahi	Stem bark	Stem bark paste is applied as an ointment for cuts and wounds of domestic animals.
129	<i>Lantana camara</i> L. [Verbenaceae]	Naguari	Leaf	Decoction of leaves applied on tail of animals and bandaged to cure tail gangrene.
130	<i>Lawsonia inermis</i> L. [Lythraceae]	Mehendi, Manjuati	Leaf	Dried leaf powder mixed with water is given to animal twice a day to cure haematuria
131	<i>Leea macrophylla</i> Roxb. ex Hornem. [Vitaceae]	Hati pan, Hati kand	Whole plant	Plant-paste mixed with butter milk given to cure diarrhoea.

Table 1 continued....

Table 1 continued....

132	<i>Leonotis nepetifolia</i> (L.) R.Br. [Lamiaceae]	Gorakhmundi	Bark	Bark paste is applied as ointment on udder of cattle to cure mastitis.
133	<i>Leucas cephalotes</i> (Roth) Spreng [Lamiaceae]	Bada gayasa	Whole plant	Whole plant with water is given twice a day for three days to cattle against snakebite.
134	<i>Limonia acidissima</i> L. [Rutaceae]	Kaitha	Bark	250 g stem bark powder mixed with water is given to animal twice a day for 2 days to cure itching.
135	<i>Lindernia crustacea</i> (L.) F.v. Muell. [Linderniaceae]	Chhoti bui	Leaf	Paste of leaf is applied over animal body to cure eczema.
136	<i>Luffa acutangula</i> (L.) Roxb. [Cucurbitaceae]	Jahni, Tarada	Fruit	Fruit juice is dropped into eyes to treat conjunctivitis.
137	<i>Macrotyloma uniflorum</i> (Lam.) Verd. [Fabaceae]	Kolatha	Seed	Boiled seeds are used as tonic to oxen.
138	<i>Madhuca indica</i> Gmel [Sapotaceae]	Mahula	Stem bark	Decoction of stem bark is applied on hooves and bandaged in foot rot disease.
139	<i>Mangifera indica</i> L. [Anacardiaceae]	Amba	Seed	Seed paste mixed with lime is given against diarrhoea.
140	<i>Martynia annua</i> L. [Martyniaceae]	Bagha nakhi	Fruit	100 g fruits are crushed and mixed in water is given orally twice a day for threedays to cure intestinal swelling due to impaction of stone.
141	<i>Melia azedarach</i> L. [Meliaceae]	Mahanimba	Stem bark	50-100g bark is ground and given once for five days to killintestinal worms.
142	<i>Mentha spicata</i> L. [Lamiaceae]	Pudina	Leaf	Leaves are fed with fodder twice to thrice a day for five days in bloating.
143	<i>Mimusops elengi</i> L. [Sapotaceae]	Baula	Fruit.	Ripen fruits are fed with fodder in diarrhoea and bloot.
144	<i>Mirabilis jalapa</i> L. [Nyctaginaceae]	Rangani	Root.	Root paste is given orally to cattle for cooling effect against sun stroke.
145	<i>Mitragyna parvifolia</i> (Roxb.) Korth. [Rubiaceae]	Keli-kadamba	Bark	Bark decoction (50 ml) mixed with equal amount of fermented rice water given to oxen or cows for filariasis.
146	<i>Momordica dioica</i> Roxb. ex Willd. [Cucurbitaceae]	Kankada	Leaf	Leaf paste with salt is fed to animals to treat abdominal distention.
147	<i>Moringa oleifera</i> Lam. [Moringaceae]	Sajana	Bark	Bark powder mixed with edible oil is applied on udder in mastitis.
148	<i>Mucuna pruriens</i> (L.) DC. [Fabaceae]	Baidanka	Fruit	Two pods mixed with jaggery are fed twice a day for five days to animal to bring it in to heat.
149	<i>Musa paradisiaca</i> L. [Musaceae]	Kadali	Leaf	Leaves are fed to cow after delivery for expulsion of placenta.
150	<i>Nicotiana tabacum</i> L. [Solanaceae]	Dhuan-patra	Leaf	Leaf paste applied on hooves to kill maggots in foot and mouth disease.
151	<i>Nyctanthes arbor-tristis</i> L. [Oleaceae]	Singadahara	Leaf	Decoction of leaves with <i>Piper nigrum</i> (Kalimirch) given twice a day to cure fever in cattle.

Table 1 continued....

Table 1 continued....

152	<i>Ocimum basilicum</i> L. [Lamiaceae]	Durlabha	Leaf	Leaves crushed with jaggery and the decoction is given to cattle for blood purification.
153	<i>Oroxylum indicum</i> (L.) Vent. [Bignoniaceae]	Phanaphania	Seed	The seeds fried in mustard oil, made into a paste and is applied on wounds or cracks on the nipples, twice daily till cure.
154	<i>Oryza sativa</i> L. [Poaceae]	Dhana, Rice	Seed	Rice bran with honey (2:1) used as plaster on bone fracture of cattle.
155	<i>Oxytelma esculenta</i> (L.f.) R.Br. ex Schult. [Asclepiadaceae]	Dudhialata	Leaf	5-6 leaves are mixed with 400 g of coarsely ground grain of <i>Triticum aestivum</i> (Wheat) are given to cattle as a galactagogue.
156	<i>Pergularia daemia</i> (Forssk.) Chiov. [Asclepiadaceae]	Uturuli	Leaf	Leaf extract is applied on tumours, blisters and leg-ache of bullocks.
157	<i>Phyllanthus fraternus</i> Webster [Euphorbiaceae]	Bhuinaenla	Whole plant.	Whole plant is crushed and given to increase lactation.
158	<i>Physalis minima</i> L. [Solanaceae]	Tipai	Seed	Seeds are crushed and mixed with oil cake is given to animal as appetizer.
159	<i>Piper longum</i> L. [Piperaceae]	Pippali	Fruit	Fruit powder mixed with juice of 'onion' (<i>Allium cepa</i>) is applied on the affected hoof during foot and mouth disease.
160	<i>Piper nigrum</i> L. [Piperaceae]	Golamaricha	Seed	50g seeds are pulverized with 50g fennel and 50g salt and this mixture is given in constipation.
161	<i>Plumbago zeylanica</i> L. [Plumbaginaceae]	Chitaparu	Root	Root paste (5 g) with jaggery (10 g) is given to goats against stomatitis.
162	<i>Pongamia pinnata</i> (L.) Pierre [Fabaceae]	Karanja	Seed	Seed oil with leaf paste of <i>Justicia adhatoda</i> (Basanga) applied as ointment on humpsores of cows and buffaloes.
163	<i>Pueraria tuberosa</i> (Willd.) DC. [Fabaceae]	Bhui-kakharu	Tuber	Tubers are fed to cows and buffaloes with fodder to increase secretion of milk.
164	<i>Ricinus communis</i> L. [Euphorbiaceae]	Jada	Leaf	Leaves are slightly warmed and bandaged over fractured-bone.
165	<i>Saccharum spontaneum</i> L. [Poaceae]	Kasha-tandi	Whole plant.	Plant mixed with fodder given to cattle as galactagogue.
166	<i>Semecarpus anacardium</i> L.f. [Anacardiaceae]	Bhalia	Seed	Luke warm seed oil is applied on tail to treat tail gangrene.
167	<i>Senna tora</i> (L.) Roxb. [Caesalpiniaceae]	Chakunda	Leaf	Paste of leaves is applied with the help of cloth on eye lid of cattle to cure redness of eyes.
168	<i>Sesamum orientale</i> L. [Pedaliaceae]	Khasa, Rasi	Seed.	Seeds with jaggery (20 mg) are given to cows and buffaloes to increase lactation.
169	<i>Solanum virginianum</i> L. [Solanaceae]	Ankaranti	Root	Decoction of root is given in ephemeral fever. Decoction of root is given against spermatorrhoea.
170	<i>Soyimataefrifuga</i> (Roxb.) A. Juss. [Meliaceae]	Rohani	Bark	20 g stem bark mixed with roots of <i>Calotropis gigantea</i> (Aak) make it in a paste is applied on eye and bandaged for opacity of cornea.

Table 1 continued....

Table 1 continued....

171	<i>Syzygiumcumini</i> (L.) Skeels [Myrtaceae]	Jamu	Bark	Stem bark mixed with curd and ghee to prepare a juice. It is drenched to animal to treat blood in urine.
172	<i>Tamarindus indica</i> L. [Caesalpinaceae]	Tentuli	Leaf	Leaves are boiled with anti-hill soil and salt, after cooling the paste is applied on fractured bones of domestic animals.
173	<i>Tectona grandis</i> L.f. [Verbenaceae]	Saguwan	Seed	Seed powder mixed with water given orally to cattle for thrice a day against retained urination.
174	<i>Tephrosia purpurea</i> (L.) Pers. [Fabaceae]	Banakolathia	Whole plant.	Plantis boiled in water, filtered and given orally to cure haematuria.
175	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn. [Combretaceae]	Arjuna	Bark.	Bark paste is plastered over bone fracture and bandaged for fast recovery.
176	<i>Terminalia bellirica</i> (Gaertn.) Roxb. [Combretaceae]	Bahada	Fruit.	2-3 fruits are roasted in 100 g of ghee to make paste and applied on the affected eye to cure redness of eyes in cattle.
177	<i>Tinospora sinensis</i> (Lour.) Merr. [Menispermaceae]	Guluchi	Whole plant	Plant extract is given orally to cattle twice a day for 5 days to cure rheumatism.
178	<i>Tribulus terrestris</i> L. [Zygophyllaceae]	Gokhara	Leaf	Leaves are crushed to make paste. It is applied on septic wounds of animals.
179	<i>Trichosanthes cucumerina</i> L. [Cucurbitaceae]	Kuamainta	Fruit	Fruit juice is given orally for 5 days to treat urinary diseases.
180	<i>Trichosanthes tricuspidata</i> Lour. [Cucurbitaceae]	Mahakala	Seed	Seeds are pounded and given with whey to cattle twice a day for a week incold, cough, fever and pneumonia.
181	<i>Tridax procumbens</i> L. [Asteraceae]	Bisalyakarani	Leaf	Crushed leaves mixed with butter milk is given orally to animals for curing tympany and also against blood urine.
182	<i>Trigonella foenum-graecum</i> L. [Fabaceae]	Methi	Seed	Seeds and that of <i>Pennisetum glaucum</i> (Bajra) seeds are cooked and mixed with jaggery is fed to cows and buffaloes to increase milk production.
183	<i>Vitex negundo</i> L. [Verbenaceae]	Begunia	Leaf	Leaves are mixed with turmeric powder in ratio of 2:1, slightly warm and applied externally to cure pain due to sprain.
184	<i>Wrightia tinctoria</i> (Roxb.) R.Br. [Apocynaceae]	Pita korua	Root	Root powder is given to buffaloes and cows for development of healthy foetus.
185	<i>Xanthium indicum</i> Koenig [Asteraceae]	Bada gokhara, Jhagada	Leaf.	Leaf paste is applied on chronic wound of goat or sheep.
186	<i>Zingiber officinale</i> Rosc. [Zingiberaceae]	Ada	Rhizome.	Paste of rhizome mixed with jaggery and <i>Piper nigrum</i> (Kali mirch) given to cattle in cold and cough.
187	<i>Ziziphus nummularia</i> (Burm.f.) Wight & Arn. [Rhamnaceae]	Bhuin-barakoli	Leaf	Leaves pounded finely in <i>Linum usitatissimum</i> (Alsi) oil to form a paste. It is applied on burnt parts of animals till cure.

well as those adding to the strength and vigour of the livestock have also been included. Bronchitis, constipation, conjunctivitis, diarrhoea, dysentery, galactorrhoea, mumps and foot and mouth diseases are the most common animal diseases in the area under investigation. Farmers, cattle growers and other rural folk being herbal practitioners have added these medications to their indigenous knowledge system by trial and error, spanning over hundreds of years and covering several generations. Unfortunately, adequate attention has not yet been given to the traditional veterinary herbal remedies in India. Even the 'Ayurveda', the pioneer document with curative properties of plants, have not provided much information on veterinary remedies. Similar to other aspects of ethnobotany, ethnoveterinary herbal medicine also offers enormous opportunity for further research; hence all the existing information needs to be correctly documented, before it is lost. Basing on these age-old practices of the rural communities of the study area, pharmaceutical industries may formulate some new prescriptions or upgrade the older ones to treat various animal ailments.

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