

# Assessment of traditional medicinal plant Ethnomedicinal value and its sustainable conservation Status used by indigenous people to treat Different Ailments in Babile District, Oromia Region, Ethiopia

## Abstract

Ethno-botanical study of medicinal plant was conducted to study use and management of traditional medicinal plants by indigenous people in Babile woreda. The Semi-structure interviews, observation and questionnaires were employed to obtain data. A total of 12 species of traditional medicinal plants were identified for treating human and animal ailments. The medicinal plants preparation were administered through oral, dermal, and nasal route. Oral application was the highest and followed by dermal application. The most commonly plant part used for medicine preparation were leaf 5(41.7%), seed 1(8.3%) root 1(8.3%), sap 3(25%) and bulb 3(25%), rhizome 1(8.3%). Agricultural expansion, fire wood collection and use of plant for construction were reported as major threats to medicinal plants of the study area. In order to protect the traditional plants the indigenous people of the Babile Woreda are cultivating some plants in home garden, while other cultivated on the farm land.

**Keywords:** ethno botany, healers, conservation, indigenous knowledge, medicine plant, dosage

Volume 6 Issue 3 - 2021

**Bekele Kindie, Chala Tamiru**

Ethiopian Biodiversity Institute, Harar Biodiversity Centre, Ethiopia

**Correspondence:** Bekele Kindie, Ethiopian Biodiversity Institute, Harar Biodiversity Centre, Tel +251953226601, Ethiopia, Email kindiebekele21@gmail.com

**Received:** May 03, 2021 | **Published:** May 17, 2021

## Introduction

Ethno-botany is the study of direct interrelation between human and plant.<sup>1</sup> In many countries of Africa, Asia and Latin America peoples depend on traditional knowledge and medicinal plant to meet some of their primary health care. For instant Africa up to 80% of population use traditional medicinal plants for their health care.<sup>2</sup> From plant human can obtain food, medicines, fuels, pesticides, construction materials and spiritual fulfillments. These indigenous knowledge on plants appeared when human started and learned how to use plants.<sup>3</sup> Plants have been used as sources of medicines in Ethiopia from time immemorial to treat different ailments. Due to its long history traditional medicines has in fact become an integral parts of the country side to treat some common ailments using plants available around them. Medicinal plants are very vital in their uses for medication, besides providing ecological, economic, and cultural services. The world primary means of treating diseases and fighting infections have been based on the use of medicinal plants. From ancient times, plants have been rich sources of effective and safe medicines.<sup>4</sup> According to,<sup>5</sup> 80% of the Ethiopian human population and 90% of livestock are depends on traditional medicines for their primary health care. More than 95% of traditional medicines preparations are plant origin<sup>6</sup> despite its significant contribution to society, traditional medicines has experienced very little attention in modern research and development and less effort has been made to upgrade the practice.

Over countries indigenous peoples have developed their own locality specific knowledge on plants use and conservation.<sup>7</sup> The complex knowledge, beliefs and practice generally known as indigenous knowledge develops and change with time and space, with changes of resources and cultures. Each indigenous people through time have developed its own ways of conservations of natural

indigenous knowledge. As the life of each community has evolved with the biota existence in their ecological set up, thus indigenous knowledge has developed because of human interaction with their ecosystems. To view this studies on traditional medicinal plants are use full in documentation, analyzing of the indigenous knowledge.<sup>1</sup> Herbal medicines treatment is believed to have been stated by early humans when people started to select their food from plants growing real they must have kept some of those which they found to cure some of their ailments.<sup>8</sup>

However, these plants have got little attention regarding the documentation of scientific names, uses, ecology, and conservation in Ethiopia, in particular and world-wise, in general. Moreover, in Ethiopia, traditional medicine is faced with a problem of sustainability and continuity mainly due to the loss of taxa of medicinal plants<sup>9</sup> besides having lack of quality control for herbal medicines. The main causes for the loss and decline of diversity of plants in Ethiopia are human-made factors.<sup>10</sup> Habitat destruction and deforestation for commercial timber and forest encroachment for urbanization, investment, agriculture, and other land uses are the major causes of the loss of many medicinal plant species. In addition to these, traditional medicinal plants and its associated traditional knowledge are being lost due to the lack of systematic conservation, research, proper utilization, and documentation.<sup>11</sup> The knowledge on identifying and managing of traditional medicinal plants with their parts, use, and ecology is mostly associated with local and elder people, who transmitted their knowledge verbally. These, verbal transmissions of indigenous knowledge on traditional medicinal plants have resulted in eroding and loss of knowledge and the plant materials as well. Therefore, this study was conducted in the following objectives.

1. To identify traditional medicinal plant species and composition used in Harar town for treatment of human and other animals.

2. To identify parts of plant used and method of preparation,
3. To assess the management practiced in the Town and
4. To collect information and document traditional medicinal plants for sustainable use ,conservation and managements

## Materials and methods

### Description of the study area

The study will be conducted at Babile district, Eastern Hararghe Zone of Oromia Regional State. It is located at 658 km far from Addis Ababa and 33 km from Harar city. Geographically, the study site is located at geographic position at latitude of 08°22'30"- 09°00'30"N and longitude of 42°01'10"-43°05'50"E (Yirmed *et al.*, 2006). The altitude in the sanctuary ranges from 850 to 1786masl. It is a semi-arid part of the eastern lowlands of Somali-Masai Biome which extends all throughout the Horn of Africa. Babile Elephant Sanctuary has quite a number of indigenous plants (trees shrubs and herbs).

### Selection of kebeles

Th study kebeles were selected purposely namely Erer Ibada, Ibada Gamachu, and Elemoo kebeles. From each selected kebeles 40 informants' respondent and twelve key informants (traditional healers) were selected systematically from each kebele. These kebeles was selected based on the availability of traditional medicine practitioners, traditional medicine use history, and altitudinal variation between kebeles.

### Sampling method

For this study both purpose and random sampling method were used to collect data. A total of 15 individual were selected. From those individual four were healers and one is agricultural experts were purposely selected from each kebele to conduct them directly and to collect information details about plants species used as traditional medicine, parts of plant used, method of preparation, dosage, route of administration and threats and conservation medicinal plants. .whereas 10 individuals are randomly selected from the kebele to ask their attitude toward traditional medicinal plants. The entire selected individuals were above the age of 20.

### Data collection

The data was collected by using different techniques of data collection methods. The semi structure interview was prepared and

conversation and discussion was being based on questionnaires prepared in English. The information was gathered systematically by speaking to the selected people from the kebele. Local name of medicinal plants, part used, method of preparation, disease treated and management system were collected.

### Data analysis

The collected data was analyzed by descriptive data analysis techniques such as percentages and medicinal plant used against a particular disease category the informant consensus factor (ICF) were be used the formula given by (Heinrich, 1998).

$$FIC = \frac{Nur - Nt}{Nur - 1}$$

Where,

Nur; is the "number of use-reports" or species used in each disease category and

Nt; is the number of taxa used for a particular use category by all informants.

The data and the result were also presented by using text and figures.

## Result and discussion

### Distribution and medicinal plants in the study area

In the study area a total of 12 plants species distributes in 12 families were recorded to have medicinal value for 14 different health problems. These plant species were used to cure both human and animal, 10(83.3%) for human and 2(16.6%) for animal respectively. The family myrtaceae was accounted the highest number of medicinal plants 2(16.6) species and followed by solanceae species 1 (8.3%) and Rutaceae 1(8.3%) while the other has 1 species. The presence of knowledge and practice on medicinal plants by Babile Woreda in each Kebeles healers show that the indigenous people of the area still depend on the traditional medicinal plants.

### Habitat of medicinal plant

In Babile Woreda the majority of medicinal plant species were obtained from forest area and some are collected from home garden, and grass land field. Of the total 12 medicinal plant collected from the study area 5(41.6%) trees, 5(41.6%) herbs and 2(16.6%) were shrubs species.

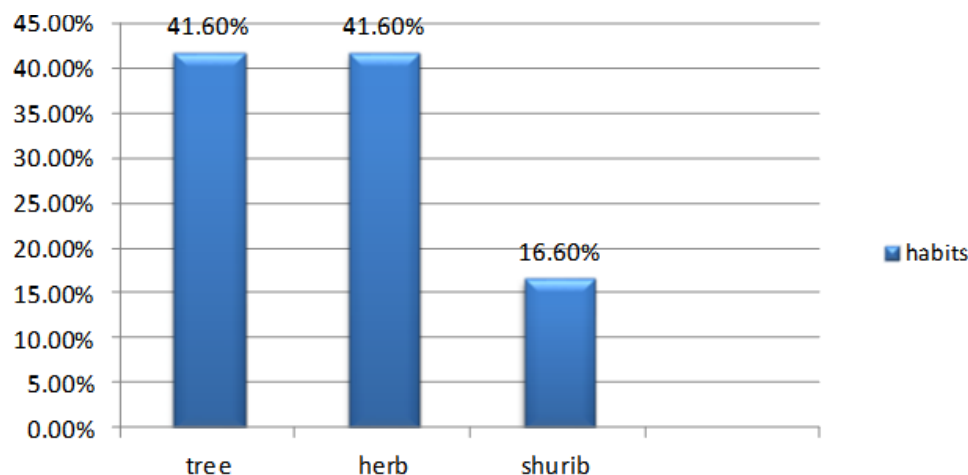


Figure 1 Habits of medicinal plants.

## Plant part used for medicine

In study area people used different plant parts for preparation of traditional medicine. This study shows that in Babile leaf is the most used part of plant with 5(41.7) followed by 3(25%), sap3 (25%) the bulb were and 1(8.3%) is seed, root 1(8.3%) and rhizome1 (8.3%)

Using leaves for preparation traditional medicine have few effects on the mother plants when we compare with other parts such as roots and sap ( This agree with some previously done in many part countries.<sup>12</sup> The preparation traditional medicine from parts of plants such as roots, bark and bulb have some effects on the survival of plants.

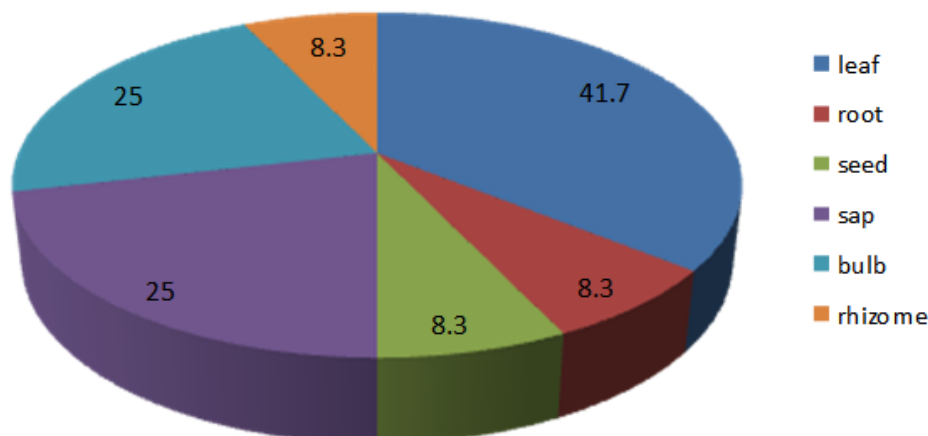


Figure 2 Parts of medicinal plants used.

## Medicinal plant used to treat animal ailments

In the study of Babile Woreda the majority of medicinal plants are identified to treat human disease was more than that of livestock's disease. Total of 12 plant species were identified under 2 families to treat livestock's ailments. In the study area people mostly use

traditional medicine plants to treat livestock's disease, due to it is cheaper than modern medicine (Appendix 1). According to Mccorkle<sup>13</sup> Ethno veterinary medicine provide traditional medicines which are local available and usually cheaper than standard treatment live stock holders can prepared and use homemade remedies with minimum expenses.

### Appendix I List of medicinal plants

Scientific Name and plant habit	Family	Local Name	Health problem treated	Part(s) used, Mode of Preparations and application	Route of application
Allium sativum L. Herb	Alliaceae	Qullubi adii	Stomach ache*	Bulb: Bulb will be eaten when there is pain	Oral
			Cough*	Bulb: Bulb will be crushed and eaten	Oral
			Febrile*	Bulb: Bulb pounded with the leaf of Ruta chalepensis and eaten	Oral
Croton macrostachyus Del.Tree	Euphorbiaceae	Bakkanisa	Ring worm*	Sap: Sap will be rubbed against the affected body part	Dermal
			Wound**	Sap: Sap will be rubbed against the affected body part	Dermal
Solanum incanum L. Herb	Solanaceae	Hiiddi	Stomach ache*	Root: Root tip will be chewed and swallowed	Oral
Eucalyptus camaldulensis Dehnh.Tree	Myrtaceae	Baargamoo diima	Stomach ache*	Leaf: Leaf will be chewed and swallowed	Oral
Eucalyptus globules Labill Tree	Myrtaceae	Baargamoo adii	Common cold*	Leaf: Leaf will be boiled and the steam will be inhaled	Nasal
Schinus molle L.Tree.	Anacardaceae	Qundoobarbaree	Blotting**	Leaf: Leaf will be pounded mixed with hot pepper and water and given to the animal	Oral
Catha edulis (Vahl) Forssk. ex Endl. Shrub	Celastraceae	Caati	Gonorrhea*	Leaf: Leaf will be infused into tea and drunk	Oral
Cucurbita pepo L. Herb	Cucurbitaceae	Dubaa	Tape worm*	Seed: Seed will be roasted and eaten	Oral

Table Continued...

Scientific Name and plant habit	Family	Local Name	Health problem treated	Part(s) used, Mode of Preparations and application	Route of application
Euphorbia abyssinica Gmel. Tree	Euphorbiaceae	Adaami	Wound**	Sap: The sap will be applied onto the wound	Dermal
Ruta chalepensis L. Herb	Rutaceae	Teenaadaam	Stomachache*	Leaf: Leaf will be crushed mixed with coffee and drunk	Oral
Zingiber officinale Roscoe Herb	Zingiberaceae	Jinjibilli	Tonsillitis*	Rhizome: Rhizome will be crushed together with Solanum incanum flower and applied	Oral

### Medicinal plant used to treat both human and animal

The indigenous people of the study area use single plants to cure both human and animal diseases. A total of 12 species of medicinal plant used for both animal and human ailment treats were identified. These plants were gathered from the wild source and home garden (Appendix 1).

### Preparation method of medicinal plant

The preparation of traditional medicine by indigenous people employs various method of preparation of traditional medicine for different types of ailments. The preparation ways is vary based on the types of disease and the actual site of ailments. The principal method of preparation reported was crushing. This may be due to its highest medicinal value. In the study area people using single plant part or mixing with different part of the same plants or different plants such as coffee, tea and also use some additive like alcohols. Using additive for preparation of medicine reported bay some researcher.<sup>6,12</sup>

### Dosage and route of administration

In the study area the dosage of medicine to administer is gives by observing and guessing the physical appearance of the patient. Lack of the standard dosage may affect the health of the patients. According to Dawit et al.<sup>5</sup> lack of precision in the dosage is one of the major drawbacks of practicing traditional remedy. As many parts of the county the routes of administration of people of the study area are applied internally such as oral nasal, and externally including dermal.

### Threats to medicinal plants

From the informants various factors were recorded as the main threats of medicinal plants in Babile. These threats are plant uses for fire wood collection, house construction; overgrazing, agricultural expansion and urbanization were reported to be factors for decreasing of natural vegetation. Indigenous knowledge and traditional medicine used were kept secret and transferred orally from generation to generation, this also contributing the loss of indigenous knowledge and traditional medicinal plants. According to Ensermu Kelbessa<sup>14</sup> there are two sources of threats to medicinal plants i.e. manmade and natural causes. Rapid increase in population the need for fuel, urbanization, timber production, over harvesting, destruction, invasive species, commercialization degradation agriculture expansion and habitat distraction are man made threats to medicinal plants. Likewise natural causes include recurrent drought bush fire, diseases and pest but break.

### Conclusion and recommendation

Babile district is relatively rich in medicinal plant diversity. Twelve (12) medicinal plants were recorded. Of these, 10 and 2 species were noted to treat human ailments and livestock only, respectively, while 1 species were used to treat both livestock and human ailments. The medicinal plant species were identified largely from the forest and home gardens. Totally 12 ailments of human and livestock were reported to be treated by traditional medicinal plants of the area.<sup>15–20</sup>

Herbs constitute the main source of traditional remedies followed by tree and shrub species. Leaf were also found to be the most frequently used plant parts followed by sap for preparation of human and livestock remedies. The main threat for medicinal plants in the area arises from agricultural expansion, fire wood, charcoal production, and construction. Threat comes to medicinal plants due to the utilization of these plants for medicinal purpose is negligible. Whereas threats that erode indigenous knowledge emanate from secrecy, oral based knowledge transfer, reluctance of young generation to gain the knowledge, unavailability of the species, influence of modern education and awareness factors are the major ones. Therefore, awareness rising should be made among the healers so as to avoid erosion of the indigenous knowledge and to ensure its sustainable use. Further biological studies should also be conducted on the reported medicinal plant species of the study area so as to utilize them in drug development.<sup>20–31</sup>

Based on the result of the study finding the following recommendations were forwarded;

1. The local people need to be trained, encouraged and supported on how to conserve and manage the medicinal plant species and whole plant resources found in their area.
2. Local community must be aware of preserving indigenous knowledge on medicinal plants
3. Local people must be taught of growing medicinal plants in home gardens mixing with crops in the farm lands and live fences.
4. Raising awareness of the young generation to avoid negative impacts on the medicinal plants and associated knowledge in the area, hence, documentation of the medicinal plants of the area needs to continue.
5. Attention should be given to standardization of measurement and hygiene of the medicines made from plants by training both the healers and other members of the local community.



## Declarations

### Authors' contributions

Authors were involved in the all manuscript content work through data collection and writing of the manuscript as well as read and approved the final manuscript for submission and publication.

### Competing interests

All authors declare that there are no competing interests.

## Availability of data and material

The recorded raw data used for analysis and supplementary information files is available at the author's hand and within the article.

## Acknowledgments

The authors' special word of thanks is to Ethiopian biodiversity institute, Harar biodiversity center and the studied area of local communities who were so kind and willing to supply us with information on traditional medicinal plants.

## Funding

None.

## References

- Martin GT. Ethno botany; A method mannual. Chapman and hall. London. 1985: 256–270.
- Worku Abebe. Traditional pharmaceutical practice in Gonder region, North West Ethiopia journal WHO (2001) planning for cost effective traditional health services in the new century discussion paper. *Pharmacology*. 1999;34-47.
- Possey D. Ethnobotany: its implication and application, proceeding of the first international congress of Ethnobiology. 1999;1-7.
- Russell SJ, Karunaratne NS, Mahindapala RT. Rapid inventory of wild medicinal plant populations in Sri Lanka. *Journal of Biological Conservation*. 2006;132(4):22-32.
- Dawit Abebe, Ahadu Ayelu. Medicinal and enigmatic health practice of north Ethiopia Birhanesalam printing enterprise. *Addis Abeba*. 1993:341.
- Dawit Abebe. Traditional medicine in Ethiopia. The attempt being made to promote it for effective and better utilization. SINET; J.Sci. 1986;9:61-69.
- Cotton CM. Ethno botany principle, and application John Wiley and son's New York. 1996:4/2,
- Jansen PCM. Spices condiment and medical plants in Ethiopia their taxonomy and agriculture significance center for agricultural publishing and documentation, Wageningen, Netherland. 1981:1-32.
- Kelbessa E, Demissew S, Wolde Z. Some threatened endemic plants of Ethiopia. In the Status of Some Plants in Parts of Tropical Africa. NAPRECA, No. 2. East and Central Africa: Botany. 2000; 1992:35–55.
- Tolossa T, Megersa M. Ethnobotanical Study of Medicinal Plants Used to Treat Human Diseases in Berbere District, Bale Zone of Oromia Regional State, South East Ethiopia. London: Hindawi. 2019.
- Birhane E, Aynekulu E, Endale D. Management, use and ecology of medicinal plants in the degraded dry lands of Tigray, Northern Ethiopia. *Journal of Medicinal Plant Research*. 2011;5(3):309-318.
- Mirutse Giday. An ethno botanical study of medicinal plant used by Zey people in Ethiopia Msc.Theses.
- Maccorkle CM. Ethnoveterinaries research. Development extension for studying and applying knowledge. *Journal of agricultural and human value society*. 1995;22(2):52-80
- Ensermu Kelbessa. Some threatened endemic plants of Ethiopia and The status of some plants in port of tropical Africa pp35-55. NAPRECA. No2 Botany 200: East and central Africa. 1992.
- Abbink J. Menritua, medicinal and other plants. A contribution to southwest Ethiopian *ethno botany journal of Ethiopian studies*. 1993;26(2):1–21
- Abbink J. Medicinal and ritual plants of Ethiopia south west; An accounts of recent research of indigenous knowledge and development monitor. 1995;3:6–8
- Alcorn BJ. Huastec may an ethno botany university of tax press. *Austin USA*. 1984.
- Amare Getahun. Some common medicinal and poisonous plants used in Ethiopia Folk Medicine. Addis Abeba University. 1976.
- Asfew Debela, Kelbessa Urge. An overview of traditional medicinal. In Ethiopia prospective and development efforts, pharmaceutical association silver jubilee Anniversary. *Pharmaceutics Association Addis Abeba Ethiopia*. 1999;45–53.
- Balick MJ. Transforming ethno botany for new millennium Ann. *Missouri Bot. G*. 1966;83,58–66.
- Balick MJ. Plants people and culture science of ethno botany New York. 1996.
- Dawit Abebe. Traditional medicine in Ethiopia .The attempt being to promote it for effective and better utilization. SINET; *Ethiopia, journal of science*. 1996:62–69.
- Dawit Abebe. The role of medicinal plants in health care coverage of Ethiopia, the possible integration. Conservation and sustainable uses of medicinal plants in Ethiopia. 2001:6–21.
- Desalegn Dessissa. Use and conservation status of medicinal plants used by shinsasha people EWNH and Addis Ababa. 1996.
- Medhin Zewdu, Abebe Demissie eds.. Proceeding of the National workshop. IBCR, Addis Ababa. 1988.
- Migirsa Kebab. Utilization of plant medicine for treatment of health problems. The case of Oromo of chore distinct Illuababor zone western Ethiopia. *Journal article of health development*. 1999;10(3):161-16
- Pankhurst RA. Historical reflection on the traditional Ethiopian pharmacopeias. *Journal of Ethiopian pharmaceutical Association* 1965;2:29-33.
- Quansh N. Bicultural diversity and integrated health care in Madagascar. *Nature and resource*. 1998;30:18-22.
- Sebu Keera. Africa environment outlook 2; forest and wood land. 2001.
- Tafesse Mesfin and Mekonen Lemma. The role of traditional veterinary herbal medicine and its constraints in animal health care system in Ethiopia. In: Biodiversity Conservation and Sustainable use of medicinal plants in Ethiopia. 2001.
- Thomas H. Indigenous knowledge. Emancipation and Alienation. *Journal of knowledge transfer and utilization university of Washington*. 1995;8(1):63-73.

## Questionnaires and interview

- What are the main common human health problems or disease in your locality?
- What are the main or most common livestock (animal) health problem or diseases?

3. List plant species used to treat a given disease in your area?
4. List plants used treat both human & live stock disease?
5. Which plant do you use to treat that particular health problem?
6. Are medicinal plant easily accessible?
7. How do you assess a accessibility of medicinal plants when compared with the past decade?
8. Are the local people conserve the medicinal plants separately from other plants? A/yes B/no
9. How do you conserve medicinal plants?
10. Are the people in your area aware of the highly threatened traditional medicinal plants? A/Yes B/No
11. If your answer for question #11 is yes, are they ready to conserve not to loss the left?