

Survey of ethno-veterinary medicinal plants in Melkabello District, Eastern Harerghe Zone, Eastern Ethiopia

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<http://dx.doi.org/10.4314/evj.v20i2.1>

Abstract

An ethno botanical survey was conducted from November 2014 to April 2015 in Melkabello district, Eastern Harerghe Zone, Oromia Regional State of Ethiopia. The objectives of the study were designed to document ethno veterinary medicinal plants and identify their associated threats. A structured and pre tested questionnaire was used to collect the required data. About 20 traditional healers were purposively selected based on the recommendation of local authorities. The majority of the healers were male, 16 (80%) and the remained 4 (20%) were females. In this study about 68 medicinal plant species belonging to 55 families were identified in the study area. The principal sources of the medicinal plants were from wild, cultivated and both with the proportion of 53 (77.9%), 12 (17.6%) and 3 (4.4 %), respectively. In this study herb, 27 (39.7%) followed by tree, 19 (27.9%) were the most commonly used habits of the plants by traditional healers. The major plant parts used were leaf, 40 (58.8%) and bark, 2 (2.9%). The most common administration routes were oral, 48 (70.6%) followed by topical, 12 (17.6%) and aerosol 3(4.4%). Febrile diseases, gastrointestinal disorders, external injuries, blackleg and reproductive insufficiency were treated by the traditional practioners. In conclusion, the study revealed that participants had a good knowledge to treat livestock ailments, but the dose varies among the healers. Therefore, further study should be conducted to evaluate the efficacy and standardize the dose of medicinal plants in the study area.

Keywords: Ailments, Eastern Harerghe Zone, Ethiopia, Ethno-Veterinary, Medicinal Plants

Introduction

In Ethiopia plant remedies are still the most important and sometimes the only sources of therapeutics for nearly 80% of human and more than 90% in livestock population. A great variety of traditional plants are used to treat and prevent livestock health problems and medicinal plants which have been used both for prevention and cure of various diseases of humans and animals from time immemorial occupy the largest portion (Gebrehiwot Mengistu, 2004).

Despite that the traditional healers are the best sources of information about the knowledge of the medicinal plants, it was found very difficult to assure their indigenous knowledge. Because, it is transferred from generation to generation or ally so the knowledge of ethno-medicinal plants is on the verge of irreversible loss (Mirutse Giday *et al.*, 2003; Tadesse Birhanu and Dereje Abera, 2015). Still now, it is not widely used as it could be because the knowledge and skills are fragile and not well documented including Melkabello district, eastern Harerghe Zone as it is kept as a secret (Yared Yigezu *et al.*, 2014). Therefore, the study was designed to document ethno-veterinary medicinal plant species and knowledge of the traditional health practitioners in study area.

Materials and Methods

Study area

The study was conducted from November 2014 to May 2015 in Melkabello district, East Harerghe Zone of Oromia Regional State, eastern Ethiopia. The study area is found at 487kms of east of Addis Ababa, the capital city of the country. The average temperature in the area is 24°C with the average rain fall is 1800 mm and the altitude ranges from 1300-3140m above sea level and the various topographic features of district include Dega (high land) (20%), Woyna Dega (Mid-high land) (39%) and kola (Lowland) (41%) (NAMSA, 2015). In terms of livestock population 75,564, sheep 12,708, goats 18,681, equine 98,674, chicken and 84, 276. *Podocarpus Acacia* plants are the dominant vegetation of the area. Mixed farming system is the mode of agriculture in the districts in which cattle and goats play an important role for the livelihood of the local population (CSA, 2009).

Study population

The target populations for this study were 20 voluntary traditional healers who participated and interviewed purposively based on the recommendation of local authorities of the district.

Data collection methods

Purposive sampling technique was used to select the district and study participants based on the availability of traditional healers and recommendations of local authority. The data were collected by using a structured and pre-tested questionnaire for interview, observations and field guided walks (Martin, 1995). Before collecting the data, written permission was obtained from the office of the district and permission was obtained from the administrator of each selected kebele. Following this, the purpose of the study was explained to each informant and verbal prior consent was obtained.

During the study period, each informant was visited two to three times in order to confirm the reliability of the ethno-botanical information. The responses that were not in harmony with each other were rejected. Interviews and discussions were undertaken based on checklist of questions prepared in English and translated to local language 'Afan Oromo'. Information was carefully recorded during an interview with an informant as well the knowledge of vegetation categorization which was asked and recorded. Field observations were performed with the help of local guides on the morphological features and habitats of each medicinal plant species in the field. Group discussions were conducted on ethno-veterinary medicinal plants and their threats, conservation and transferability of knowledge in the community.

Plant specimen collection and identification

The reported medicinal plants were collected from natural vegetation and home gardens during the field walks and habitats of the plants were listed. Preliminary identification was done at the site (field) and the collected voucher specimens were taken to the Haramaya University, Department of Herbarium. Specimen identification and confirmation was undertaken by using taxonomic keys and various volumes of the Flora of Ethiopia and Eritrea (Edwards *et al.*, 2000; Hedberget *al.*, 2006). Finally, the identified specimens were reconfirmed by a taxonomic expert and labeled specimens were stored at the Herbarium.

Data analysis

The collected ethno-botanical data were entered into SPSS version 21 and summarized using descriptive statistical methods such as frequency and percentages.

Results

In this study, the majority of the study participants were male, 16 (80%) and the remained 4 (20%) were females. About 68 ethno-medicinal plant species belonging to 55 families were identified in the area. The principal sources of the plants were from wild, cultivated and both 53 (77.9%), 12 (17.6%) and 3 (4.4 %), respectively. Herb, 27 (39.7%) was the most commonly used plants by traditional healers followed by tree, 19 (27.9%). The major plant parts used were leaf, 40 (58.8%) and bark 2 (2.9%). The most common routes of administration were oral, 48 (70.6%) followed by topical, 12 (17.6%) and aerosol 3(4.4%). This study indicated that gastrointestinal disorder, febrile diseases, external injuries, Blackleg (in animals), and reproductive insufficiency were treated by the traditional healers (Table 1).

Table 1: Summary of ethno veterinary medicinal plants, diseases and diseases conditions treated local, scientific and family name of the medicinal plants from November 2014 to April 2015 in Melkabello district, eastern Harerghe zone, Ethiopia.

Family name	Species name	Local name	Livestock ailments treated
<i>Astraceae</i>	<i>Cyphostemaspp</i>	Abba korro	Mastitis, Renal problem, increase milk volume
<i>Lamiaceae</i>	<i>Clorodandrummyricoidos</i>	Harmel	Acute mastitis, Evil eye
<i>Euphorbiaceae</i>	<i>Croton macrostachyus Hochst</i>	Bakkannisaa	Wound healing, Anti -parasite
<i>Curcubitaceae</i>	<i>Cucumisdipsaleus</i>	Harrigoogee	Abdominal discomfort, bloat
<i>Astraceae</i>	<i>Vernoniaauriculifora</i>	Tiuro	Evil eye, Wound healing
<i>Polygonaceae</i>	<i>Rumennervosun</i>	Dhangaggoo	Gonorrhea, Cough, liver disease,
<i>Amarantaceae</i>	<i>Achayrentesaspera</i>	Darguu	Abdominal discomfort, Febrile disease
<i>Spundaceae</i>	<i>Alophaylusabsini</i>	Biiflee	GIT parasite, Abdominal disorder
<i>Scrophulariaceae</i>	<i>VerbascumsinaiticumBenth.</i>	Risaarrisowri	Febrile causal disease, heart disease, Renal disease
<i>Liliaceae</i>	<i>Aloe spp.</i>	Hargeessa	Antipyretic, spleen and liver problem
<i>Brassicaceae</i>	<i>Lepidiumsativum L.</i>	Shifuu	Black leg, Colic, diarrhea, Bloat, internal parasite
<i>Anacardiaceae</i>	<i>Rihasvulgaris</i>	Daboobessa	Wound healing, headache
<i>Sapidaceae</i>	<i>Dodiniaegustifolia</i>	Dhiddecha	Ectoparasite
<i>Nyctaginaceae</i>	<i>Commicarpussillatusmelkele</i>	Koontama	Febrile causal disease, evil eye
<i>Solanaceae</i>	<i>SolanumdasyphyllumSchumach.</i>	HiddiBudee	Evil eye
<i>Limoceae</i>	<i>Citruslimon</i>	Xuuxxoo	Bloat, Antitoxic
<i>Euphorbiaceae</i>	<i>Euphorbia ampliphyllaPax</i>	Adaamii	Black leg,
<i>Fabaceae</i>	<i>Mryinemelanopheloes</i>	Quboo	Retained fetal membrane, mastitis
<i>Vitaceae</i>	<i>Eyphostemaeyphotalum</i>	Gangaloota	Evil eye, Ectoparasite
<i>Lamiaceae</i>	<i>Menthaspicata</i>	Naanaa	Renal problem
<i>Lamiaceae</i>	<i>Thymus schimperiRonn.</i>	Xoosennoo	Gonorrhea, Cough, liver disease,

Family name	Species name	Local name	Livestock ailments treated
<i>Asteraceae</i>	<i>Vernoniaamygdalina</i>	Ebichaa	Abdominal pain Mich, Febrile disease
<i>Fabaceae</i>	<i>Erythrinabrucei</i>	Waleensuu	evil eye
<i>Aspergesae</i>	<i>Asparagesafricanus</i>	Kammona	Anurea, Heart failure,
<i>Fabaceae</i>	<i>Pterotobiumstellatum</i>	Qajimagurracha	wound healing
<i>Asteraceae</i>	<i>Cyphostemaspp</i>	Barbariisaa	Black leg, Abdominal disorder
<i>Cypraceae</i>	<i>Cypresnivies</i>	Qunnii	Deworming of equide
<i>Aguifliciae</i>	<i>Ilese mites</i>	Mi'essaa	Wound healing, Gonherra
<i>Cucurbitaceae</i>	<i>Memordicafoetidaschumacha</i>	Sukee	Metritis for good flavor
NA	NA	Habasooddaa	infertility, GIT disorder
<i>Caricaceae</i>	<i>Caricapapaya</i>	Papaya	Febrile disease, Amebiasis
<i>Rhamnaceae</i>	<i>Ziziphusmauritanica</i>	Qurquraadii	paralytic Cold, Vomition, Endoparasite
<i>Fabaceae</i>	<i>Acacia brevispica</i>	Hammarreessa	Black leg, Abdominal disorder
<i>Fabaceae</i>	<i>Carissa spinarum L</i>	Agamsa	Febrile causal disease, evil eye
NA	NA	Atarajawwee	Abdominal discomfort
<i>Asclapiadaceae</i>	<i>Periplocalinearifocia</i>	Buriidiimtuu	Mastitis, evil eye, increase milk volume
<i>Lataceae</i>	<i>Opuntiaticusindica</i>	Tini	Black leg, Mich, dingetegna
<i>Moraceae</i>	<i>Ficussycomorus</i>	Luugo	Warts ,dermatological disease
<i>Solanaceae</i>	<i>Nocotanatabacum</i>	Tobacco	snake repellent,
<i>Convolvulaceae</i>	<i>Ipomeaspps</i>	Doobbiisaartu	Black legs, Endoparasite
<i>Fabaceae</i>	<i>Acacciatortilis</i>	Dhiddecha	Ectoparasite
<i>Dacaceae</i>	<i>Oleaeuropae sub Spp</i> <i>Cuspidate</i>	Ejersa	Effective for dermatological disease.
<i>Kleinae</i>	<i>Euphorbia</i>	Qinciba	Bovine TB, Eye opaqueness
<i>Solanaceae</i>	<i>Withaniasomnitera</i>	Mixmixa	Bloat, Antitoxic, Appetizer
<i>Urticaceae</i>	<i>Urerahypselodendronwedd</i>	Saakayyee	urinating equide
<i>Fabaceae</i>	<i>Sennadidymobotiya Irwin</i>	Sanamakki	Deworming ,

Family name	Species name	Local name	Livestock ailments treated
<i>Rhamnaceae</i>	<i>Rhammusprina ides</i>	Geeshee	For treatments of Salmonellosis
<i>Boraginaceae</i>	<i>Cordia Africana</i>	Waddeessa	Deworming of equide
NA	NA	Baaqilharragoo	Febrile causal disease
<i>Braecumae</i>	<i>Trigonellafoerum</i>	Hulbata	Botulism toxin, Constipation
<i>Rutaceae</i>	<i>Rutachalepen</i>	Xalataam	Ear pain, evil eye, heart failure
<i>Rutaceae</i>	NA	Rahaana	Evil eye, Anti pain
<i>Balsaminaceae</i>	<i>Impatienstinctoria</i>	Qacuu	Effective for endoparasiteGonoheria.
<i>Verbenaceae</i>	<i>Premnschimperia</i>	Urgessaa	Wound healing
<i>Rutaceae</i>	NA	Masoolbaa	Appetizer, spice
<i>Primulaceae</i>	<i>Runicagranetum</i>	Rummana	Diarrhea, vomit ion, Endoparasite
<i>Rosaceae</i>	<i>Hageriaabyssininica</i>	Heexoo	Effective deworming
<i>Ulmaceae</i>	<i>Celtisafricana</i>	Ceekaa	Ectoparasite
NA	<i>Eclophytus tree</i>	Baarsaa	Respiratory disease, anti-bacterial property
<i>Lamifoliumceae</i>	<i>Ocimumlamifolium</i>	Daamakasee	Dingetengya, Black leg
<i>Cammalinaceae</i>	<i>Commelinastephaninachiov</i>	Walgabbis	for fattening
<i>Rutaceae</i>	<i>Citrus sinensis</i>	Samargeela	Ectoparasite, Coughing
NA	NA	Maxxannee	Black leg
<i>Compositaceae</i>	<i>EchinopskerebichoMesfin</i>	Qorobichoo	Black leg, Respiratory disease.
<i>Flacourtiaceae</i>	<i>Oncobaspinosafors</i>	Jilboo	Internal parasite, Mastitis
<i>Apocynacea</i>	<i>Carrissespinarum</i>	Hiddiire'ee	Evil eye
<i>Capporidae</i>	<i>Caparissepialcommelina</i>	Rigaagaangee	Deworming of equide,
NA	NA	Muchaarrabgaaraa	Snake toxin

Remark (NB): NA=Not available

Preparation mode and route of administration

The most common routes of administration were oral, 48 (70.6%) followed by topical, 12 (17.6%) and aerosol 3(4.4%) (Table 2). This study also indicated that the traditional healers uses the medicinal plants in different forms but majorly they states the three forms fresh, dry and both forms were commonly used with in fresh forms representing the largest proportion but the dry forms was also less commonly used. Fresh, 40 (58.8%), fresh and dry, 17 (25%) and dry, 11 (16.2%) were the condition of the medicinal plant usage form for preparation in the study area (Table 3).

Table 2: Administration route of the medicinal plants in Melkabello district from November 2014 to April 2015

Rout of administration	Frequency	Percent (%)
Oral	48	70.6
Topical	12	17.6
Oral and topical	5	7.40
Aerosol	3	4.40
Total	68	100

Table 3: Summary of the condition of the medicinal plant usage form in Melkabello district from November 2014 to April 2015

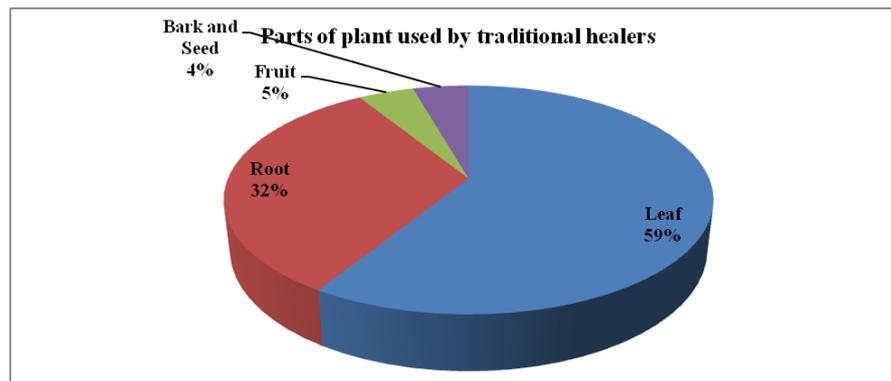
Medicinal plant condition	Frequency	Percent (%)
Fresh	40	58.8
Dry	11	16.2
Fresh and dry	17	25.0
Total	68	100

Habit and sources of medicinal plants

Herb, 27 (39.7%) was the most commonly used habits of the plants by traditional healers followed tree, 19 (27.9%). The principal sources of the medicinal plants were from wild, cultivated and both with proportion of 53 (77.9%), 12 (17.6%) and 3 (4.4 %), respectively (Table 4).

Table 4: Source of the ethno veterinary medicinal plants in Melkabello district from November 2014 to April 2015

Sources of medicinal plants	Frequency	Percent (%)
Wild	53	77.9
Cultivated	12	17.6
Both wild and cultivated	3	4.40
Total	68	100
Habits of the plants	Frequency	Percent (%)
Tree	19	27.9
Herb	27	39.7
Shrub	14	20.6
Climber	8	11.8
Total	68	100

Parts of plant remedies used for the preparation**Figure 1: Major parts of the medicinal plants used in the study area**

The results of study depicted that the major part of the medicinal plants were leaf, root, fruit, bark and seed with proportion of 40 (58.8%), 22 (32.4%), 3 (4.4%) and 2 (2.9%), respectively in the study area (Figure 1).

Harvesting technique of medicinal plants

Different unscientific harvesting techniques of medicinal plants were practiced by traditional healers with equal proportion of the whole removal, 23 (33.8%)

followed by uprooting and debarking, 22 (32.4%). Abnormal harvesting techniques are the major threatens for conservation of medicinal plants in the study area (Table 5).

Table 5: Harvesting technique of medicinal plants in Melkabello district from November 2014 to April, 2015

Harvesting methods	Frequency	Percent (%)
Uprooting	22	32.4
Whole Removal	23	33.8
Debarking	23	33.8
Total	68	100

Discussion

In this study, a total of 68 major considerable medicinal plant species belonging to 55 families were identified and documented in the study area during the study period. The results of the study revealed that *Fabaceae*, *Astraceae* and *Laminaceae* families were represented the dominant families. The finding of the survey was revealed that the majority of the traditional healers rely on indigenous traditional knowledge and locally available materials which was in line with the result of Mirutse Giday *et al.* (2003).

In this study, different livestock alignments: febrile diseases, “Mich”, Blackleg, gastrointestinal parasites infestations, external injuries, reproductive insufficiency and others diseases as well as disease conditions were treated by the medicinal plants in study area. This agrees with Reshid *et al.* (2010) in Bangladesh who reported that the most common cattle ailments observed were fever, meningitis, gastrointestinal disorders, and helminthiasis. This might be due to similarity in climatic condition and the purpose for which the medicinal plants used in both study areas. The result was also consistent with Tadesse Birhanu and Dereje Abera (2015) who reported the dominant plant species at selected districts of Horro Gudurru Wollega Zone, western Ethiopia.

The finding of this study was indicated that the habit of collected medicinal plants herb, tree, shrub and climber were identified with that herb, 39.7%

was dominant in the study area. This result was agreed with study conducted by Tilahun Teklehaymanot and Mirutse Gidey (2007) who reported the dominance of herbs, 52% in Northwest Ethiopia. Other similar study that was conducted by Tamiru Tessema *et al.* (2001) in northern Ethiopia indicated that high percentage of herbs. This finding could be an indication of abundance of herbs around rain fall areas. However, the dominance of herbs in the identified medicinal plants could have a negative implication since their growth could easily be hampered by recurrent drought which is common in the studied sites this fact was in accordance with Winfred *et al.* (2012) in Kenya and Ugyen *et al.* (2011) in Bhutan which stated that removing a large proportion of herb species in one year is likely to have a significant impact on the species resiliency.

The results of the study indicated that the majority of the medicinal plants which used for medicinal value by the traditional healers were obtained from wild and less commonly also acquired from both wild and cultivated. So the present finding was agreed with the previous finding of Tadesse Birhanu *et al.* (2014) who reported that most of the medicinal plants were collected from the wild (68%) and others were from home gardens (32%) in East Wollega Zone, western Ethiopia. The present study also showed 53 (77.9%) of medicinal plants exposed to continuous extraction from the wild and substantial loss of their habitats and resulted decline of many highly valuable medicinal plant species in the study area due to difficulty of management and control. This finding also close related to Ugyen *et al.* (2011) who stated that because of the high price and increased demand on traditional medicines; the wild species are hunted illegally and are traded across the borders. This might be due to the level of forest staff in rural districts was insufficient to manage or control the vast forest areas, which is made even more difficult by the rough undulating impassable terrain of the country.

The finding of this study was showed that majority of the plant's parts used to treat livestock ailments were leaf, root, fruit bark and seed with highest proportion of leaf 40 (58.8%) and with least proportion of bark and seed 2 (2.9%) as used medicinal value in the study area which was in line with the result of Tadesse Birhanu *et al.* (2014) that was done in eastern Wollega Zone and Tilahun Teklehymanot (2013) which was conducted in Tigray region who stated that the widely used plant part for the preparation of the remedies was leaves. Such wide harvesting of leaves for traditional medicine compared to roots in the study area which are important for survival of plants has a less

negative influence on the survival and continuity of useful medicinal plants and hence does not affect sustainable utilization of the plants.

The study also showed that there were different unscientific harvesting techniques of medicinal plants which was practiced by traditional healers with equal proportion of whole cutting and debarking, 23 (33.8%) followed by uprooting, 22 (32.4%). This study finding was in concurrence with Winfred *et al.* (2012) in Kenya which stated that some of the most destructive methods employed by the practitioners while harvesting medicinal plants were: total debarking, uprooting of whole plants and whole cut. On the other hand, uprooting directly related with herb, trees and shrub are more prone to total debarking and climbers are exposed whole cut. Specially uprooting is one of the poor harvesting methods causes danger of genetic erosion. The debarking of the plants may result into slow death of the whole plant due to the interruption of photosensitization. Similarly, the study was conducted by Edwards (2001) which indicated in appropriate harvesting was interfere with life cycle of medicinal plants.

The most commonly used administration routes of medicine were oral, 48 (70.6%), topical, 12 (17.6%), both oral and topical 5 (7.4%), and aerosol 3(4.4%). This finding agrees with ethno-botanical study conducted in Tigray region by Tilahun Teklehymanot *et al.* (2013) who reported that about 20(64.5%) species of the medicinal plants were taking by oral, about 8 (25.8%) species of medicinal plants were taking by dermal and the rest 3 (9.7%) were taken both by oral and dermal mode of application. The finding was showed that the highest mode rout administration of these medicinal plants were oral which is in line with the report of Teklay Abraha *et al.* (2013) that reported the routes of administration are oral (65%), followed by topical (15%) in Tigray regional state of Ethiopia. The choice of oral administration may be related to the use of some solvents or additives (milk, butter, alcoholic drinks, boiled coffee, and food) that are commonly believed to serve as a vehicle to transport the remedies. The additives are also important to minimize discomfort, improve the taste and reduce adverse effects such as vomiting and diarrhea, and enhance the efficacy and healing conditions (Kebu Balemie *et al.*, 2004).

The present finding indicated that majority of the plant remedies were prepared from fresh material of the plants which accounted (82.5%) followed by fresh/dry (17.5%) which in lined with the work conducted by Tadesse Birhanu *et al.*

(2014) at East Wollega Zone and Gebre Medhin Gebrezgabiher *et al.* (2013) in Tigray region Gemad district who stated the common dominant preparation mode was fresh form (Mirutse Giday *et al.*, 2003; Tadesse Birhanu and Dereje Abera, 2015).

Conclusion

In general, the present study identified and documented about 68 medicinal plant species belonging to 55 families of ethno-veterinary medicinal plants. The plants were mainly collected from the wild based on the consultation of traditional healers. Agricultural expansion and overgrazing were found to be the main threats for the medicinal plants. This study also showed the largest numbers of remedies of the medicinal plants were used to treat livestock diseases and disease conditions. Thus, the traditional healers and modern health professionals should be integrated to combat diseases via improving veterinary services. Moreover, further scientific research should be needed to determine the safety, toxicity and standardize dose.

Acknowledgements

The authors would like to thank Wollega University, School of Veterinary Medicine, Local Administration Authorities, study participants and all individuals who render help during the study period.

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