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### **Research Article**

### Ethnobotanical study of traditional medicinal plants in Boreda woreda, Southern Ethiopia

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#### **Abstract**

Plants are the major and cheap sources of traditional medicine. Countries like Ethiopia with ethnic and cultural diversity own a vast treasure of indigenous knowledge of medicinal plants. However, much of this knowledge remained undiscovered for generations. The objective of this study was to investigate the traditional knowledge of medicinal values of plants in Boreda woreda in two kebeles. A survey was conducted on purposively selected five key informants of healers and 25 elders who provide traditional healing service in the locality. An informant consensus factor and preference matrix analysis was employed to analyze the data. Identification of taxonomic class of plants was carried out using expert methods and Flora of Ethiopia and Eritrea. Overall, 35 medicinal plant species belonging to 22 families were recorded. About 63% of the plants found to be herbs and 20% of them were trees, and the remaining were shrubs. About 75% of the plants were used for treatment of human ailment. Leaves of herbs were the most widely used part of the plants followed by root and stem. According to preference matrix analysis *Citrus x limon* (L.) Osbeck, *Nigella sativa* L. and *Ocimum forskolei* Benth., were the first three priority plants by the indigenous people for internal pain treatment. There is high level (0.78) of consensus of using medicinal plants for various diseases treatment among the community. Therefore, such high value indigenous knowledge should be conserved and the medicinal plants need to be protected.

**Keywords:** Biodiversity; Boreda; Ethnobotany, Hambissa; Medicinal plant

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#### 1. Introduction

Plant as primary food producers plays an irreplaceable role in balancing ecological life cycle. Besides this vital role, plant have been used for treating various diseases (Fabricant and Farnsworth, 2001; Michael, 2006). Several studies showed that around the world people are still highly dependent on plant-derived medicines (Dawit, 1986; Mengistu, 2010; Belayneh et al., 2012; Mirutse and Tilahun, 2013; Tilahun, and Moa, 2018). Over 80% of the world's population gets treatment directly from plant product medicines (Tilahun, and Moa, 2018). According to

Zao et al. (2019), traditional medicines from plant roots, stems, leaves and fruits or seed parts were used for treating several diseases in China. Similar practice of using different plant parts for healing of different diseases also reported in Turkey (Polat, 2019). Traditional preparation of medicine from the tissues of plants may vary from place to place. Most of the time crude extraction with water is used.

Indigenous communities in several Asian and African nations have a strong cultural tradition of using medicinal herbs (Subramanyam et al., 2008). In particular, the rural population uses traditional herbal medicine as their main source of healthcare (Haile and Delenasaw, 2007; Mohammed and Berhanu, 2011). Additionally, according to WHO (2019), 60–70% of Ethiopians practice traditional medicine. Due to Ethiopia's many languages, cultures, and beliefs, as well as its great geoclimatic diversity, which has facilitated the establishment of various habitats for medicinal plants, there is a high anticipation of extensive traditional knowledge and use of medicinal plant species (Cunningham, 2001).

Only few members of the communities are allowed to practice healing. The healing skills are transferred to generations through inheritance from family members. These are made through verbal communication and demonstration. As the last successor (the old person) who owned the knowledge is about to die, the training begins and usually ends with the death of the elder. This results in the loss of most of the knowledge before it is completely transferred. Beside such specific people, the larger community has some commonly held knowledge about plants. Therefore, this study aimed at assessing some commonly used medicinal plants by Boreda indigenous people. The study also tried to discover how much of the traditional knowledge is owned by ordinary people. Boreda is located in remote area. There is no direct highway or subway road that links the area to main cities. Hence, investigation of an original traditional knowledge from such remote area has great value for ongoing science in the field of ethnobiology.

#### 2. Materials and Methods

### 2.1. Study area

This study was conducted from mid of April to end of June 2021 in Boreda area, Gamo zone, Ethiopia. Boreda woreda is located in between 6° 22′ 0″ N to 6° 42′ 30″ N longitude and 37°31′ 15″ E to 37° 48′ 45″ E (Fig.1) at average altitude of 2185masl. It is just at the upper shaft of East African Rift Valley with beautiful undulating landscape. Indigenous ethnic group (Gamo) inhabited the area for more than five hundred years (Freeman, 1999). According to the CSA's 2007

census, there are 67,960 people living in the region, with 34,460 men and 33,500 women. Of these, 2,761 (4.06%) are urban dwellers. The people of Boreda are settled farmers. They harvest crop like maize (*Zea mays*), teff (*Eragrostis tef*), coffee (*Coffea arabica*), and enset (*Ensete ventricosum*). Some people are engaged with cattle husbandry. The study was conducted particularly in two adjacent kebeles known as Hamibisa and Meteka mele. According to CSA (2007) census, both kebeles have total population of 4625 (2308 men and 2317 women). The climate of the area is predominantly characterized by moist lowland and with mosaic dry lowland and moist mid highlands (Azene, 2007). The hottest and coldest months of the year are March and December, respectively. Average annual precipitation is 1180.5 mm (year 2025).

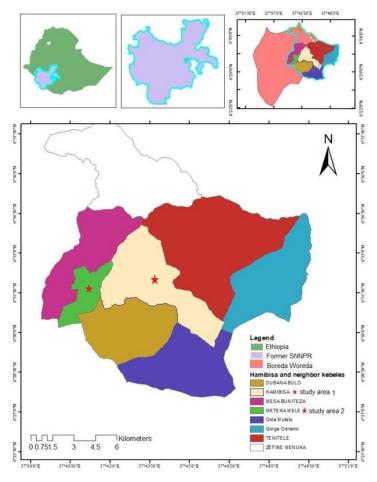


Figure 1. Map of the study areas with other neighboring kebeles (ArcGIS 10.1).

## 2.2. Data collection methods

To get relevant data, 30 informants with the age of 30 to 45 (8 female and 22 male) were identified and divided into two groups. Five (two from Meteka mele and three from Hamibisa) of the informants were traditional healers and the remaining (10 from Metekamele and 15 from Hamibisa) were other community members. The elites of traditional healers were purposively

selected. Elder informants were selected from the community randomly. Two separated questionnaires were prepared in the local language (Gaammoththo doona); one for traditional healers and the other for the community elders who used the traditional medicinal plants for human and animal ailments. Informal interview method has been used by which plant specimen were demonstrated following Bernard (1988). Informants were asked to give information for local name of traditional medicinal plants, parts used, disease treated, and methods of preparation. Besides this, the limitations of traditional medicine and its side effects were discussed. Guided field walk method was used for some community members. Plant samples were collected from randomly selected gardens of farmer's house. Plants were, then, pressed and preserved following appropriate herbarium techniques following Lucilene et al. (2013). Plant taxonomic identification was made through expert methods and crosschecked with Flora of Ethiopia and Eritrea.

#### 2.3. Data analysis

#### 2.3.1. Quantitative analysis

Microsoft Excel 2010 was used for sorting plant names for quantitative analysis based on informant's response and field observations.

## 2.3.2. ICF analysis

To find out whether the informants agreed with the reported plant remedies for the group of illnesses, an ICF analysis was conducted. It also gauges the informants' level of awareness. In accordance with Troter and Logan (1986), the ICF was computed as follows (Eq. 1).

$$ICF = \frac{n_{ur} - n_t}{n_{ur} - 1} \tag{1}$$

Where ICF = Informants Consensus Factor, nur = number of use citation in each category, nt = number of species used

#### 2.3.3. Preference ranking

Following Martin (1995), a preference ranking was carried out for five significant medicinal herbs that are used to treat internal parasites that cause sickness in humans and livestock. In order to determine the most popular medicinal herbs for treating internal parasites, five randomly chosen informants took part in the study. After being handed the plants, the informants were asked to rank the medicinal plants according to how often they were used. They were to provide the greatest number (5) to the most favored plant species, the lowest number (0) to the least preferred plant, and a value in between for the remaining plants. The findings were then compiled for each respondent and arranged according to the sum of the ratings for every medicinal plant.

### 3. Results and Discussion

### 3.1. Medicinal plant diversity

Overall, 35 plants belonging to 22 families were identified as Traditional medicinal plants (TMP) used by the people in the study area (Table 1). A similar study in Northern Ethiopia showed that more than 80 species of medicinal plants records (Seyoum and Zerihun, 2014) and more than 130 species in Delanta in Northern Ethiopia (Misganaw et al., 2015). This might not be surprising because in the former studies, data were collected from geographically larger areas.

The agro-climatic condition variation among the study locations can be the factors that might account for the species richness of the traditional medicinal plants in those areas. Mirutse et al. (2003) has also speculated that reduction of medicinal plant diversity induced could be driven by deforestation. In the present study, five plant species belong to Solanaceae, four to Euphorbiaceae and three to Lamiaceae families. Lamiaceae and Euphorbiacea were also reported to be among the first three top plant families for medicinal plants sources elsewhere (Ermias et al., 2008; Seyoum & Zerihun, 2014). Nearly 63% of the TMP collected were herbs and only 20% were found to be trees (Fig.3). The present findings agree with the work of others (e.g., Mirutse et al., 2003; Misganaw et al., 2015), where herbs are found to be the most frequently used plants in traditional medicine. This high proportion of herbs in traditional medicine is due to relatively higher abundance, easy adaptability and mulifunctionality (Guo et al., 2023). About 75% of the plant samples were used to treat human ailments and about 17% of the plants were used to treat livestock ailments (Table 1).

The indigenous people has also learnt and classified the medicinal plants based on route of administration and target organ for treatment as plant for eye; plant for abdomen and plant for skin. Over 70% of the plants were administered orally to treat intestinal (internal organ) diseases. Plants like *Withania somnifora, Geranium maculatum, Ocimum lamiifolium* were used in diluted form to treat various type internal pains. About 20% of medicinal plants were also mentioned as they were used for skin care and related problems. Such plants were used for skin wound, lesion, tumor, and even as disinfectants for body and household equipment. Some of the plants used for dermal treatment were *Commelina diffusa, Croton macrostachyus* and *Euphorbia tirucalli. C. diffusa* has been identified as plant with anti-fungal properties (Prima et al., 2019). The later species were also reported for similar function in other places (Dawit et al., 2003).

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Table 1. Medicinal Plants and physiognomic features with their use parts and administration route in Hamibisa kebele Gamo zone, Ethiopia

Table 1. Medicinal Plants and physiognomic features with their use parts and administration route in Hamibisa kebele Gamo zone, Ethiopia								
Taxonomic Name of the plant	Family	LN	HB	PU	Disease treated	TO	RA	
Allium cepa (L.)	Alliaceae	Qeyshinkurt	H	Root	Coughing	Hu	Oral	
Allium sativum (L.)	Alliaceae	Nech-shinkurt	H	Root	Comman cold	Hu	Oral	
Aloe vera (L.) Burm.f.	Aspodelaceae	Godere-uta/rett	H	Stem	Eye disease	Hu	Ocular	
Amaranthus caudatus (L.)	Amaranthaceae	Gagabsa	H	Seed	Internal organ broken	Hu	Oral	
Asparagus scaberulus (A. Rich)	Asparagaceae	Sereta	S	Leaf	Diarrhea	Hu & L	Oral	
Capsicum annuum (L.)	Solanaceae	Qarya	H	Fruit	Rumen disease	Hu	Oral	
Citrus x limon (L.) Osbeck	Rutaceae	Lome	T	Fruit	Internal	Hu	Oral	
Clinopodium nepeta (L) Kuntze	Lamiaceae	Gulo	S	Leaf	Wart	Hu	Dermal	
Combretum molle R.Br. ex G. Don Commelina diffusa Burm.f.	Combertaceae Commelinaceae	Ambe Dal'aso	T H	bark stem	Tonsil Lesion on head	Hu Hu	oral dermal	
Croton macrostachyus Hochst. ex Delile	Euphorbiaceae	Bisana	T	leaf	Wound	Hu	Dermal	
•	•					пи		
Datura stramonium (L.)	Solanaceae	Machara	Н	leaf	External parasite	L	Dermal	
Dirichletia glaucescens (Hiern) verdc.	Sapindaceaae	Tora-tuko	S	Leaf	Internal pain	Hu	Oral	
Ehretia cymosa Wild. exRoem.&Schult.	Boraginaceae	Esirwanja	T	leaf	Tumor	L	Oral	
Eragrostis tef subsp. red (Zucc.) Trotter	Poaceae	Zo'ogashe	Н	seed	Internal pain	Hu	Oral	
Euphorbia tirucalli (L.)	Euphorbiaceae	Qinchib	T	Stem	Wart	Hu	dermal	
Foeniculum vulgareMill.	Apiaceae	Caticala/ensilal	Н	leaf Stem	Stomach discomfort	Hu	Oral	
Jatropha curcas (L.)	Euphorbiaceae	Jatropha	MT	leaf	Cut and wound	Hu	Dermal	
Linum usitatissimum (L.)	Linaceae	Telba	H	Seed	Bone brake	Hu	Oral	
Manihot esculenta (Crantz)	Euphorbiaceae	Mithaboye	Н	Tip of stem	cholera	L(hen)	Oral	
Moringa stenopetala (Baker f.) Cufod.	Moringaceae	Halako	T	Root	malaria	Hu	Oral	
Nigella sativa (L.)	Ranunculaceae	Tikurazmud	Н	Seed	Internal parasite	Hu	Oral	
Ocimum forskolei Benth	Lamiaceae	Shasha	S	root	Internal parasite	L	Oral	
Ocimum lamiifolium Hochst. ex-Benth	Lamiaceae	Waselo/damakesse	Н	leaf	Anemia	Hu &L	Oral	
Oxalis radicosa Tent. Fl. Abyss.	Oxalidaceae	Zil'emata	H	leaf	Tumor	Hu	Dermal	
Pelargonium whytei Baker	Geraniaceae	Ayin-fiqir	Н	leaf	Lesion	Hu	Dermal	
Ç ,		• •						
Ruta chalepensis(L.)	Rutaceae	Tena'adam	H	leaf	Internal parasite	Hu	Oral	
Solanum coagulans Forssk.	Solanaceae	Yegomen	Н	leaf	Coughing	Hu	Oral	
Solanum incanum (L.)	Solanaceae	Embway	H	root	Stomach disease	Hu	Oral	
Spilanthes costata Benth.	Asteraceae	Aydame	H	Leaf	Tonsil	Hu	Oral	
Vachellia nilotica sbsp. nilotica (L) Del.	Fabaceae	Girar(chacha)	T	Stem tip	Eye disease	L	Ocular	
Vernonia amygdalina Delile	Asteraceae	Girawa	MT	leaf .	Internal parasite	L	Oral	
Withania somnifera (L.) Dunal	Solanaceae	Girosana	Н	root	Internal parasite	L	oral	
Zingiber officinale Roscoe	Zingeberaceae	Zingibil	Н	Stem	Common cold and	Hu	Oral	
Zingiver officialite Roscoc	Zingeberaceae	Ziligion	11	Stelli	common cora ana	114	Orai	

H= Herb, T=Tree, S=Shrub, MT= Medium Tree, Hu= Human, L=Livestock, TO=Target organism, RA=Root of administration, LN=Local name, HB=Habit, PU=Plant part use

Twenty-two plant families with their relative abundance of species is presented in Figure 2. Solanaceae family with five species leads while Amaranthaceae and other 14 families were at the bottom, each with one representative species in the study area.

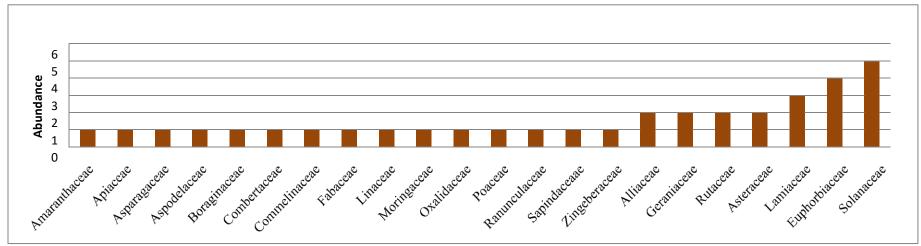


Figure 2. Medicinal plants with respect to their taxonomic family group distribution

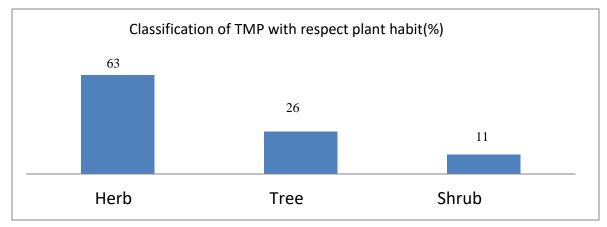


Figure 3 Medicinal plant comparisons with respect to plant habit

Traditional Medicinal Plant were highly out sourced from herbs (Fig. 3). This might be because the trees and shrubs are being used extensively for fuel and other destructive uses (Helmut, 2023).

Almost in all plant habit, the leaf parts have been used as medicine (Fig. 4). Debela et al. (2006) and Tilahun and Moa (2018) reported that root as major part of the plant used as medicine followed by leaf and shoot. Higher score observed in herbaceous plant. Surprisingly utilization of fruit as medicine was observed only in herbaceous plants. This might be due to the target sampling area which was only restricted to plants in the garden holdings.

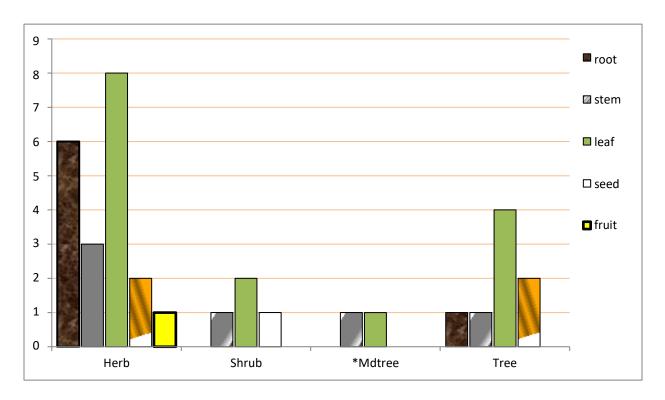


Figure 4. Plant habit and their tissue parts used for treatment (\* Mdtree = medium tree)

### 3.2. Preference ranking of medicinal plants

In this study, five key informants (A-E) were selected to conduct ranking on medicinal plant based on priority to treat internal parasite and related pin (Table 2). *Citrus x limon* was prioritized first followed by *Nigella sativa* and *Ocimum forskolei*.

Table 2. Preference ranking of top five medicinal plants for internal parasite and related pain treatment

Plant species	Respondents(A-E)score for the plant							
	A	В	C	D	F	Total	Rank	
Nigella sativa	5	4	5	4	3	21	$2^{nd}$	
Ocimum forskolei	2	4	4	1	4	15	$3^{rd}$	
Carphalea glaucescens	0	1	3	1	0	5	5 <sup>th</sup>	
Citrus x limon	5	3	5	4	5	22	$1^{st}$	
Ruta chalepenses	3	5	3	3	2	16	$4^{th}$	

## 3.3. Knowledge level of the community towards uses of 10 selected plants

Analyses on homogeneity of knowledge level for 10 randomly selected medicinal plants were carried out on randomly selected respondents. The results are presented in Table 3.

Table 3. ICF analysis for common uses of top 10 randomly selected medicinal plants

Treatment use category	Nt	%nt(sp)	ur	%(Ur)	ICF
Internal parasite	8	80	47	23.74	0.847826
Common cold	8	80	40	20.20	0.820513
Wound healing	10	100	42	21.21	0.780488
Lesion	10	100	39	19.70	0.763158
Tumor	10	100	30	15.15	0.689655
Total					0.780328

The informant consensus for the various diseases treated by the traditional medicinal plants in the study region was displayed in Table 3's ICF analysis result. For the majority of use categories, informants' agreement was strong (mean ICf = 0.780328). This suggests that the informants have the most uniform understanding of how to use various TMP species for various human and animal foods. Internal parasites had the highest degree of consensus (ICF=0.847826), followed by the common cold (ICF=0.820513). Knowledge about utilizing TMP to treat tumors and lesions had comparatively low levels of consensus (ICF=0.689655) and 0.763158, respectively.

### 4. Conclusions

Despite the spatial advantages that help shield indigenous knowledge from the pressures of modernization and the presence of a favorable agro-ecological climate, the number of medicinal plants recorded in this study is comparatively lower than in previous research. While there is general awareness among local communities regarding the use of traditional medicinal practices (TMP), this knowledge remains heavily reliant on herbaceous species and is gradually diminishing, particularly in relation to livestock treatment. Encouragingly, remnants of this valuable knowledge still persist, underscoring the urgent need for a comprehensive conservation strategy. Such efforts should include the protection and encouragement of traditional medicine practitioners, active

governmental involvement in preserving medicinal plant species, systematic documentation and manual preparation to safeguard local knowledge, and the identification, cultivation, and propagation of key medicinal plants. Additionally, training traditional healers on standardized dosages to minimize adverse effects and conducting phytochemical and pharmacological studies on frequently used species are essential steps to ensure the sustainability and scientific validation of traditional medicine for future generations.

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#### **Conflict of interest**

Authors declare no conflict of interest.

#### References

- Anteneh Belayneh, Zemede Asfaw, Sebsebe Demissew, & Negussie Bussa (2012). Medicinal plants potential and use by pastoral and agro-pastoral communities in Erer valley of Babile woreda, Eastern Ethiopia. Journal of Ethnobiology and Ethnomedicine, 8:42
- Azene Bekele Tesema (2007). Useful trees of Ethiopia: Identification, propagation and management in 17 agroecological zones. Nairobi, RELMA in ICRAF Project.

Bernard H. (1988). Research methods in cultural anthropology (2<sup>nd</sup> ed.). Sage, Newbury Park, Canada.

CSA (2007). Central statistical agency of Ethiopia 2007 report. Addis Ababa, Ethiopia

Cunningham, A. B. (2001). Applied ethnobotany: people wild plant use and conservation.

London and Sterling, Earthscan Publications Ltd.

- Dawit Abebe (1986). Traditional medicine in Ethiopia: The attempt being made to promote it for effective and better utilization. SINET- Ethiopian Journal of Science, 9, 61-69.
- Dawit Abebe, Asfaw Debella, & Kelbessa Urga (2003). Illustrated c hecklist of medicinal plants and other useful plants of Ethiopia. Ethiopian Health and Nutrition Research Institute, Camerapix Publishers International, Nairobi.
- Debela Hunde, Zemede Asfaw, & Ensermu Kelbessa (2006). Use of traditional medicinal plants by people of Boosat sub-district, Central Eastern Ethiopia. Ethiopian Journal of Health Science, 16(2), 141-155.
- Ermias Lulekal, Ensermu Kelbessa, Tamirat Bekele, & Haile Yineger (2008). An ethnobotanical study of medicinal plants in Mana Angetu district, Southeastern Ethiopia. Journal of Ethnobiology and Ethnomedicine, 4, 10. doi:10.1186/1746-4269-4-10.

Fabricant, D., & Farnsworth N. (2001). The value of plants used in traditional medicine for drug discovery. Environmental Health Perspects, 109:69–75.

- Freeman D. (1999). Transforming traditions: The dynamics of cultural variation in the Gamo Highlands, Southwest Ethiopia (Unpublished Doctoral Dissemination). Microform Edition ProQuest LLC.
- Guo, H., Zhou, X-B., Tao, Y., Yin, J-F., Zhang, L., Guo, X., Liu, C-H., & Zhang, Y-M. (2023). Perennial herb diversity contributes more than annual herb diversity to multifunctionality in dryland ecosystems of North-western China. Frontiers in Plant Science, 14:1099110. doi:10.3389/fpls.2023.1099110
- Haile Yineger, & Delenasaw Yehwalaw (2007). Traditional medicinal plant knowledge and use by local healers of Sekoru district, Jimma zone Southwestern Ethiopia. Journal of Ethnobiology and Ethnomedicine, 3:24ss
- Helmut, K. (2023). Challenges and prospects of medicinal plant sustainability in Ethiopia. Journal of Pharmacy and Pharmacology Research, 7: 233-242
- Lucilene, L., Fabio, J., Luciana, G., Ana, C., Leidiana, L., & Gardene, M. (2013). Techniques for collecting and processing plant material and their application in ethnobotany research. In Ulysses Paulino Albuquerque et al. (eds.), methods and techniques in ethnobiology and ethnoecology. Springer, New York, U.S.A:
- Martin, G. (1995). Ethnobotany: A method manual. Chapman and Hall, London, UK.
- Mengistu Gebrehiwot (2010). An ethnobotanical study of medicinal plants in Seru Woreda, Arsi zone of Oromia region Ethiopia (Unpublished Master Thesis). Addis Ababa University.
- Michael W. (2006). Plant, Medicine and Man. J Sci Food Agric 86:1797–1804
- Mirutse Giday, Zemede Asfaw, Thomas Elmqvist, & Zerihun Woldu (2003). An ethnobotanical study of medicinal plants used by the Zay people in Ethiopia. Journal of Ethnopharmacology, 85 (1), 43-52.
- Mirutse Gidey, & Tilahun Teklehymanot(2013). Ethnobotanical of plant used in management of livestock health problems by Afar people of Ad'ar district Afar regional state, Ethiopia. Journal of Ethnobiology and Ethnomedicine, 9, 8. doi: 10.1186/1746-4269-9-8. 9:8
- Ming-ming Zhao, Ke-ru Wang, Rui Gu, & Shi-hong Zhong (2019). A comparative study on shared-use medicines in Tibetan and Chinese medicine. Journal of Ethnobiology and Ethnomedicine, 15, 43. https://doi.org/10.1186/s13002-019-0320-5.
- Mohammed Seid, & Berhanu Abreha (2011). Ethnobotanical survey of traditional medicinal plants in Tehule Dere district, South Wollo. Ethiopian Journal of Medicinal Plants Research, 5(26), 6233-6242.
- Polat R. (2019). Ethnobotanical study on medicinal plants in Bingol (City center) (Turkey). Journal of Herbal Medicine, 16, 100211
- Prima, A., Ahmed, R., Faruk, A., Zafroon, Z., & Dash P. (2019). Pharmacological importance of *Commelina diffusa* (Commelinaceae): A review. International Journal of Life Sciences and Review, 5(1), 1-05. doi: 10.13040/IJPSR.0975-8232.IJLSR.5(1).1-05
- Seyoum Getaneh, & Zerihun Girma (2014). An ethnobotanical study of medicinal plant in Debre Libanos wereda, Central Ethiopia. African Journal of Plant Science, 8(7), 366-379 Subramanyam, R., Steven, N. G., Murugesan, M., Balasubramaniam V., & Muneer M. (2008). Consensus of the Malasars' Traditional Aboriginal Knowledge of Medicinal Plants in the velliangiri holy hills, India. J. Ethobiol. Ethnomed. 4:8

- Tilahun Tolossa, & Moa Megersa (2018). Ethnobotanical study of medicinal plants used to treat human diseases in Berbere district, Bale zone of Oromia Regional State, South East Ethiopia. Evidence-based complementary and alternative medicine. Hindawi, https://doi.org/10.1155/2018/8602945
- Troter, R., & Logan, M. (1986). Informant consensus: A new approach for identifying potentially effective medicinal plants. In Etkin, N. L. (ed.) Indigenous medicine and diet: biobehavioural approaches (pp. 91–112). Redgrave Bedford Hills, New York
- World Health Organization (2019). WHO global report on traditional and complementary medicine. Geneva