

# Ethnoveterinary survey of medicinal plants used for treatment of animal diseases in Ambo District of Oromia Regional State of Ethiopia

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## Research article

**Keywords:** Ambo District, Medicinal plants, Ethnoveterinary, Informant consensus factor, Ethiopia

**Posted Date:** September 16th, 2019

**DOI:** <https://doi.org/10.21203/rs.2.14516/v1>

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## Abstract

**Background:** Traditional knowledge on the use of medicinal plants is in danger of extinction because of different changes taking place all over the world including Ethiopia and thus there is a need for its immediate documentation for the purpose of conservation, sustainable utilization and development. Thus, an ethnobotanical study was conducted in Ambo District, Oromia Regional State of Ethiopia to document and analyze local knowledge on medicinal plants used for the treatment of animal diseases.

**Methods:** Data were collected between November, 2017 and April, 2018 mainly through semi-interviews conducted with purposively selected informants. Data collected mainly included demographic information of respondents, local names of medicinal plants, plant parts used, preparation methods, mode of applications, diseases treated, and habit and habitat of the reported plants. Based on data obtained through interviews, Informant Consensus Factor (ICF) values were computed.

**Results:** A total of 55 medicinal plants used to manage livestock ailment were reported by informants in the Ambo District. Herbs were commonly used in the preparation of remedies. Leaf was the most frequently utilized plant part accounting for 49.1% of the total reported medicinal plants. The majority (69.0%) of the medicinal plants used in the study District were uncultivated ones mainly harvested from edges of forests and bushlands, roadsides, river banks and grasslands. High ICF values were obtained for ophthalmological (0.82), dermatological (0.79), febrile (0.77) and gastro-intestinal ailments (0.77).

**Conclusion:** The current study shows that there is still rich traditional knowledge on the use of plants to control various animal diseases in study District. However, such claim needs to be scientifically verified with priority given to medicinal plants used in the treatment of ailment categories with high ICF values as such plants are considered to be good candidates for further pharmacological evaluation.

## Background

In Ethiopia, traditional medicine, in general, and medicinal plants, in particular, are still playing a significant role in solving livestock health problems [1]. Ethnoveterinary systems of treatment are still widely used even in areas where modern veterinary services have been introduced many years ago [2]. However, despite the significant role that has been played by medicinal plants in treating livestock ailments in both settled and pastoralist areas in Ethiopia, very limited attempts have been done to explore, document, evaluate and develop, and promote them for their wider uses in the country [3]. Survey to document and analyze traditional use of medicinal plants is an urgent matter as both plant materials and the associated traditional knowledge are currently being lost at an alarming rate due to various factors mainly including environmental degradation, deforestation and acculturation [4–6].

There are a number of ethnoveterinary surveys carried out in Oromia Region of Ethiopia to which also the Ambo District belongs [7–13]. However, literature survey shows that there was no proper ethnoveterinary study so far conducted in Ambo District to document the use of medicinal plants in managing livestock ailments. Some personal communications indicate the wide practice of using medicinal plants to control different types of animal health problems in the study area. Therefore, the purpose of this study was to document and analyze medicinal plants used to treat livestock diseases in Ambo District of the Oromia Region of Ethiopia.

## Methods

### Description of study area

Ambo District administratively belongs to West Shoa Zone, Oromia Regional State of Ethiopia. Ambo town is an administrative centre for both Ambo District and West Shoa Zone. The town is located at a distance of 114 km west of Addis Ababa within latitudes of 8°59' and 8.983° N and longitudes of 37°51' and 37.85° E and has elevation of 2101 meters above sea level. [14]. Ambo town has an annual rainfall of 1007.3 mm and mean minimum, mean maximum and mean average monthly temperatures of 9.96°C, 19.82°C and 14.89°C, respectively [15]. According to Tamiru *et al.* [14], the agro-ecology of Ambo District consists highland (23%), midland (60%) and lowland (17%). The District is divided into 34 administrative kebeles; kebele is the smallest unit of administration in Ethiopia.

The livelihood of people in the District is largely dependent on agriculture mainly involving crop production and animal rearing [16]. The has a livestock population 145371 cattle, 50152 sheep, 27026 goats, 105794 chickens, 9088 horses, 2914 donkeys and 256 mules [14]. Liver fluke, pastorellosis, black leg, epizootic lymphangitis, African horse sickness, trypanosomiasis, ascariasis, leech worm infestation, gastro-intestinal parasites infection, lumpy skin disease, anthrax, and foot and mouth disease are the commonly occurring diseases in the study District, of which anthrax, black leg, and foot and mouth disease are considered the most serious ones [17]. There are 13 veterinary clinics of different levels in the study District and a total of 21 veterinary professionals, of which four are DVM holders, three are BVSc holders and 14 are animal health attendants (Ambo District Agriculture Office, unpublished data, 2018).

## Informants sampling and data collection

A total of 55 knowledgeable informants with ages ranging from 35 to 71 years were purposively selected from the study District with the support of Ambo District Administration Office and respected local elders. Of these, 31 were males and 14 were females. Ethnoveterinary data were collected from November 2017 to April 2018 through individual semi-structured interviews that were held with the selected informants. In the interviews conducted in Oromo language, the widely spoken language in the study area, data on socio-demography of informant, local names of medicinal plants used in ethnoveterinary practices, parts used, preparation methods, mode of applications and diseases treated were collected. Data related to habitats of threats to medicinal plants were also gathered during interviews. Voucher specimens of medicinal plant reported during interviews were collected, properly pressed, dried and identified by their scientific names by a botanist at Aklilu Lemma Institute of Pathobiology (ALIPB), Addis Ababa University, and were deposited at the mini-herbarium of the Medicinal Plants Unit at ALIPB.

## Data analysis

Ethnobotanical data on the local use of medicinal plants were entered into Microsoft Excel spreadsheets and analyzed using SPSS version 20 software and summarized using appropriate descriptive statistical methods. Informant consensus factor (ICF) values were also calculated to determine the level of agreement of informants on the reported medicinal plants for the treatment of a given major ailment category using the

formula  $ICF = \frac{nur-nt}{nur-1}$ , where nur = number of informant citations for a particular ailment category and nt = number of medicinal plants used for the same ailment category with ICF values ranging between 0.00 and 1.00 [18]. ICF helps in the identification of medicinal plants with relatively higher informants agreement in choosing them in the treatment of a given ailment category [19]. Grouping the specific ailments into major ailment categories was made with assistance of a veterinarian at ALIPB, Addis Ababa University, following the approach of Heinrich *et al.* [18]. ICF values were calculated for major disease categories against which at least five informant use reports were recorded following the approach of Lautenschläger *et al.* [20].

## Results

### Medicinal plants used and ailments managed

The current study documented 55 medicinal plant species that were used in Ambo District to manage several livestock ailments (Table 1). The plants were distributed across 36 families and 53 genera. Of the total medicinal plants reported, relatively higher numbers of medicinal plants belonged to the families Euphorbiaceae and Lamiaceae, each contributing five species. The families Fabaceae and Solanaceae contributed four medicinal plants each, and the families Acanthaceae, Asteraceae, Malvaceae, Ranunculaceae and Rubiaceae contributed two medicinal plants each. The rest of the families contributed one medicinal plant each. Herbs were the most commonly used ones in the preparation of remedies in the study District accounting for 32 species (58.2%), followed by shrubs (17 species; 30.9%) and trees (6 species; 10.9%). The highest number of medicinal plants (29 species) was used to manage gastro-intestinal complaints including bloat, colic, endoparasites infections and diarrhea which largely affect cattle, sheep and goats. Good number of medicinal plants was also used to treat febrile illness (9 species) and eye infection (5 species).

Insert Table 1 here

### Part used, methods of preparation and route of administration

Leaf was the most commonly used plant part in the preparation of remedies accounting for 49.1% of the total reported medicinal plants, followed by those used for their root (21.8%) and seed (12.7%) parts (Figure 1). Result shows that most (62.7%) remedies in the study District were prepared by crushing (Figure 2). There was very little practice of storing plant materials for future use in the study District; plant parts were mostly harvested for their immediate uses. As a result, the majority (72.1%) of remedies were prepared from fresh plants materials. Only few were prepared from dry (22.9%) or dry or fresh (5.0%) materials. Most (85.3%) remedies were processed with the addition of water. The majority (58.2%) of medicinal plants preparations were revealed to be administered orally, and some were administered dermally (19.5%), taken nasally (18.8%) or applied through the eyes (3.5%).

### Informant consensus factor

ICF values were calculated for major disease categories against which at least five informant use reports were recorded. Accordingly, ophthalmological (0.82), dermatological (0.79), febrile (0.77) and gastro-intestinal (0.77) ailments were found to be the major disease

categories that scored high ICF values in the study District (Table 2).

## Habitat

The majority (69.0%) of the claimed medicinal plants in the study District were found to be uncultivated ones mainly harvested from edges of forests and bushlands, roadsides, river banks and grasslands. Few of the uncultivated ones were weeds growing in cultivated fields and homegardens. Some (31.0%) of the reported medicinal plants were cultivated in homegardens but primarily for other purposes. Only *Ocimum lamiifolium*, *Ocimum urticifolium* and *Lepidium sativum* were cultivated in home garden primarily for their medicinal uses.

## Comparison of knowledge of medicinal plants between different social groups

Analysis of data collected revealed significant difference ( $p < 0.05$ ) in medicinal plant knowledge between the older ( $\geq 46$  years of age) and the younger ( $< 46$  years of age) people. The mean number of medicinal plants reported by the older people was 5.2 while that reported by the younger people was 3.0. The study further showed significant difference ( $p < 0.05$ ) between males and females in the mean number of medicinal plants reported; 4.5 and 3.2 were the mean numbers of medicinal plants reported by males and females, respectively. However, there was no significant difference ( $p > 0.05$ ), in the mean number of medicinal plants reported, between illiterate (4.3) and literate (4.1) people.

## Discussion

### Medicinal Plants used and ailments managed

The number of medicinal plants (55 species) documented from Ambo District that were used to manage several livestock ailments is comparable to a figure reported by a study conducted in Midakegn District of West Shoa Zone, to which also Ambo District belongs, which revealed the use of 60 medicinal plants to treat different livestock ailments [12]. On the other hand, the number of medicinal plants reported by the current study is much higher as compared to figures reported by studies conducted in different districts of three neighboring zones of the Oromia Region, namely Horro Gudurru, Jimma and East Wollega zones [7,8,21]. Twenty eight medicinal plants were documented from East Wollega Zone [21], 25 medicinal plants were documented from Horro Gudurru [8], and 21, 20, 19 and 14 medicinal plants, were recorded from Manna, Dedo, Kersa and Seka Chekorsa districts of the Jimma Zone, respectively [7]. The fact that higher number of medicinal plants was reported from the study district as compared to some neighboring districts or zones could be attributed to the rich livestock population in the district as reported in Tamiru *et al.* [14]. The fact that Euphorbiaceae and Lamiaceae contributed higher number of plants to the medicinal plants flora of the study District may be related to their respective sizes in terms of the number of species each comprises in the flora of Ethiopia. Euphorbiaceae and Lamiaceae are among the largest families in the Flora of Ethiopia and Eritrea containing 209 and 184 species, respectively [22,23]. The relative richness of the two families in medicinal plants may also be related to their richness in some active principles. The common use of herbaceous plants in the study District in the preparation of remedies could be attributed to the better abundance of the same as compared to other life forms as was also observed by the investigators of the study during their visits to the study area. The common use of herbs was also reported by other ethnoveterinary studies carried out in Midakegn District of West Shewa Zone [12] and some districts of Horro Gudurru [8] and East Wollega [21] zones. The use of high number of medicinal plants for the treatment of gastrointestinal complaints could be an indication of high prevalence of this ailment category in the study District. According to Bacha and Taboge [17], gastro-intestinal ailments are among the commonly occurring diseases in the study District.

### Part used, methods of preparation and route of administration

Leaf was the most commonly used plant part in the preparation of remedies, which is in agreement with studies conducted in other parts of the country [8,12,21]. The wider use of leaves may be related to the fact it is much easier and faster to prepare remedies from such plant part. Most remedies in the study District were prepared by crushing, a method which is also commonly applied in the preparation of remedies elsewhere in the country [1,13,24–26]. The common use of crushing in the preparation of remedies may be related to its easiness. Most remedies in the study District are prepared from fresh plants materials and other studies conducted in different parts of Ethiopia [8,10,13,26,27] also reported the common use of fresh materials. The wider use of fresh materials in remedy preparation could indicate the availability of most of the needed plant parts in the vicinity any season of the year. The common use of water as diluent in processing remedies in the study District may be related to its property in dissolving many active compounds. The fact that most remedies were administered orally could be attributed to the common occurrence of gastro-intestinal tract ailments in the study District. A study reveals that gastro-intestinal ailments are among the top animal health problems in the study District [17].

## **Informant consensus factor**

Ophthalmological, dermatological, febrile and gastro-intestinal ailments were the major disease categories that scored high ICF values in the study District and medicinal plants used against such ailments categories could be considered as good candidates for further pharmacological evaluation as they are expected to exhibit better potency as compared with those that are used to treat ailment categories with low ICF values [18].

## **Habitat**

The majority of the claimed medicinal plants in the study District were found to be uncultivated ones, which is in agreement with reports of other studies conducted elsewhere in the country [8,13,26,28]. The fact that the majority of medicinal plants were harvested from the wild indicates serious threat to the same amid ongoing deforestation and habitat destruction that are taking place in the country.

## **Comparison of knowledge of medicinal plants between different social groups**

The fact that older people in the study District had better knowledge of medicinal plants as compared with the younger ones may indicate the problem medicinal plant knowledge transfer, across generations, is facing, which could be related to lack of interest by the younger generation to practice traditional medicine due to acculturation. Other Studies conducted elsewhere in different parts of the country also demonstrated that older people have better knowledge of medicinal plants as compared with younger ones [29,30]. The reason why males had better knowledge of medicinal plants as compared with females could be related to the fact that, in Ethiopia, traditional medical practice is dominated by men which is reflected in the choice of knowledgeable people to transfer their knowledge along the male line [31]. There was no difference on knowledge of medicinal plants between illiterate people and literate ones as was also reported by study conducted in Ankober District of Amhara Region of Ethiopia [30].

## **Conclusion**

The present study revealed rich knowledge on the use of medicinal plants for treatment of various livestock ailments in Ambo District. It was found out that the highest number of medicinal plants was used to manage gastro-intestinal complaints, an indication of high prevalence of this ailment category in the area. Most remedies in the study District were prepared by crushing leaves and this may be related to their easiness. The majority of the claimed medicinal plants were found to be harvested from the wild and this indicates their serious threat amid ongoing deforestation and habitat destruction taking place in the country. The highest ICF value was obtained for ophthalmological problems. Thus, priority for evaluation should be given to medicinal plants used in the treatment of ophthalmological problems as medicinal plants used in the treatment of ailment with high ICF values are considered to be good candidates for further pharmacological studies.

## **List Of Abbreviation**

**ICF: Informant consensus factor**

**ALIPB: Akililu Lemma Institute of Pathobiology**

## **Declarations**

## **Ethical approval and consent to participate**

The proposal was reviewed and approved by the Ethical Review Board (IRB) of the School of Veterinary Medicine, Wollo University. Oral informed consent was obtained from people who participated in the study as it was difficult to get written consent as the majority of them were found to be illiterate ones. The IRB accepted the approach that was clearly stated in the proposal that consent from study participants would be obtained orally.

## **Consent for publication**

Not applicable.

## Availability of data and materials

Voucher specimens were deposited at the mini-herbarium of Medicinal Plants Unit of Aklilu Lemma Institute of Pathobiology, Addis Ababa University. Ethnoveterinary data were stored in a computer available at Aklilu Lemma Institute of Pathobiology.

## Competing interests

Authors declare that they have no conflict of interests.

## Funding

The research was financially supported by Office of the Vice President for Research and Technology Transfer of Addis Ababa University. The Role of the Office is supporting academic staff and students to conduct problem-solving research and publish their findings.

## Authors' contributions

Proposal was drafted by MB and reviewed by MG, SF and TT. Ethnoveterinary data was collected and analyzed by MB. All authors participated in the write-up of the manuscript. All authors have read and approved the final manuscript.

## Acknowledgments

We are very grateful to the informants in Ambo District for their unreserved willingness to share their traditional knowledge with us on the use of plants for ethnoveterinary purposes. We thank Ambo District Administration Office and local elders for their support in the selection of informants, and Ambo District Agriculture Office for provision of information regarding number of veterinary clinics and animal health professionals in the District. Our thanks also go to Addis Ababa University for supporting the study financially. Last but not least, we thank Dr. Tadesse Eguale (veterinarian at ALIPB, Addis Ababa University) for his assistance in translating local names of livestock ailments into their English equivalents, based on descriptions of symptoms, and grouping the same into major diseases disease groups.

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## Tables

Table 1. Lists of medicinal plants used for treatments of livestock diseases in Ambo District

| Scientific Name                                | Family        | Local name     | Habit | Part used      | Local disease name                                    | English disease name               | Animal treated               | Administration route | Voucher number |
|--|---------------|----------------|-------|----------------|---|------------------------------------|------------------------------|----------------------|----------------|
| <i>Acacia abyssinica</i><br>Benth.             | Fabaceae      | laaftoo        | tree  | leaf           | bofatu arge<br>(afuura bofaa)                         | snake bite                         | bovine                       | topical              | MB-18          |
| <i>Acanthus pubescens</i><br>(Oliv.) Engl.     | Acanthaceae   | kosorruu       | shrub | root           | Dhibee ijaa   | eye infection                      | bovine,<br>ovine,<br>caprine | ophthalmic           | MB-20          |
| <i>Ajuga integrifolia</i><br><b>Buch.-Ham.</b> | Lamiaceae     | armaguusa      | herb  | leaf           | michii  | febrile illness                    | bovine,<br>ovine,<br>caprine | oral                 | MB-30          |
| <i>Allium sativum</i><br>L.                    | Alliaceae     | qullubbii adii | herb  | leaf<br>(bulb) | Dhukkuba<br>garaa keessaa,<br>ciniinnaa,<br>bokoka    | abdominal<br>pain, colic,<br>bloat | bovine,<br>ovine,<br>caprine | oral                 | -              |
| <i>Aloe pubescens</i><br>Reynolds              | Aloaceae      | argiisa        | shrub | leaf<br>sap    | Madaa waanjoo   | wound                              | bovine,<br>equine            | topical              | MB-40          |
| <i>Amaranthus caudatus</i> L.                  | Amaranthaceae | ayyaansoo      | herb  | leaf           | albaatii  | diarrhea                           | bovine,<br>ovine,<br>caprine | oral                 | -              |
| <i>Anethum graveolens</i> L.                   | Apiaceae      | insilaalee     | herb  | leaf           | bokoka  | bloat                              | bovine                       | oral                 | MB-53          |
| <i>Bidens pilosa</i><br>L.                     | Asteraceae    | dhama'ee       | herb  | root           | dhibeeijaa  | eye infection                      | bovine,<br>ovine,<br>caprine | ophthalmic           | MB-49          |
| <i>Brassica carinata</i><br>A.Braun            | Brassicaceae  | raafuu         | herb  | leaf           | bokoka  | bloat                              | bovine                       | oral                 | -              |
| <i>Brassica nigra</i><br>(L.) K.Koch           | Brassicaceae  | senaafica      | herb  | seed           | Rakkoo<br>dakamuu<br>nyaataa,<br>ciniinnaa,<br>bokoka | indigestion,<br>colic, bloat       | bovine,<br>ovine,<br>caprine | oral                 | -              |
| <i>Brucea antidysenterica</i><br>J.F.Mill.     | Simaroubaceae | qomanyoo       | shrub | root           | Dhibee sirna<br>hargansuu                             | breathing<br>problem               | bovine,<br>ovine,<br>caprine | oral                 | MB-10          |
| <i>Buddleja polystachya</i><br><b>Fresen.</b>  | Loganiaceae   | anfaara        | shrub | leaf           | bokoka  | bloat                              | bovine                       | oral                 | MB-48          |

|   |               |              |                    |                |                           |                            |                              |                               |       |
|---|---------------|--------------|--------------------|----------------|---------------------------|----------------------------|------------------------------|-------------------------------|-------|
| <i>Calpurnia aurea</i> (Aiton)<br><b>Benth.</b>         | Fabaceae      | ceekaa       | shrub              | leaf           | Injiraan<br>balleesuuf    | pediculosis                | bovine,<br>ovine,<br>caprine | topical                       | MB-39 |
| <i>Capsicum annuum</i> L.                               | Solanaceae    | barbaree     | herb               | fruit          | ciniinnaa                 | colic                      | bovine,<br>ovine,<br>caprine | oral                          | -     |
| <i>Carissa spinarum</i> L.                              | Apocynaceae   | agamsa       | shrub              | root           | Dhibee sirna<br>hargansuu | breathing<br>problem       | bovine,<br>ovine,<br>caprine | oral                          | MB-38 |
| <i>Chloris gayana</i><br>Kunth                          | Poaceae       | coqorsa      | herb               | whole<br>plant | afuurabofaa               | snake bite                 | bovine                       | topical                       | MB-19 |
| <i>Clematis hirsute</i> Guill. & Perr.                  | Ranunculaceae | hiddaadii    | Shrub<br>(climber) | whole<br>plant | Dhibee ijaa               | eye infection              | bovine,<br>ovine,<br>caprine | ophthalmic                    | MB-16 |
| <i>Coffea arabica</i><br>L.                             | Rubiaceae     | buna         | shrub              | seed           | Madaa                     | wound                      | bovine,<br>ovine,<br>caprine | topical                       | -     |
| <i>Croton macrostachyus</i><br><b>Hochst. ex Delile</b> | Euphorbiaceae | bakkanniisa  | tree               | leaf           | biichee, o'ichoo          | lymphangitis,<br>foot rot  | bovine,<br>ovine,<br>caprine | oral and<br>topical           | MB-01 |
| <i>Cucumis ficifolius</i><br><b>A.Rich.</b>             | Cucurbitaceae | hiddiihooloo | herb<br>(trailing) | fruit          | Rammoo garaa              | endoparasites<br>infection | bovine,<br>ovine,<br>caprine | oral                          | MB-15 |
| <i>Datura stramonium</i> L.                             | Solanaceae    | asaangira    | herb               | leaf           | qaafirafardaa             | systemic<br>illness        | equine                       | oral                          | MB-02 |
| <i>Dodonaea angustifolia</i><br>L.f.                    | Sapindaceae   | ittacha      | shrub              | leaf           | caba                      | fracture                   | bovine                       | tied on the<br>fractured site | MB-47 |
| <i>Ensete ventricosum</i><br>(Welw.)<br><b>Cheesman</b> | Musaceae      | warqee       | herb               | whole<br>plant | dhibeeijaa                | eye infection              | bovine,<br>ovine,<br>caprine | ophthalmic                    | MB-37 |
| <i>Eucalyptus globulus</i> Labill.                      | Myrtaceae     | bargamooadii | tree               | leaf           | michii                    | febrile illness            | bovine,<br>ovine,<br>caprine | fumigation                    | MB-23 |
| <i>Euphorbia lathyris</i> L.                            | Euphorbiaceae | adaamii      | herb               | stem<br>bark   | furroo                    | strangle                   | equine                       | fumigation                    | MB-17 |
| <i>Gardenia ternifolia</i>                              | Rubiaceae     | gambeela     | tree               | leaf           | dhibeeijaa                | eye infection              | bovine,<br>ovine,            | ophthalmic                    | -     |

|  |                |                |       |       |  |                                       |                        |                |       |
|--|----------------|----------------|-------|-------|--|---------------------------------------|------------------------|----------------|-------|
| <b>Schumach. &amp;</b>   |                |                |       |       |  |                                       | caprine                |                |       |
| <b>Thonn.</b>  |                |                |       |       |  |                                       |                        |                |       |
| <i>Hagenia abyssinica</i><br>(Bruce ex Steud.)<br>J.F.Gmel.      | Rosaceae       | heexoo         | tree  | fruit | Raammoo garaa                          | endoparasites infection               | bovine, ovine, caprine | oral           | MB-26 |
| <i>Ipomoea cairica</i> (L.)<br><b>Sweet</b>                      | Convolvulaceae | hiddaqarac     | herb  | root  | albaatii                               | diarrhea                              | bovine, ovine, caprine | oral           | MB-22 |
| <i>Juniperus procera</i><br>Hochst. ex Endl.                     | Cupressaceae   | gaattiraa      | tree  | leaf  | Maxxantoota alaa                       | ectoparasites infestation             | bovine, ovine, caprine | topical        | MB-12 |
| <i>Justicia schimperiana</i><br>(Hochst. ex Nees) T.<br>Anderson | Acanthaceae    | sansallii      | shrub | leaf  | dhukkuba saree ittisuuf                | rabies                                | bovine, ovine, caprine | oral           | MB-14 |
| <i>Kalanchoe</i> sp.   | Crassulaceae   | bosoqqee       | herb  | root  | abba sangaa, Kintaarotii               | anthrax                               | bovine, ovine, caprine | oral           | MB-52 |
| <i>Lens culinaris</i><br><b>Medik.</b>                           | Fabaceae       | missira        | herb  | seed  | Dhibee sharariitii                     | spider poisoning                      | bovine, ovine, caprine | topical        | -     |
| <i>Leonotis ocymifolia</i><br>(Burm.f.)<br><b>Iwarsson</b>       | Lamiaceae      | raaskimmirii   | herb  | leaf  | michii                                 | febrile illness                       | bovine, ovine, caprine | oral           | MB-29 |
| <i>Lepidium sativum</i> L.                                       | Brassicaceae   | feecoo         | herb  | seed  | bokoka, ciniinnaa, maxxantoota keessaa | bloat, colic, endoparasites infection | bovine, ovine, caprine | oral           | -     |
| <i>Linum usitatissimum</i> L.                                    | Linaceae       | talbaa         | herb  | seed  | Dhoqqeen garaatti goguu, dil'uuture    | constipation, retained placenta       | bovine, ovine, caprine | oral           | -     |
| <i>Malva verticillata</i> L.                                     | Malvaceae      | xoqonuu/liitii | herb  | root  | dil'uuture                             | retained placenta                     | bovine                 | oral           | MB-55 |
| <i>Nicotiana tabacum</i> L.                                      | Solanaceae     | tamboo         | herb  | leaf  | dhulaandhula, dhukkubagaraa,           | leech infestation,                    | bovine, ovine,         | nasal and oral | MB-04 |

|   |                |                  |                    |      |                               |  |                              |                |       |
|---|----------------|------------------|--------------------|------|-------------------------------|--|------------------------------|----------------|-------|
|   |                |                  |                    |      | ciniinnaa,<br>bokoka          | abdominal<br>pain, colic,<br>bloat       | caprine                      |                |       |
| <i>Nigella sativa</i><br>L.                             | Ranunculaceae  | abasuudagurracha | herb               | seed | ciniinnaa                     | colic                                    | bovine,<br>ovine,<br>caprine | oral           | -     |
| <i>Ocimum<br/>lamifolium</i><br>Hochst. ex<br>Benth.    | Lamiaceae      | daamaakasee      | shrub              | leaf | michii                        | febrile illness                          | bovine,<br>ovine,<br>caprine | oral           | MB-28 |
| <i>Ocimum<br/>urticifolium</i><br>Roth                  | Lamiaceae      | ancabbii         | shrub              | leaf | michii                        | febrile illness                          | bovine,<br>ovine,<br>caprine | oral           | MB-32 |
| <i>Phytolacca<br/>dodecandra</i><br><b>L'Hér.</b>       | Phytolaccaceae | andoodee         | shrub              | root | dhibee saree,<br>dhulaandhula | Rabies, leech<br>infestation             | bovine,<br>ovine,<br>caprine | oral and nasal | MB-03 |
| <i>Rhamnus<br/>prinoides</i><br>L'Hér.                  | Rhamnaceae     | geeshoo          | shrub              | leaf | dhibee saree                  | rabies                                   | bovine,<br>ovine,<br>caprine | oral           | MB-05 |
| <i>Ricinus<br/>communis</i> L.                          | Euphorbiaceae  | qobboo           | herb               | leaf | qabbana                       | foot and<br>mouth<br>disease             | bovine                       | oral           | MB-41 |
| <i>Rumex<br/>nepalensis</i><br><b>Spreng.</b>           | Polygonaceae   | tultii           | herb               | root | ciniinnaa                     | colic                                    | bovine,<br>ovine,<br>caprine | oral           | MB-25 |
| <i>Ruta<br/>chalepensis</i> L.                          | Rutaceae       | ciraakkota       | shrub              | leaf | michii,<br>dhulaandhula       | febrile illness,<br>leech<br>infestation | bovine,<br>ovine,<br>caprine | oral and nasal | MB-44 |
| <i>Salvia nilotica</i><br><b>Juss. ex Jacq.</b>         | Lamiaceae      | bokkolluu        | herb               | leaf | michii                        | febrile illness                          | bovine,<br>ovine,<br>caprine | oral           | -     |
| <i>Scadoxus<br/>multiflorus</i><br><b>(Martyn) Raf.</b> | Amaryllidaceae | caraanaa         | herb               | root | albaatii                      | diarrhea                                 | bovine                       | oral           | MB-54 |
| <i>Sida ternate</i> L.<br>f.                            | Malvaceae      | hiddalaaluu      | herb<br>(trailing) | root | albaatii                      | diarrhea                                 | bovine,<br>ovine,<br>caprine | oral           | -     |
| <i>Solanecio<br/>gigas</i> (Vatke)<br>C.Jeffrey         | Euphorbiaceae  | bosoqa           | herb               | leaf | michii                        | febrile illness                          | bovine,<br>ovine,<br>caprine | oral           | MB-31 |

|   |                |                |       |              |                                     |   |                        |                  |       |
|---|----------------|----------------|-------|--------------|-------------------------------------|---|------------------------|------------------|-------|
| <i>Solanum giganteum</i><br>Jacq.                             | Solanaceae     | hiddiiongorcaa | shrub | fruit        | qufaa                               | cough   | horse                  | oral             | MB-45 |
| <i>Stephania abyssinica</i><br>(Quart.-Dill. & A.Rich.) Walp. | Menispermaceae | kalaalaa       | herb  | leaf         | dhibee saree, madaa                 | rabies, wound                                   | bovine, ovine, caprine | oral and topical | MB-13 |
| <i>Tragia plukenetii</i><br>Radcl.-Sm.                        | Euphorbiaceae  | doobbii        | herb  | root         | dil'uuture, dhulaandhula            | retained placenta, leech infestation            | bovine                 | oral and nasal   | MB-11 |
| <i>Trigonella foenum-graecum</i> L.                           | Fabaceae       | abishii        | herb  | seed         | rammoogaraa                         | Endoparasites infection                         | bovine, ovine, caprine |                  | -     |
| <i>Vernonia amygdalina</i><br>Delile                          | Asteraceae     | eebicha        | shrub | leaf         | Michii, Bokoka, Maxxantoota keessaa | febrile illness, bloat, endoparasites infection | bovine, ovine, caprine | oral             | MB-06 |
| <i>Zingiber officinale</i><br>Roscoe                          | Zingiberaceae  | zingibila      | herb  | stem (tuber) | Dhibee garaa keessaa, bokoka,       | abdominal pain, bloat                           | bovine, ovine, caprine | oral             | -     |

Table 2. Informant consensus factor calculated for major disease categories in Ambo District

| Category of the disease    | Numbers of plant species | Number of informant citations | ICF  |
|----------------------------|--------------------------|-------------------------------|------|
| Ophthalmological           | 4                        | 18                            | 0.82 |
| Dermatological             | 10                       | 43                            | 0.79 |
| Febrile                    | 10                       | 40                            | 0.77 |
| Gastro-intestinal          | 19                       | 78                            | 0.77 |
| Snake and spider poisoning | 4                        | 12                            | 0.73 |
| Nervous system             | 6                        | 18                            | 0.71 |
| Respiratory system         | 5                        | 12                            | 0.64 |
| Reproductive system        | 3                        | 5                             | 0.50 |
| Others/unclassified        | 5                        | 6                             | 0.20 |

## Figures

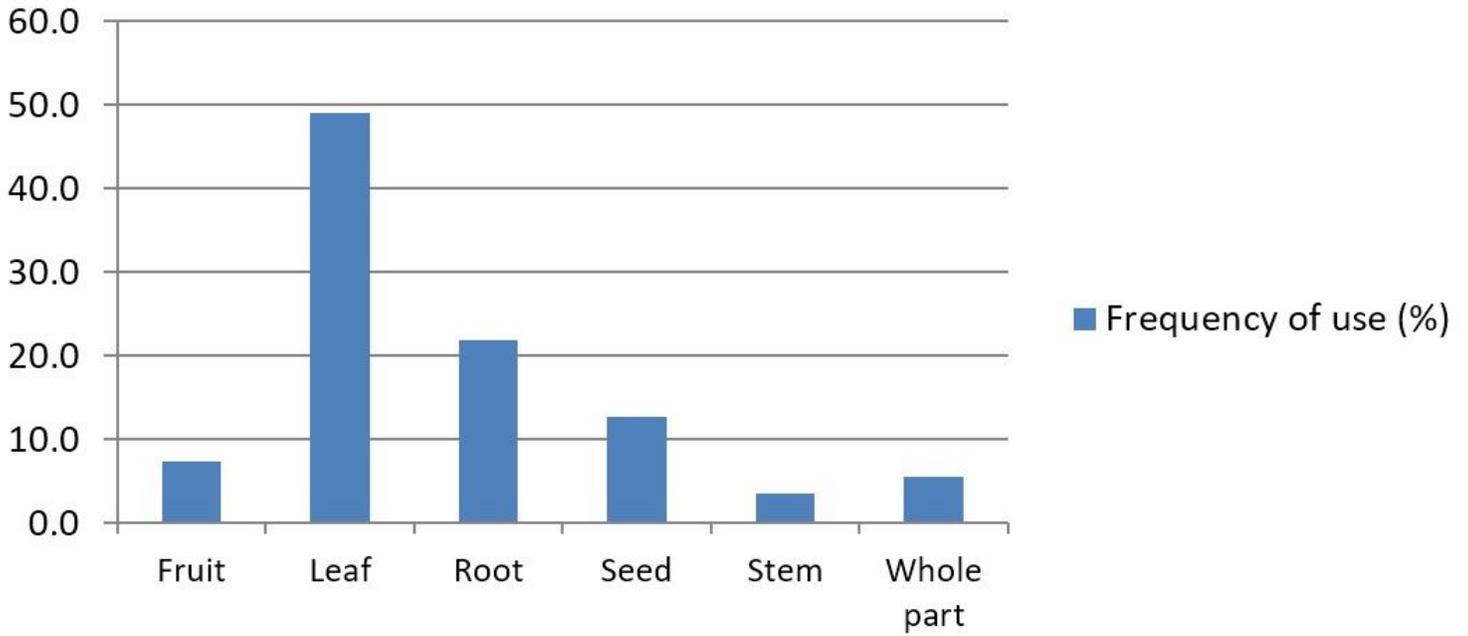


Figure 1

Frequency of plant parts used in preparation of remedies in Ambo District

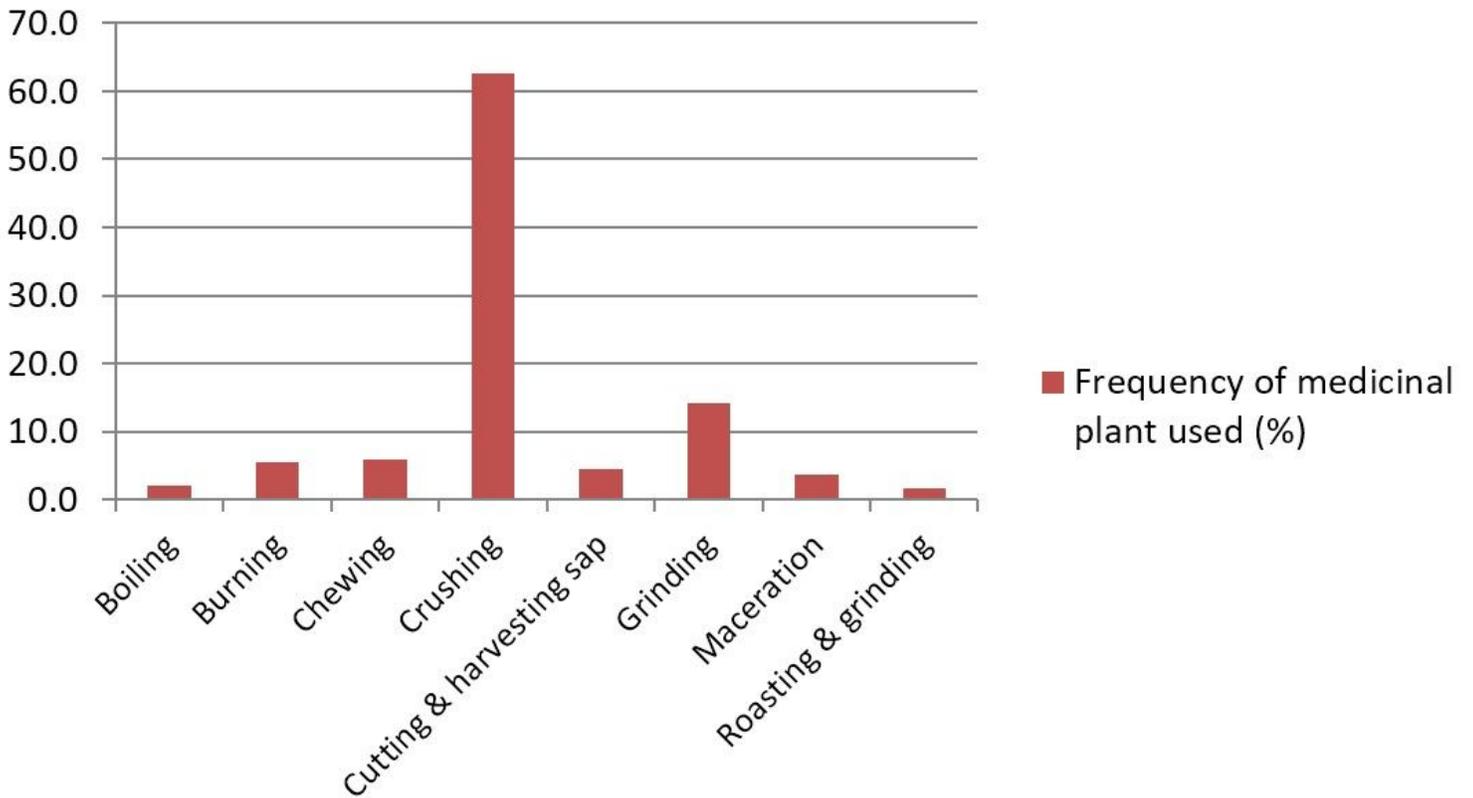


Figure 2

Frequency different remedy preparation methods in Ambo District