

## Ethnobotanical Study of Traditional Medicinal Plants in and Around Fiche District, Central Ethiopia

<sup>1</sup>Abiyu Enyew, <sup>2</sup>Zemedede Asfaw, <sup>2</sup>Ensermu Kelbessa and <sup>1</sup>Raja Nagappan

<sup>1</sup>Department of Biology, College of Natural and Computational Sciences, University of Gondar, Post Box 196, Gondar,

<sup>2</sup>Department of Plant Biology and Biodiversity Management, College of Natural Sciences, Addis Ababa University, Post Box 3434, Addis Ababa, Ethiopia

**Abstract:** An ethnobotanical study of medicinal plants was conducted in and around Fiche District, North Shewa Zone of Oromia Region, Ethiopia from September 2011 to January 2012. Ten kebeles were selected from North to South and East to West directions of Fiche District and its surroundings by purposive sampling method. Six informants including one key informant were selected from each kebele for data collection by using printed data collection sheets containing, semi-structured interview questions, group discussion and guided field walk. The plant specimens were identified by using taxonomic keys in the Floras of Ethiopia and Eritrea. The data were analysed using descriptive statistics; informant consensus factor and fidelity level using MS-Excel 2010. Totally, 155 medicinal plants belonging to 128 genera and 65 families were recorded. Most medicinal plants (72.9%) were used for human healthcare in which Lamiaceae was dominant (11%) in which *Ocimum lamifolium*, *Otostegia integrifolia* and *Leonotis ocymifolia* were the most common species. Herbs were dominant (43.87%) flora followed by shrubs (35.48%). The most frequently used plant parts for remedial preparation were leaves (38.1%) followed by roots (14.8%) and others. Fresh plant parts were used mostly (47.7%) followed by dried (13.5%) and the remaining (38.7%) either in fresh or dried. Among the preparations, crushing was the dominant (21.3%) form followed by squeezing (16.1%). The remedial administration was mostly oral (38.7%) followed by dermal (29%). The highest (88%) ICF was associated with intestinal parasites followed by emergency diseases (82%). The FL of *Actiniopteris semiflabellata*, *Plantago lanceolata*, *Capparis tomentosa* and *Clerodendrum myricoides* was calculated 100% irrespective of diseases. In conclusion, rich diversity of floras were mostly practiced in crude form and to prevent extinction of medicinal plants due to unsustainable anthropogenic activities, local communities need to give attention for in-situ and ex-situ conservation, which is harmonized with adoption of sustainable utilization patterns and preservation of their valuable biocultural knowledge. This documentation was first hand information and need to confirm through scientific investigation for the welfare of future generation.

**Keywords:** Ethnomedicine, ethnobotany, Fiche District, medicinal plants, traditional healers

### INTRODUCTION

Medicinal plants play an important role in human life for therapeutic purposes (Sofowora, 1993) and popularized worldwide due to great contribution by traditional practitioners (WHO, 2003). Many indigenous local communities have developed various traditional systems using locally available resources for the alleviation of health problems (Tsfaye and Sebsebe, 2009). In developing countries up to 80% of populations depended on plants for their primary healthcare (Kurt and Andrew, 2002) and the value of medicinal plants to human livelihoods is essentially infinite (Hamilton, 2004). Medicinal plants have source for the invention of novel drugs (Wright, 2005) and 25% of modern drugs contain one or more active

principles of plant origin (Medhin *et al.*, 2001) and top 25 best selling medicines in the world originated from plant materials (Ohigashi, 2008). According to Perumal and Gopalakrishnakone (2008) plant based drugs provide outstanding contribution to modern therapeutics.

In Ethiopia, the majority of the rural populations traditionally use many plants as sources of medicine for humans and livestock (Tsfaye *et al.*, 2009). Generally, traditional healers use roots, barks and other parts of the plant to prepare phytotherapies (Alexiades, 1996) and in the process they have developed their own local knowledge. This knowledge is transferred orally from generation to generation through herbalists and knowledgeable elders. The indigenous knowledge system in Ethiopia is not fully documented when

compared to available multiethnic, cultural and flora diversity (Fisseha *et al.*, 2009; Mirutse *et al.*, 2009). Scientific documentation is to preserve valuable traditional knowledge for future generations (Martin, 1995; Cotton, 1996). In Ethiopia, research and documentations on medicinal plants have started in recent times even though plants used traditionally as a source of medicine since time immemorial (Mesfin and Sebsebe, 1992). Many traditional remedies are remaining hidden due to migration of people, urbanization, influence of modern medicine and exotic cultures (Tafesse and Mekonnen, 2001).

In Ethiopia, few studies have been conducted and documented on method of traditional medicine preparations by using local medicinal plants, parts used and routes of applications (Kebu *et al.*, 2004; Haile and Delenasaw, 2007; Ragunathan and Solomon, 2007). However, there is no ethnobotanical documentation of medicinal plants in Fiche District and its surroundings. Many elderly people in this area have wellversed in traditional practices to provide remedies for human and livestock health problems. Therefore, documentation of medicinal plants and the associated knowledge in this area is important for conserving the plants, ensuring their sustainable use and to preserving the knowledge for the next generation. In this study, traditional medicinal plants used by the local healers and

communities in and around Fiche District were documented and reported for the first time.

## MATERIALS AND METHODS

**Description of the study area:** Ethnobotanical study was conducted in Fiche District, North Shewa Zone of Oromia Regional State, Ethiopia from September 2011 to April 2012. The geographical coordinates of the study area stretch out between 38°40'0"E-38°50'0"E and 9°42'0"N-9°52'0"N (Fig. 1) and the altitude ranges from 1901 to 2940 m.a.s.l. According to ten years meteorological data obtained from Fiche weather station, the study area received mean annual rainfall and temperature of 1139 mm and 14.4°C respectively.

**Materials:** Field materials such as wooden frames, cardboards, blotters, newspapers, plastic bags, cutting tools and plant diggers were used for specimen collection, pressing and drying. In addition, field printed data collection sheets like; semi-structured interview questionnaires and group discussions were used to collect the plant specimen and documentation of traditional knowledge on the medicinal plants.

**Informants selection:** Totally 10 kebeles were selected for the study in which four from Fiche District and six from surrounding of Fiche District. Those six

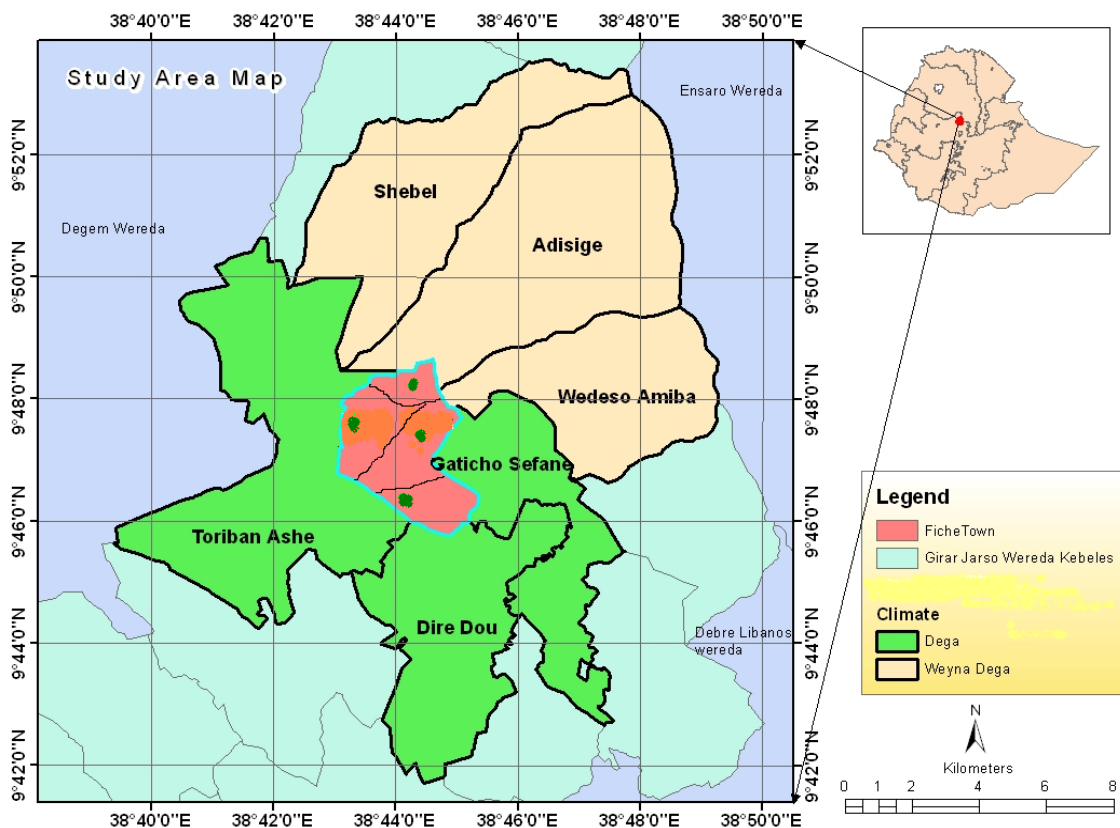


Fig. 1: Map of the study area

surrounding kebeles were Adisige, Dire Dou, Wedeso Amiba, Gaticho Sefane, Shebel and Toriban Ashe. The estimated population in the study area was 53, 837 in which 26, 888 (49.94%) males and 26, 949 (50.06%) were females (CSA, 2011). To avoid biased sampling, surrounding kebeles were selected from North to South and East to West directions using purposive sampling method. From each kebele, six informants were selected including one key informant from the age of 20 and above. Totally 60 informants, 32 men and 28 women were selected for this study. The key informants were selected based on the association of elders, local authorities, traditional healers and local farmers as recommended by Martin (1995). The remaining 50 general informants (5 per kebele) were selected randomly at every 150m interval based on their ethnobotanical knowledge and traditional practices. In order to determine the degree of information consistency, each informant was repeatedly crosschecked and interviewed at least twice.

**Ethnobotanical data collection:** Cunningham (1996) recommendation was strictly followed and informants were clearly informed about the purpose of this research. The primary data were collected directly from the informants in the study area by semi-structured interviews, group and individual focused discussions, field visits and informal conversations. During group discussion, necessary information related to medicinal plants, mode of preparation, routes of application, type of diseases, parts of the plant used for preparation of remedies were documented systematically to obtain detail quantitative and qualitative data. The medicinal plants used for various diseases were collected from the study area in cooperation with the local practitioners. The plant materials were used to prepare herbarium specimens and the identity confirmed at the National Herbarium of Ethiopia, Addis Ababa University using taxonomic keys and different volumes of Flora of Ethiopia and Eritrea. Finally, identified specimens were deposited at the National Herbarium of Ethiopia for future reference.

**Data analysis:** Descriptive statistics were used for qualitative and quantitative data analysis by using Microsoft Excel 2010. The statistical tools were used to identify the most common ailments in the study area includes, popularly used medicinal plant species, proportions of different variables like plant families, growth forms, plant parts used, methods of preparation and percentage frequency. The informant consensus factor for most frequently reported disease categories was calculated in order to evaluate the reliability of the information provided by the informants following the methods of Alexiades (1996) and Phillips (1996). The

following formula recommended by Trotter and Logan (1986) was used to calculate Informants' Consensus Factor (ICF):

$$ICF = \frac{Nur - Nt}{(Nur - 1)}$$

where,

Nur : Number of use-reports for a particular use category

Nt : Number of taxa used for a particular use category by all informants

The Fidelity Level (FL) index was calculated based on the formula recommended by Friedman *et al.* (1986) which is used to quantify the importance of a given species for a particular purpose in a given cultural group or to determine the most preferred plants for a treatment of a particular disease and calculated as:

$$FL = \frac{Np}{N} \times 100$$

where,

Np : Number of use-reports cited for a given species for a particular ailment

N : Total number of use-reports cited for any given species

## RESULTS

**Medicinal plants recorded:** Medicinal plants used by the traditional healers from Fiche District and its environment are presented in Table 1. From the study area, 155 ethnomedicinal plant species belonging to 128 genera and 65 families were collected with the guidance of local people. The medicinal plants were identified and preserved in the National Herbarium (ETH), Addis Ababa University, Ethiopia. Among the total plants recorded, Lamiaceae was the most dominant family contained 17 species (11%) followed by Asteraceae 13 species (8.4%), Fabaceae 11 species (7.1%) and Solanaceae 9 species (6%), respectively. Among those plant species, *Aloe pulcherrima*, *Impatiens rothii*, *Laggera tomentosa*, *Solanecio gigas*, *Urtica simensis*, *Vernonia leopoldi*, *Gomphocarpus purpurascens*, *Kalanchoe petitiana*, *Lippia adoensis* and *Thymus schimperi* are endemic to Ethiopia. Out of 155 species, 105 (67.7%) were collected from the natural habitats and 50 (32.3%) from homegardens and farming sites. Among these, the majority (43.87%) were herbs followed by shrubs (35.48%), trees (14.84%) and climbers (5.81%) respectively. The data recorded from the practitioners indicates that, most ethnomedicinal plants were used for human healthcare (Fig. 2).

Table 1: List of traditional medicinal plants used to treat human and livestock health problems, A- Amharic, Or-Oromifa; AE- Abiyu Enyew

Botanical and family name (Voucher No.)	Local name	Ailment treated	Parts used, method of preparation and application
<i>Acacia abyssinica</i> Hochst. ex Benth., Fabaceae, (AE 55)	Girar (A)	Tonsillitis	Fresh root bark is given for chewing
<i>Acacia etbaica</i> Schweinf., Fabaceae, (AE 147)	Derie (A)	Snake bite Evil eye	Dried or fresh root bark is given for chewing Dried or fresh root powder fire smoke is fumigated
<i>Acacia mearnsii</i> De Wild., Fabaceae, (AE 145)	Sheferie (A)	Snake bite	Stem bark is given for chewing
<i>Achyranthes aspera</i> L., Amaranthaceae, (AE 04)	Telenji (A)	Bleeding Retained placenta	Fresh leaf or stem paste topical application Fresh stem crushed with water and given orally
<i>Acokanthera schimperi</i> (A.DC.) Schweinf., Apocynaceae, (AE 68)	Mirez (A)	Evil Eye  Gonorrhoea, Amoebiasis	Dried tender single stem's leaf or roots crushed with water and squeezed a drops through nasal region Leaf juice with water given orally
<i>Actinopterys semiflabellata</i> Pic.Serm., Actinopteridaceae, (AE 17)	Menna or Ebinat (A)	Wound	Fresh or dried leaf paste is applied topically
<i>Alchemilla pedata</i> A. Rich., Rosaceae, (AE 129)	Tuta (Or)	Bleeding, wound	Fresh leaf paste is applied topically
<i>Allium sativum</i> L., Alliaceae, (AE 95)	Shinkurtiaddi (Or)	Malaria, Intestinal parasite	Fresh or dried bulb, honey and <i>Capsicum annuum</i> mixed together and given to eat
<i>Aloe pulcherrima</i> Gilbert and Sebsebe, Aloaceae, (AE 64)	Sete- Iret (A)	Asthma, Diabetes Dandruff	Latex, water and sugar boiled together and given orally Fresh latex topical application
<i>Aloe trichosantha</i> Berger Aloaceae (AE 103)	Wonde- Iret (A)	Evil eye	Dried or fresh leaf is chopped and covered with polythene bag and tied around neck or waist
<i>Andrachne aspera</i> Spreng. Euphorbiaceae (AE 101)	Etse-Tekeze (A)	Snake bite Abdominal pain, Asthma	Dried or fresh root is given for chewing Dried root and leaf powder mixed with water and given orally
<i>Apodytes dimidiata</i> E.Mey. ex Arn. (AE 125)	Guraa (Or)	Diuretic	Fresh leaf crushed and mixed with <i>Foeniculum vulgare</i> leaf is given orally for cattle and human
<i>Arisaema schimperianum</i> Schott, Araceae, (AE 113)	Cherana (Or)	Abdominal pain	Fresh rhizome is crushed and mixed with water given orally to cattle
<i>Artemisia afra</i> Jack. ex Wild., Asteraceae, (AE 82)	Chikugn (A)	Evil Eye, Malaria	Fresh leaf and <i>Allium sativum</i> bulb squeezed together and given orally or through nasally
<i>Asparagus flagellaris</i> (Kunth) Baker, Asparagaceae, (AE 97)	Seriti (A)	Depression	Dried or fresh stem piece tied around waist or neck
<i>Barleria eranthemoides</i> R. Br. ex C.B. Clarke, Acanthaceae, (AE 105)	Yesetaf (A)	Snake bite, Tumor Conjunctivitis	Dried or fresh root powder with water is given orally Fresh root mixed with water, filtered and the juice is applied
<i>Brassica nigra</i> (L.) Koch in Röhling, Brassicaceae, (AE 49)	Senafich (A)	Abdominal pain	Dried seeds and <i>Lepidium sativum</i> seeds, powdered together, and diluted with water is given orally
<i>Brucea antidysenterica</i> J. F. Mill., Simaroubaceae, (AE 71)	FetAbalo (A)	Scabies, Eczema, Leprosy Rabies Vomiting	Fresh leaf is crushed and soaked with water for three days and given to body wash Fresh leaf juice is given for human and livestock orally Dried leaf is crushed and fire fumigation to nasal region
<i>Buddleja polystachya</i> Fresen, Loganiaceae, (AE 27)	Amfar(A)	Wound, Dandruff	Fresh leaf is crushed and given for topical application
<i>Calpurnia aurea</i> (Ait.) Benth., Fabaceae, (AE 43)	Digita (A)	Rabies  Wound, Skin infection Abdominal pain	Fresh or dried leaf, fruit and seeds crushed, mixed with food and given to dogs Fresh or dried leaf crushed with little water and given for topical application to human and cattle Dried fruit powder is homogenized with water and given orally to human and cattle
<i>Capparis micrantha</i> A. Rich., Capparidaceae, (AE 144)	Yeseitan Gумero (A)	Psychiatric diseases	Fresh root is given for fire fumigation
<i>Capparis tomentosa</i> Lam., Capparidaceae, (AE 99)	Gумero (A)	Evil eye	Dried or fresh root fire fumigation is given through nasally
<i>Carissa spinaru</i> m L., Apocynaceae, (AE 57)	Agam (A)	Spiritual diseases, Evil eye Snake bite	Fresh or dried root bark powder is added on fire and the smoke is allowed to inhale Fresh shoot buds from several plants are given for chewing
<i>Caylusea abyssinica</i> (Fresen.) Hilet and Mey, Resedaceae, (AE 51)	Erench (A)	Herpes zoster, Wound	Fresh leaf juice mixed with water is given for topical application
<i>Cheilanthes farinose</i> (Forssk.) Kaulf., Pteridaceae, (AE 118)	Etse-Enzerezer (A)	Wound	Dried leaf ash powder mixed with water and the paste applied on skin
<i>Chenopodium ambrosioides</i> L., Chenopodiaceae, (AE 137)	Amedmado (A)	Tonsillitis, Leprosy Wound	Dried root and leaf powder is mixed with little water and given orally Fresh root and leaf juice is given for topical application
<i>Citrus limon</i> (L.) Burm.F., Rutaceae, (AE 154)	Lomi (A)	Coccidiosis  Amoebiasis, Hypertension	Fruit juice, leaf of <i>Leonoti socymifolia</i> and seed of <i>Lepidium sativum</i> , <i>Salvia schiperi</i> , <i>Ruta chalepensis</i> and <i>Allium sativum</i> , mixed together in water and given orally to hen Fresh juice is mixed with tomato and given orally

Table 1: Continue

<i>Clematis simensis</i> Fresen., Ranunculaceae, (AE 90)	Idefitii (Or)	Tonsillitis Cellulites Leech infection Evil Eye	Fresh leaf crushed with water, filtered juice is given orally Fresh leaf is crushed and given for topical application Fresh leaf juice mixed with little water and applied through nasal region of the cattle
<i>Clerodendrum myricoides</i> (Hochst.) Vatke, Lamiaceae, (AE 54)	Misrich (A)		Fresh leaf is crushed with <i>Carissa spinarum</i> leaf and used for fire fumigation through nasally
<i>Clusia abyssinica</i> Jaub. and Spach., Euphorbiaceae, (AE 08)	Fiyele-Feji (A)	Vomiting Dysentery Ecto-parasites	Fresh root powder juice with water is given orally Crushed fresh or dried stem powder with water is given orally Fresh leaf with <i>Calpurina aurea</i> leaf squeezed with water is given to wash cattle
<i>Colocasia esculenta</i> (L.) Scott, Araceae, (AE 155)	Wuhayinekash (A)	Toothache Cellulites	Fresh root is given for chewing Dried or fresh root is crushed and given for topical application
<i>Crassula alata</i> (Viv.) Berger, Crassulaceae, (AE 77)	—	Wound	Fresh whole plant is crushed with little water and given for topical application
<i>Croton macrostachyus</i> Del., Euphorbiaceae, (AE 18)	Bisana (A)	Intestinal parasite Ringworm Gonorrhoea Heart failure	Fresh stem bark crushed with water and given orally for cattle Latex is given for topical application Fresh leaf juice with water is given orally Stem bark powder is mixed with milk and given orally
<i>Cucumis ficifolius</i> A. Rich., Cucurbitaceae, (AE 28)	Yemidir Embuay (A)	Evil eye Intestinal parasite Diarrhea	Fresh or dried root powder is mixed with water and given orally Whole fresh plant is used to prepare decoction with water and given orally for human and cattle Whole dried plant powdered with water is given orally for cattle
<i>Cucurbita pepo</i> L., Cucurbitaceae, (AE 131)	Duba (A)	Taeniasis	Dried fruit and seed is roasted and mixed with fruit of <i>Embelschimperii</i> is given to eat Dried seed is cooked and given to eat in empty stomach
<i>Datura stramonium</i> L., Solanaceae, (AE 48)	Atefaris (A)	Tape worm, Ascariasis Toothache Ringworm Anal prolepses	Dried seed mixed with butter is given for fire fumigation Fresh leaf juice is given for topical application Fresh root paste mixed with water is applied
<i>Delphinium dasycaulon</i> Fresen., Ranunculaceae, (AE 119)	Tikur Abeba (A)	Snake bite	Fresh leaf and root juice is given orally for human and livestock
<i>Dichrostachys cinerea</i> (L.) Wight & Arn., Fabaceae, (AE 104)	Ader (A)	Scorpion bite	Fresh stem bark is crushed and applied
<i>Discopodium penninervium</i> Hochst., Solanaceae, (AE 85)	Rajii (Or)	Repellent, Detoxification	Fresh leaf is crushed and rubbed on the skin
<i>Dodonaea angustifolia</i> L.f., Sapindaceae, (AE 32)	Kitkita (A)	Evil eye Wounds, Eczema Flies Repellent	Dried leaf is mixed with leaf of <i>Acokantheraschimperi</i> , powdered and given for fire fumigation Fresh leaf paste mixed with butter and applied Fresh or dried leaf is fire fumigated
<i>Dombeya torrida</i> (J.F. Gmel.) P. Bamps, Sterculiaceae, (AE 87)	Danisa (Or)	Abdominal pain	Dried leaf powder is mixed with honey and given orally
<i>Dovyalis abyssinica</i> (A. Rich.) Warb., Flacoutiaceae, (AE 93)	Koshim (A)	Cancer, Abdominal pain	Six to ten fruits are given to eat
<i>Dregea rubicunda</i> K. Schu, Asclepiadaceae, (AE 92)	Hidaa ananii (Or)	Rabies	Dried stem bark powder is mixed with milk and given to dogs
<i>Dyschoriste radicans</i> Nees, Acanthaceae, (AE 123)	Yeras-mitat (A)	Headache	Fresh or dried stem and leaf juice is swallowed after chewing
<i>Echinops hispidus</i> Fresen., Asteraceae, (AE 74)	Kebercho (A)	Cough Febrile illness	Dried or fresh root decoction with water is given orally Dried root powder is fire fumigated
<i>Echinops macrochaetus</i> Fresen., Asteraceae, (AE 150)	Kusheshile (A)	Toothache Febrile illness	Fresh root paste with water is given orally Dried root decoction is given orally
<i>Ekebergia capensis</i> Sparm., Meliaceae, (AE 146)	Washinto (A)	Snake biting	Dried or fresh stem bark paste/powder is mixed with water and given orally
<i>Eleusine floccifolia</i> (Forssk.) Spreng., Poaceae, (AE 115)	Akirma (A)	Mumps, Skin allergic	Fresh plant juice is filtered and applied through the ear
<i>Eucalyptus globulus</i> Labill., Myrtaceae, (AE 109)	NechBahirzaf (A)	Febrile illness, Cough	Fresh young leaf bud is mixed with <i>Solanecio gigas</i> leaf and boiled water vapor fumigated
<i>Euclea racemosa</i> Murr., Ebenaceae, (AE 44)	Dedeho (A)	Warts, Ecto-parasites Venereal diseases Toothache Tape worm	Dried leaf powder paste is applied topically for human and livestock Fresh leaf juice is given orally Fresh stem is given for chewing Fresh leaf juice with water is given orally
<i>Euphorbia abyssinica</i> G. F. Gmel., Euphorbiaceae, (AE 139)	Qulqual (A)	Venereal disease Wart Rabies	Latex is mixed with <i>Eragrostis tef</i> powder to prepare bread and given to eat Fresh latex is applied topically Latex is given orally to livestock
<i>Euphorbia tirucalli</i> L., Euphorbiaceae, (AE 134)	Kinchib(A)	Rabies, Scorpion bite Skin cancer	Latex mixed with bean powder and given to eat after food Latex is given for topical application
<i>Evolvulus alsinoides</i> (L.) L., Convolvulaceae, (AE 122)	Lotu Qitel (A)	Eye infection	Leaf juice is applied topically to livestock
<i>Foeniculum vulgare</i> Miller, Apiaceae, (AE 130)	Ensilal (A)	Urine retention, Bloating	Dried or fresh leaf is mixed with <i>Leonotocymifolia</i> and <i>Rutachalepensis</i> to prepare juice and given orally to human and livestock
<i>Galinsoga quadriradiata</i> Ruiz and Pavon, Asteraceae, (AE 141)	Deha Neqay (A)	Tonsillitis	Fresh root is peeled and given for chewing

Table 1: Continue

<i>Galium aparinoides</i> Forssk. Rubiaceae, (AE 138)	Ashkit (A)	Tinea corporis Deformed lips	Fresh or dried leaf juice is given for topical application Dried leaf powder is mixed with little water and given orally
<i>Galium thunbergianum</i> Eckl. and Zeyh., Rubiaceae, (AE 20)	Chemid (A)	Ringworm, Wound	Fresh or dried whole plant is crushed, mixed with water and applied topically
<i>Geranium arabicum</i> Forssk. Geraniaceae, (AE 143)	Wof Anqur (A)	Invoking sprit	Dried root is chopped, covered with polythene paper and tied on neck
<i>Gladiolus</i> sp. Iridaceae, (AE 30)	Enzerezer (A)	Abdominal pain	Fresh underground bulb is given for chewing
<i>Gladiolus schweinfurthii</i> (Baker) Goldblatt and de Vos, Iridaceae, (AE 01)	Etse Berehan (A)	Taeniasis Memory loss	Fresh rhizome is crushed with water and given orally after food Dried rhizome is crushed with little water and given orally before food
<i>Gomphocarpus purpurascens</i> A. Rich., Asclepiadaceae, (AE 05)	Tifrindo (A)	Eczema Wart	Dried leaf fire ash is mixed with little butter and applied topically Fresh leaf or stem latex is given for topical application
<i>Guizotia schimperi</i> Sch. Bip. ex Walp, Asteraceae, (AE 108)	Adaa (Or)	Ecto-parasite Eye infection	Fresh leaf juice is mixed with water and applied for cattle Flower juice is mixed with water and applied through eye
<i>Habenaria ichneumonea</i> (Sw.) Lindl., Orchidaceae, (AE 33)	Woin (Eshet) (A)	Mumps, Otitis media, Earlesion	Dried fruit powder is mixed with little water and applied
<i>Habenaria petitiiana</i> (A.Ric.) Th. Dur. and Schinz, Orchidaceae, (AE 03)	Etse-Yiketil (A)	Heart failure	Fresh rhizome is given for chewing
<i>Hagenia abyssinica</i> (Brace.) J. F. Gmel., Rosaceae, (AE 135)	Koso (A)	Hypertension	Fresh fruit and leaf is boiled with little water and mixed with alcohol given orally
<i>Heteromorpha arborescens</i> (Spreng.) Cham. and Schtdl., Apiaceae, (AE 126)	Yejib Mirkuz (A)	Taeniasis Ringworm, Cellulites	Fresh fruit and leaf is soaked in water and given orally Fresh leaf and dried stem is crushed and mixed with water to prepare paste and applied to human and livestock
<i>Hibiscus crassinervius</i> Hochst. ex A. Rich, Malvaceae, (AE 66)	Yeteja Chenger (A)	Ringworm	Fresh leaf juice is applied topically
<i>Hordeum vulgare</i> L. Poaceae, (AE 96)	Nech Gebes (A)	Gastric ulcer	Dried seed powder mixed with water is given orally
<i>Hypericum quartianum</i> A. Rich., Hypericaceae, (AE 152)	Yezinjero- Ades (A)	Invoking sprit, Bone fracture, Epilepsy	Dried leaf Powder and leaf of <i>Podocarpus falcatus</i> and <i>Teclea nobilis</i> soaked in water and used for body wash
<i>Impatiens rothii</i> Hook. f., Balsaminaceae, (AE 84)	Buri (Or), Gishrit (A)	Intestinal parasite	Fresh rhizome is crushed with water and given orally to livestock
<i>Indigofera spicata</i> Forssk, Fabaceae, (AE 124)	Yayit Misir (A)	Febrile illness	Fresh leaf and stem is used for fire fumigation
<i>Indigofera zavattarii</i> Chiov., Fabaceae, (AE 36)	Kechine (A)	Rh-factor	Fresh root is mixed with <i>Cucumisficifolius</i> , <i>Thalicttrumrhynhocarpum</i> and <i>Gomphocarpus purpurascens</i> powder and given orally before food
<i>Jasminum randiflorum</i> mL. Oliaceae, (AE 34)	Tembelel (A)	Wound	Fresh leaf and young bud is crushed and applied topically
<i>Juniperus procera</i> Hochst. ex. Endl., Cupressaceae, (AE 88)	Yabesha Tsid (A)	Wound	Fresh leaf is crushed and applied topically
<i>Justicialadanoides</i> Lam., Acanthaceae, (AE 40)	Denkul (A)	Eye infection	Fresh leaf juice is mixed with water given as a drops
<i>Justicia schimperiana</i> (Hochst. ex Nees) T. Anders., Acanthaceae, (AE 26)	Sensel (A)	Rabies Abdominal pain, Malaria	Fresh leaf with <i>Salix mucronata</i> leaf, squeezed juice is given orally for human and animals in the morning before food Fresh leaf with <i>Rumex nervosus</i> and <i>Vernonia amygdalina</i> leaf juice mixed with little water and given orally
<i>Kalanchoe petitiiana</i> A. Rich., Crassulaceae, (AE 91)	Bosoqee (Or)	Bone fracture Wart, Swollen	Fresh leaf juice is mixed with butter and applied topically Fresh stem decoction or warmed with fire and applied
<i>Laggera crispata</i> (Vahl) Hepper and Wood, Asteraceae, (AE 13)	Kes Bedeje (A)	Tinea corporis, Tinea capitis, Dandruff	Fresh leaf juice is applied topically
<i>Laggera tomentosa</i> (Sch. Bip. ex A. Rich.) Oliv. and Hiern, Asteraceae, (AE 56)	Shiro Kesse (A)	Repellent Headache	Either fresh leaf applied or dried leaf is fire fumigated Fresh leaf paste is applied topically
<i>Lens culinaris</i> Medik., Fabaceae, (AE 67)	Misir (A)	Cough	Dried seed and leaf of <i>Rubiocordifolia</i> decoction is given orally
<i>Leonotis ocyimifolia</i> (Burm. f.) Iwarsson, Lamiaceae, (AE 24)	Yeferes Zeng (A)	Ascariasis, Febrile illness Coccidiosis	Fresh leaf juice is mixed with water and given orally
<i>Lepidium sativum</i> L., Brassicaceae, (AE 29)	Fetto (A)	Intestinal parasite Malaria, Venereal diseases	Fresh leaf mixed with <i>Salvia schimperi</i> and <i>Ruta chalepensis</i> leaf all together in water and squeezed juice is given orally to hen Dried seed decoction is given orally to animals
<i>Leucas abyssinica</i> (Benth.) Briq., Lamiaceae, (AE 22)	Achidamo (A)	Conjunctivitis	Fresh leaf juice is applied to animals
<i>Linum usitatissimum</i> L., Linaceae, (AE 35)	Telba (A)	Diarrhea	Dried seed decoction prepared with sugar is given orally

Table 1: Continue

<i>Lippia adoensis</i> Hochst. ex Walp., Verbenaceae, (AE 07)	Kesse (A)	Eczema, Fungal infections Common cold, Cough Rh-factor	Fresh leaf juice mixed with little water and applied topically Fresh leaf decoction is diluted with water and given orally
<i>Malva parviflora</i> H Öjör, Malvaceae, (AE 76)	TikurLut (A)		Dried root with <i>Indigofera zavattarii</i> , <i>Thalictrum rhynchocarpum</i> and <i>Hibiscus crassinervius</i> root, powdered, mixed with water and taken orally for human and livestock
<i>Malva verticillata</i> L., Malvaceae, (AE 81)	Liti (Or)	Abdominal pain	Dried or fresh leaf and stem crushed with water, filtered and given orally to livestock
<i>Maytenus arbutifolia</i> (A. Rich.) Wilczek, Celastraceae, (AE 58)	Atat (A)	Repellent	Dried stem bark powder is mixed with food and spread on field to control rats
<i>Maytenus senegalensis</i> (Lam.) Exell, Celastraceae, (AE 102)	Geram Atat (A)	Wound (Dog bite)	Fresh young leaf is crushed and applied topically
<i>Mukia maderaspatana</i> (L.) M.J. Roem., Cucurbitaceae, (AE 106)	Gim-Areg (A)	Malaria, Evil eye	Dried or fresh root and stem chopped and tied on neck or waist
<i>Myrsine Africana</i> L., Myrsinaceae, (AE 38)	Quechemo (A)	Taeniasis, Tape worm Cancer	Dried fruit powder is mixed with water and given orally in the morning before breakfast Dried fruit with dried leaf of <i>Osyrisquadrupartita</i> , powdered, mixed with little water is given orally
<i>Nicandra physaloides</i> (L.) Gaertn., Solanaceae, (AE 50)	Atefaris (A)	Wound Hen Wound	Dried or fresh fruit powder/paste is applied Dried seed powder is mixed with food and given to hen
<i>Nicotiana tabacum</i> L., Solanaceae, (AE 60)	Tinhaho (A)	Leech infection Wound	Fresh leaf juice is mixed with water and given orally to cattle Dried leaf powder is mixed with <i>Coffeaarabica</i> powder and applied topically
<i>Ocimum basilicum</i> L., Lamiaceae, (AE 140)	Besobila (A)	Headache, Malaria Abdominal pain	Fresh leaf juice is given orally Fresh leaf is given for chewing
<i>Ocimumlamifolium</i> Hochst. ex Benth., Lamiaceae, (AE 16)	Damakese(A)	Febrile illness, Headache, Cough	Fresh or dried leaf is crushed with coffee and given orally before food
<i>Ocimum urticifolium</i> Roth, Lamiaceae, (AE 117)	Debesoye (Or)	Febrile illness	Fresh whole plant is boiled with water and the body is fumigated with steam
<i>Olea europaea</i> subsp. <i>cuspidata</i> (Wall. ex G. Don) Cif., Oliaceae, (AE 89)	Woyra (A)	Psychiatric disease, Evil eye	Dried leaf powder fire smoke is allowed to inhale
<i>Olinia rochetiana</i> A. Juss., Oliniaceae, (AE 116)	Gegafata (Or)	Toothache	Fresh leaf is given for chewing
<i>Opuntia ficus-indica</i> (L.) Miller, Cactaceae, (AE 94)	Adaa amii (Or)	Headache	Fresh fruit one to four is given to eat
<i>Osyris quadrupartita</i> Decn., Santalaceae, (AE 39)	Queret (A)	Cancer	Dried leaf with dried fruit of <i>Myrsineafricana</i> , powdered, mixed with water is given orally
<i>Otostegia integrifolia</i> Benth, Lamiaceae, (AE 06)	Tunjit (A)	Diarrhea Lung diseases, Vomiting	Fresh leaf juice is mixed with little water is given orally Fresh or dried leaf is used as fire fumigation
<i>Pennisetum thunbergii</i> Kunth, Poaceae, (AE 114)	Sindedo (A)	Skin allergy	Fresh stem is given for chewing and applied topically
<i>Periploca linearifolia</i> Quart.-Dill. and A. Rich., Asclepiadaceae, (AE 63)	Tikur Areg (A)	Venereal disease Sexual impotency	Fresh whole plant decoction prepared with honey and sugar is given orally Dried or fresh root is chopped and tied on waist
<i>Phytolacca dodecandra</i> L'Hérit, Phytolaccaceae, (AE 45)	Endod (A)	Scabies, Itching Intestinal parasites	Fresh leaf juice is mixed with water and applied topically Fresh leaf juice is mixed with water and given orally for human and livestock
<i>Plantago lanceolata</i> L., Plantaginaceae, (AE 09)	YebegLat (A)	Wound	Fresh leaf is mixed with little water and applied topically
<i>Plectranthus barbatus</i> Ander, Lamiaceae, (AE 86)	Keskeso (Or)	Repellent	Dried leaf is used for fire fumigation
<i>Plectranthus comosus</i> Sims, Lamiaceae, (AE 78)	Osole (Or)	Herpes zoster	Dried root powder is mixed with water and applied
<i>Plectranthus ornatus</i> Codd, Lamiaceae, (AE 47)	Yezinjero Fes (A)	Wound	Fresh stem is crushed with water and applied
<i>Podocarpus falcatus</i> (Thunb.) Mirb., Podocarpaceae, (AE 151)	Zigba (A)	Diarrhea	Fresh leaf juice is given orally
<i>Polygala abyssinica</i> Fresen., Polygalaceae, (AE 02)	Etse-Adin (A)	Evil eye, Memory loss Snake bite	Fresh or dried root is used for fire fumigation Fresh or dried root is given for chewing
<i>Pseudognaphalium melanosphaerum</i> (Sch. Bip. ex A. R. ich.) Hilliard, Asteraceae, (AE 120)	Yenib Ariti/ Kese (A)	Febrile illness	Dried or fresh leaf is used for fire fumigation
<i>Pterolobium stellatum</i> (Forssk.) Brenan, Fabaceae, (AE 112)	Mucarba (Or)	Vomiting	Fresh fruit is given to eat
<i>Rhamnus prinoides</i> L' Herit, Rhamnaceae, (AE 132)	Gesho (A)	Tonsillitis Ringworm	Fresh leaf is given for chewing Fresh ripened fruit with latex of <i>Croton macrostachyus</i> is used to prepare paste and applied topically

Table 1: Continue

<i>Rhocissus revoli</i> Planch., Vitaceae, (AE 37)	Iddefitii (Or)	Wound Leech infection	Fresh leaf juice mixed with little water is applied topically Fresh leaf and stem squeezed together with water and given orally and also nasally for livestock
<i>Rhus glutinosa</i> A. Rich., Anacardiaceae, (AE 111)	Tatisa (Or), Embis (A)	Leech infection	Fresh leaf juice is given orally to livestock
<i>Rhus retinorrhoea</i> Oliv., Anacardiaceae, (AE 53)	Tilem (A)	Wound	Fresh leaf is crushed and applied to livestock
<i>Rhynchosia elegans</i> A. Rich., Fabaceae, (AE 128)	Tero Areg (A)	Rabies Wound	Fresh or dried leaf paste or powder mixed with little water is given orally to human and livestock Dried root powder with water is applied to livestock
<i>Ricinus communis</i> L., Euphorbiaceae, (AE 133)	Gulo (A)	Anal prolepses Amoebiasis	Fresh leaf is coated with butter, warmed and applied Dried seed is given for chewing during stomachache
<i>Rosa abyssinica</i> Lindley, Rosaceae, (AE 79)	Kega (A)	Abdominal pain	Fresh fruit is given for chewing
<i>Rosmarinus officinalis</i> L., Lamiaceae, (AE 75)	Yesiga Metibesha (A)	Toothache	Fresh leaf is given for chewing
<i>Rubia cordifolia</i> L., Rubiaceae, (AE 62)	Enchibir (A)	Cough	Dried or fresh root decoction is given orally
<i>Rumex abyssinicus</i> Jacq., Polygonaceae, (AE 69)	Mekimeko (A)	Pharyngitis Hypertension Amoebiasis, Goiter	Fresh root is given for chewing Dried or fresh root crushed with milk and butter is given orally before food
<i>Rumex nepalensis</i> Spreng., Polygonaceae, (AE 15)	Lut (A)	Stabbing pain, Diarrhea	Dried or fresh root is given for chewing or powder mixed with <i>Rutachalepensis</i> leaf and water is given orally for human and livestock
<i>Rumex nervosus</i> Vahl, Polygonaceae, (AE 19)	Embacho (A)	Scabies, Acne vulgaris	Fresh stem or leaf crushed with <i>Citrus lemon</i> juice and water is given for washing
<i>Ruta chalepensis</i> L., Rutaceae, (AE 11)	Tenadam (A)	Abdominal pain	Fresh leaf juice crushed with <i>Allium sativum</i> bulb and water is given orally for human and livestock
<i>Salix mucronata</i> Thunb., Salicaceae, (AE 136)	Achaya (A)	Rabies	Fresh leaf mixed with <i>Justicia schimperiana</i> leaf and squeezed juice is given orally before food to human and livestock
<i>Salvia nilotica</i> Jacq., Lamiaceae, (AE 25)	Hulegeb (A)	Tonsillitis, constipation	Fresh leaf or root is given for chewing
<i>Salvia schimperi</i> Benth, Lamiaceae, (AE 23)	Yahiya Joro (A)	Coccidiosis	Fresh leaf mixed with <i>Leonotiso cymifolia</i> and <i>Ruta chalepensis</i> leaf and <i>Allium sativum</i> bulb, squeezed juice mixed with water is given orally to hen
<i>Salvia tilifolia</i> Vahl, Lamiaceae, (AE 142)	Aqorarach (A)	Hypertension, tonsillitis, febrile illness	Fresh leaf juice is mixed with little water and given orally
<i>Sansevieria ehrenbergii</i> Schweinf. ex Baker, Dracaenaceae, (AE 10)	Wonde-Chiret (A)	Mumps, Otitis media	Fresh leaf soaked in hot water and a drop of liquid applied through ear by squeezing
<i>Satureja punctata</i> (Benth.) Briq., Lamiaceae, (AE 121)	Toshinea (Or)	Febrile illness, Fever, Leech infection Wart	Dried or fresh leaf fire smoke is allowed to enter nasal region of human and livestock Dried leaf powder paste is applied topically
<i>Senna singueana</i> (Del.) Lock, Fabaceae, (AE 46)	Gufa (A)	Wounds, Swellings Abdominal pain	Dried leaf, stem and bark powder is mixed with butter and applied topically Dired root fire fumigation smoke allowed to enter orally and nasally
<i>Sida schimperiana</i> Hochst. ex A. Rich., Malvaceae, (AE 73)	Chifrig (A)	Evil Eye, Depression Repellent Fever, Cough Wound	Fresh leaf mixed with <i>Rumex nervosus</i> flowers is used for fire fumigation Fresh leaf is spread on the stored grains Dried or fresh leaf steam vapour is allowed to enter orally Fresh leaf is crushed and applied topically
<i>Solanecio gigas</i> (Vatke) C. Jeffrey, Asteraceae, (AE 110)	Yeshikoko Gomen (A)	Skin disease Gonorrhoea	Fresh leaf juice is applied topically Fresh root decoction is given orally
<i>Solanum americanum</i> Miller, Solanaceae, (AE 41)	YaitAwut	Gonorrhoea	Fresh root decoction is given orally
<i>Solanum anguivi</i> Lam., Solanaceae, (AE 59)	Zirit Embuay (A)	Scabies, Wart, Wound Bleeding, Gonorrhoea	Fresh fruit and seed powder/paste applied topically Fresh root is given for chewing or dried root steam vapour allowed to inhale
<i>Solanum incanum</i> L., Solanaceae, (AE 42)	Yabesha Embuay (A)	Wart Amoebiasis, Snake bite Evil Eye	Dried fruit powder is mixed with little water and applied topically to livestock Fresh root piece is given for chewing
<i>Solanum marginatum</i> L. f., Solanaceae, (AE 80)	Hiddii (Or)	Ecto-parasite	Dried shoot mixed with <i>Capparis tomentosa</i> and <i>Acokanthera schimperi</i> leaf, powdered is used for fire fumigation Fresh fruit is crushed with water and applied topically to livestock
<i>Solenostemon latifolius</i> (Hochst. ex Benth.) J.K., Lamiaceae, (AE 65)	Dachet (A)	Coccidiosis	Fresh leaf mixed with <i>Salvia schimperi</i> and <i>Leonotis ocymifolia</i> leaf, squeezed juice is given orally to livestock



Table 1: Continue

<i>Sonchus asper</i> (L.) Hill, Asteraceae, (AE 52)	Yahiya Kesso (A)	Abdominal pain	Fresh leaf juice mixed with water is given orally to livestock
<i>Stephania abyssinica</i> (Dillon. and A. Rich.) Walp., Menispermaceae (AE 70)	Yayit Areg (A)	Leg ache, Arthritis, Rheumatism	Fresh or dried root powder is mixed with <i>Eragrostis tef</i> powder to prepare bread and given to eat
<i>Tecelea nobilis</i> Del., Rutaceae, (AE 153)	Tiqure (A)	Intestinal parasite	Fresh root bark mixed with <i>Podocarpus falcatus</i> leaf is crushed with water and given orally
<i>Thalictrum rhynchocarpum</i> Dill. and A. Rich., Ranunculaceae, (AE 61)	Sire Bizu (A)	Rh-Factor	Fresh root with <i>Cucumis ficifolius</i> , <i>Achyranthes aspera</i> and <i>Gomphocarpus purpurascens</i> leaf, powdered, covered with cotton and tied on pregnant women neck
<i>Thymus schimperii</i> Ronniger, Lamiaceae, (AE 72)	Tosign (A)	Diabetes	Dried stem and leaf powder boiled with tea is given orally
<i>Torilis arvensis</i> (Hudson) Link, Apiaceae, (AE 83)	Shembeku (Or)	Ear infection, Ear lesion	Dried stem powder mixed with water, filtered and the liquid is applied through ear
<i>Tragia cinerea</i> (Pax) and Radcl-Smith, Euphorbiaceae, (AE 148)	Alebilabit(A)	Evil eye	Dried or fresh root fire smoke allowed to enter orally
<i>Urtica simensis</i> Steudel, Urticaceae, (AE 107)	Dobii (Or), Samma (A)	Wound	Fresh leaf juice is applied topically
<i>Verbascum sinaiticum</i> Benth., Scrophulariaceae, (AE 98)	Yahiya Joro (A)	Rh-factor, Heart failure, Snake bite	Fresh leaf steam vapour allowed to enter nasally and fumigated whole body
<i>Verbena officinalis</i> L., Verbenaceae, (AE 12)	Atuch (A)	Leech infection, Lymphadenitis	Dried or fresh root powder mixed with water is given orally or through nasally to livestock
<i>Vernonia amygdalina</i> Del., Asteraceae, (AE 14)	Girawa (A)	Diarrhea, Vomiting, Tonsillitis	Fresh leaf is given for chewing
<i>Vernonia hymenolepis</i> A.Rich., Asteraceae, (AE 127)	Weynagift (A)	Abdominal pain, Malaria	Fresh leaf mixed with <i>Rumex nervosus</i> and <i>Justicia schimperiana</i> leaf is squeezed with water is given orally
<i>Vernonia leopoldi</i> (Sch. Bip. ex Walp)Vatke, Asteraceae, (AE 31)	Nechillo (A)	Ear lesion, Wound	Fresh leaf or root is crushed and applied topically
<i>Withania somnifera</i> (L.) Dunal in DC., Solanaceae, (AE 100)	Gizawa (A)	Wound	Fresh leaf paste mixed with little water is applied topically
<i>Zehneria scabra</i> (Linn. f.) Sond., Cucurbitaceae, (AE 21)	ShehareAreg (A)	Febrile illness, Fever, Invoking spirit, Pneumonia	Dried or fresh root fire smoke allowed to enter nasally and whole body
<i>Ziziphus spina-christi</i> (L.) Desf., Rhamnaceae, (AE 149)	Qurqura/Geba (A)	Ringworm, Tineacaptitis, Conjunctivitis	Fresh leaf paste mixed with water is applied topically
		Evil eye, Snake repellent	Fresh leaf juice is applied as a drop Dried leaf or root is used for fire fumigation

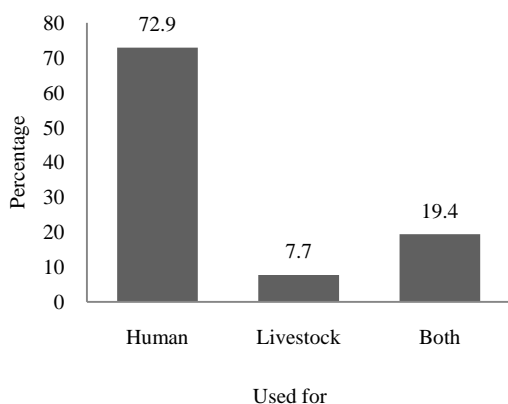


Fig. 2: Medicinal plants used for the treatment

**Parts and conditions of medicinal plants used:** The various parts of the plants used as different remedies are summarized in Fig. 3. Results revealed that greater proportion was leaves (38.1%) followed by roots (14.8%) and others. The informants indicated that fresh plant materials were used more frequently (47.7%) followed by dried (13.5%) and the remaining

(38.7%) plants were used in either fresh or in dried form for remedial preparation.

**Methods of remedy preparations and application:** Traditional healers in the study area used various a type of preparations in which crushing was the dominant (21.3%) type followed by squeezing (16.1%). The remaining methods of preparation and their percentage are indicated in Fig. 4. Preparations were administered mostly by oral (38.7%) followed by dermal (29%), oral and dermal (14.8%), oral, dermal and nasal (3.9%), dermal and nasal (3.2%), auricular (2.6%) and the remaining; oral and nasal; optical; nasal; oral, dermal and optical each share equally 1.9% based on the type of disease.

**Informant consensus factor (ICF) of medicinal plants:** Informant consensus factor was calculated for frequently reported diseases categories and presented in Table 2. Results revealed that the highest percentage (88%) of ICF was linked to problems associated with intestinal parasites followed by emergency diseases (82%). The least (33%) ICF was associated with organ diseases.

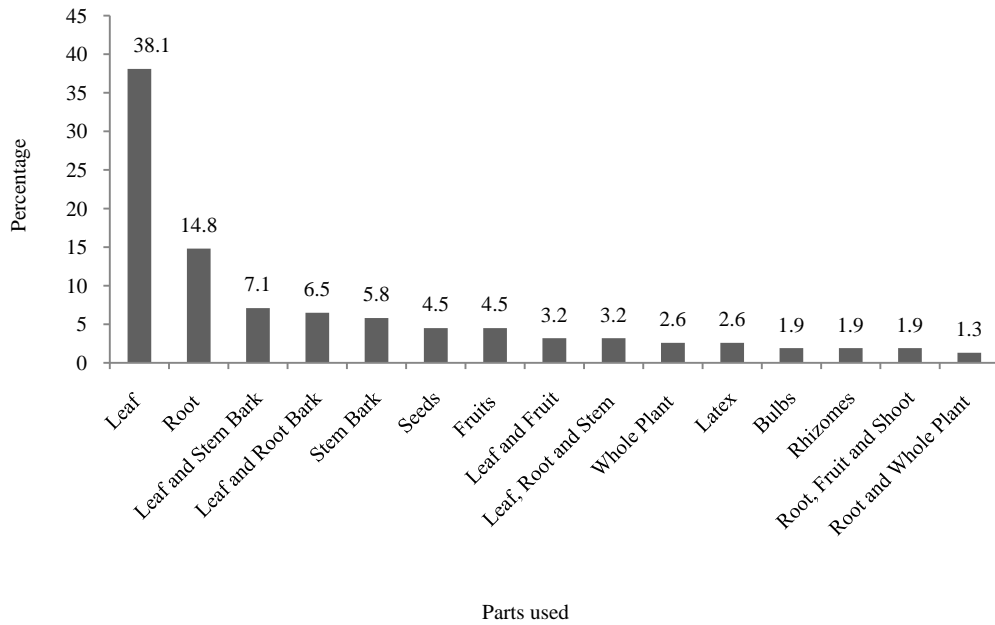


Fig. 3: Plant parts used

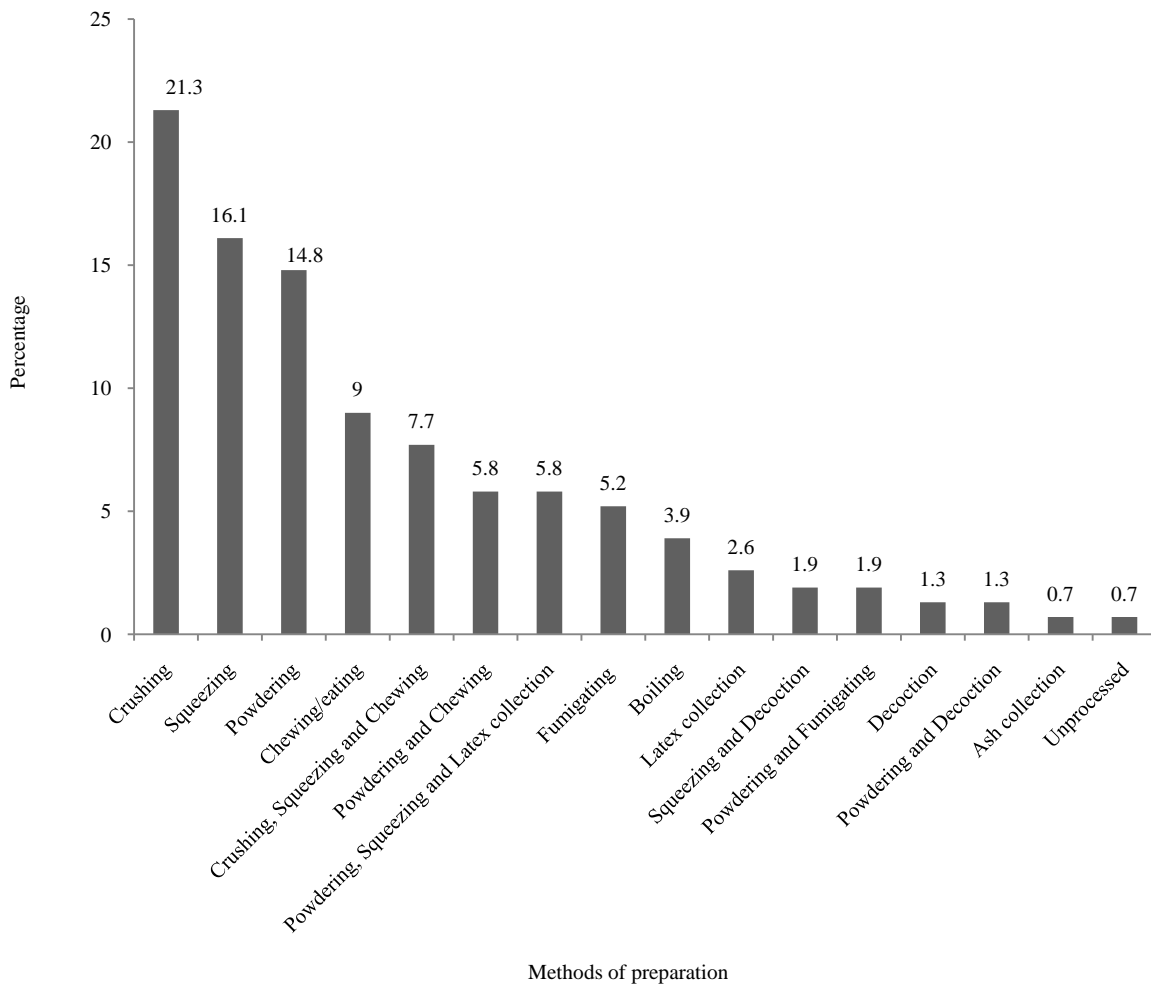


Fig. 4: Methods of remedial preparations

Table 2: Informant consensus factor of medicinal plants for seven categories of frequently reported diseases

Category of diseases	Diseases included	Nt	Nur	ICF
Dermatological problems	Acne vulgaris, dandruff, eczema, leprosy ringworm, scabies, tinea versicolor, wound and wart	61	271	0.78
Emergency diseases	Febrile illness, common cold, cough, stabbing pain, headache, legache, asthma and tonsillitis	37	201	0.82
Intestinal parasites	Amoebiasis, ascariasis, tape worm and abdominal pain, diarrhea and vomiting	44	370	0.88
Livestock diseases	Coccidiosis, leech infection, rabies, ecto-parasites and diuretic	23	40	0.44
Organ diseases	Toothache, ear lesion, conjunctivitis and sexual impotency	13	19	0.33
Poison	Snake biting, scorpion biting and spider biting	15	24	0.39
Others	Spiritual disease, evil eye, psychiatric disease and invoking sprit	23	90	0.75

Table 3: Fidelity value of traditional medicinal plants for the most frequently reported diseases

Disease treated	Medicinal plants	Np	N	FL (%)
Wound	<i>Actinopteris semiflabellata</i>	5	5	100
	<i>Plantago lanceolata</i>	4	4	100
	<i>Rumex nervosus</i>	25	30	83
	<i>Solanum anguivi</i>	2	5	40
Evil eye	<i>Capparis tomentosa</i>	4	4	100
	<i>Clerodendrum myricoides</i>	3	3	100
	<i>Withania somnifera</i>	8	10	80
	<i>Ocimum lamiiifolium</i>	57	59	96
Febrile illness	<i>Eucalyptus globulus</i>	5	6	83
	<i>Otostegia integrifolia</i>	19	38	50
	<i>Polygala abyssinica</i>	9	10	90
Snake biting	<i>Andrachmeaspera</i>	3	5	60
	<i>Verbascum sinaiticum</i>	14	17	82
	<i>Salvia nilotica</i>	6	8	75
	<i>Clematis simensis</i>	3	5	60
Tonsillitis	<i>Rumex nepalensis</i>	8	11	72
	<i>Lepidium sativum</i>	17	27	63
Abdominal pain	<i>Vernonia amygdalina</i>	3	5	60
	<i>Euphorbia tirucalli</i>	2	3	67
	<i>Justicia schimperiana</i>	3	7	43
	<i>Calpurnia aurea</i>	2	8	25
Intestinal parasites	<i>Cucumis ficifolius</i>	31	49	63
	<i>Lepidium sativum</i>	7	27	26

**Fidelity Level (FL) of medicinal plants:** The fidelity level of medicinal plants on frequently reported diseases was calculated and summarized in Table 3. Results revealed 100% fidelity level for the following plants; *Actinopteris semiflabellata* and *Plantago lanceolata* for wound healing and *Capparis tomentosa* and *Clerodendrum myricoides* for evil eye. The FL of *Ocimum lamiiifolium* was 96% for curing febrile illness and 90% for *Polygala abyssinica*, which was used as antivenom.

## DISCUSSION

Plants are used for various ailments is an age-old practices since time immemorial. The documentation of medicinal plants is gaining recognition in recent times in order to preserve the knowledge for the next generation and also make effective use of the resources. In this connection 155 medicinal plants and their parts utilized for various treatments, mode of application and method of process were documented from Fiche District and its environment. In this place, huge numbers of traditional healers are practicing from generation to generation by obtaining knowledge from their elders and also through learning. From the collected and documented medicinal plants, the most dominant families was Lamiaceae. Most of the

Lamiaceae plants are shrubs and herbs and mostly they contain aromatic secondary metabolites, which may be effective in curing various diseases. Based on evidence and availability theory, Stepp and Moerman (2002) suggested that these plants concentrate very active biological compounds as a function of their life strategies. The earlier works of Almeida and Albuquerque (2002) also indicated that family Lamiaceae was classified as the richest species in their study areas. According to Bennett and Prance (2000) most (21%) of the medicinal plants from their survey belong to the Lamiaceae and Asteraceae family. The preference of Lamiaceae family by the traditional healers may be related to their availability, wide range of distribution even in disturbed areas and potential biological properties in their secondary metabolites.

The second dominant family in human health treatment in the study area was Asteraceae. However, some other ethnobotanical investigators (Seyoum, 2009; Getaneh, 2011) observed Asteraceae was dominant in their study area. This may be related to geographical location, socioeconomic status of the local communities and other cultural reasons. Another possible reason may be related to the extent of ethnobotanical exploration in their study area or the entire area may have been not exhaustively explored. Tesfaye and Sebsebe (2009) suggested that detailed information on the medicinal plants need to be undertaken in various parts of Ethiopia where little or no ethnobotanical explorations have been made. Our, documentation of traditional medicinal plants is the first hand ethnobotanical information.

In the study area, most of the plants were used to treat human diseases followed by human and livestock (Fig. 2). Among the 155 medicinal plants, 113 species were used for the treatment of 69 human ailments, whereas 12 species were used to treat five livestock ailments and 30 species were used to treat 14 ailments affecting both human and livestock. The majority of the medicinal plants were used to treat more human diseases than livestock due to some frequently occurring human diseases such as abdominal pain, evil eye, febrile illness, snake biting, tonsillitis, cough, intestinal parasites, malaria, ringworm, wound and amoebiasis. The rural people in the study area are not easily access the modern medical facilities due to their socioeconomic status. Dawit (2001) and Kurt and Andrew (2002) reported that 80% of the Ethiopian

people still use plant remedies for various ailments. In Ethiopia, many researchers reported similar findings from their study sites (Mirutse *et al.*, 2009; Tesfaye and Sebsebe, 2009). The healers in the study area collect medicinal plants mostly from the natural habitats due to availability. The wild areas are the sources of most ethnomedicinal plants (Zemedu, 1999; Mirutse *et al.*, 2003). Some of the important plants such as *Buddleja polystachya*, *Clutia abyssinica*, *Dovyalis abyssinica*, *Gomphocarpus purpurascens* and *Rumex nervosus* were given attention to grow in homegardens and the healers need professional support to conserve the medicinal plants under in-situ and ex-situ methods. The majority (43.87%) of the traditional medicinal plants were herbs followed by shrubs (35.48%) because herbs are mostly available during the wet and late rainy season compared to shrubs and tree species and the present study was also carried out during wet season. In Ethiopia, many researchers also reported that herbs were commonly used medicinal plants (Mirutse *et al.*, 2003; Debela *et al.*, 2006; Tesfaye *et al.*, 2009).

The most commonly used plant parts (Fig. 3) for herbal preparations in the study area were leaves (38.1%) followed by roots (14.8%). The leaves may be containing most of the bioactive secondary metabolites compared to other parts. Another reason leaves are the renewal and easily accessible part of the plants and their utilization do not put medicinal plants at risk of extinction over a period. In Ethiopia, several studies reported that leaves were commonly used plant parts to treat various health problems (Dawit and Estifanos, 1991; Mirutse and Gobena, 2003). Most of the traditional medicinal plants were used in fresh form (47.7%) followed by dried (13.5%) plants. The reason for preference of fresh plants over dried ones may be related to the fact that the biologically active principles present in the leaves may decrease up on drying. Many researcher also observed similar findings elsewhere (Mirutse *et al.*, 2009; Nayyar and Suman, 2010; Gidey *et al.*, 2011).

The local communities used various methods of preparation for different types of human and livestock ailments (Fig. 4). Most of the healers used crushing (21.3 %), squeezing (16.1%) and powdering (14.8%) in descending order. In most cases, preparing plant remedies by crushing or squeezing is advantageous over using decoction since heat may affect the active constituents of the remedies. This finding was in line with earlier results; in which crushing was the common type of preparation (Seyoum, 2009). The prepared remedies were administered through oral (38.7%), dermal (29%), oral and dermal (14.8%), oral, dermal and nasal (3.9%) and dermal and nasal (3.2%) based on the nature and conditions of patients. In the study area the people are mostly affected by endoparasites and this may be one of the reasons for the dominance of oral administration. There are many ethnobotanical researchers reported similar findings elsewhere in Ethiopia (Getachew *et al.*, 2001, 1999; Kebu *et al.*,

2004; Teshale *et al.*, 2004; Haile and Delenasaw, 2007; Gidey *et al.*, 2011).

The highest (0.88) Informant Consensus Factor (ICF) of the medicinal plants was associated with problems of intestinal parasite (Table 2). It includes amoebiasis, ascariasis, tapeworm, abdominal pain, diarrhea and vomiting. The emergency diseases such as febrile illness, common cold, stabbing pain, headache and legache stood ICF value of 0.82. If plants are chosen randomly and there is no exchange of information about their use among informants, ICF values are low, near to zero. On the other hand, when information is exchanged between informants or there is a well-defined selection criterion in the community, ICF approaches to one (Gazzaneo *et al.*, 2005). High ICF value was calculated for most of the traditional medicinal plants in this study and medicinal tradition is viewed as well defined if a high degree of ICF is recorded (Heinrich, 2000).

The fidelity level (FL) of *Actiniopteris semiflabellata* and *Plantago lanceolata* for wound and, *Capparis tomentosa* and *Clerodendrum myricoides* for evil eye was showed 100% followed by *Ocimum lamiiifolium* for febrile illness (96%) and *Polygala abyssinica* for snake biting (90%) (Table 3). Generally, high FL indicates that, all use reports refer to the same way of using it, whereas low FLs are obtained for plants that are used for many different purposes.

In conclusion, traditional medicinal plants are the main source used by the local healers in Fiche district and its surroundings due to rich diversity of the flora. The knowledge difference was also observed in the study area because most of the practitioners were middle aged (31-51 years). Most of the knowledgeable people are kept the knowledge as a secret within their family members and this may put the continuity of medicinal plants and associated indigenous knowledge in question. Due to modernization in agricultural practices, the biodiversity of medicinal flora started degrading and most of the valuable medicinal plants are under threatening conditions. The healers and local communities need to give special attention for potential medicinal plants to cultivate in their home gardens. Most of the traditional practices are only in the documentation level and must be confirmed scientifically for the welfare of future generations. The ethnobotanical information documented from this field research was a first contribution for scientific publication.

#### ACKNOWLEDGMENT

Authors are thankful to Elizabeth d'Avigdor (Southern Cross University, Australia) for her financial support to conduct this research. We are also grateful to the local communities of Fiche District and its environment, who have participated in sharing their traditional indigenous knowledge on medicinal plants.

## REFERENCES

- Alexiades, M.N., 1996. Collecting Ethnobotanical Data: An Introduction to Basic Concepts and Techniques. In: Alexiades, M.N. (Ed.), Selected Guideline for Ethnobotanical Research: A Field Manual. The New York Botanical Garden, New York, pp: 52-94.
- Almeida, C.F.C. and U.P. Albuquerque, 2002. Use and conservation of medicinal plants and animals in the state of pernambuco (Northeastern Brazil): A case study. *Interciencia*, 27: 276-285.
- Bennett, B.C. and G.T. Prance, 2000. Introduced plants in the indigenous pharmacopoeia of northern South America. *Econ. Bot.*, 54: 90-102.
- Cotton, C.M., 1996. Ethnobotany: Principles and Application. John Wiley and Sons Ltd., New York.
- CSA, 2011. Population and Housing Census of Fiche District. Office of Population and Housing Census Commission, Central Statistical Authority (CSA).
- Cunningham, A.B., 1996. Professional Ethics and Ethnobotanical Research. In: Alexiades, M.N. (Ed.), Selected Guideline for Ethnobotanical Research: A Field Manual. The New York Botanical Garden, New York, pp: 453-476.
- Dawit, A., 2001. The role of medicinal plants in healthcare coverage of Ethiopia, the possible integration. In: Medhin, Z. and A. Dawit (Eds.), Conservation and Sustainable Use of Medicinal Plants in Ethiopia. Proceeding of the National Workshop on Biodiversity Conservation and Sustainable Use of Medicinal Plants in Ethiopia. IBCR, Addis Ababa, pp: 6-21.
- Dawit, A. and H. Estifanos, 1991. Plants as Primary Source of Drugs in the Traditional Healthcare Practices of Ethiopia. In: Engles, J.M., J.G. Hawakes and W. Melaku (Eds.), Plant Genetic Resources of Ethiopia. Cambridge University Press, Cambridge, pp: 101-113.
- Debela, H., A. Zemedede and K. Ensermu, 2006. Use of traditional medicinal plants by people of 'boosat' sub district, central eastern Ethiopia. *Ethiopian J. Health Sci.*, 16: 141-155.
- Fisseha, M., D. Sebsebe and T. Tilahun, 2009. An ethnobotanical study of medicinal plants in wonago wereda, SNNPR, Ethiopia. *J. Ethnobiol. Ethnomed.*, 5: 28.
- Friedman, J., Z. Yaniv, A. Dafini and D. Palewitch, 1986. A preliminary classification of the healing potential of medicinal plants, based on the rationale analysis of an ethnopharmacological field survey among bedouins in the Negev Desert, Israel. *J. Ethnopharmacol.*, 16: 275-287.
- Gazzaneo, L.R., R.F. Lucena and U.P. Albuquerque, 2005. Knowledge and use of medicinal plants by local specialists in a region of Atlantic forest in the state of pernambuco (Northeastern Brazil). *J. Ethnobiol. Ethnomed.*, 1: 9.
- Getachew, A., A. Dawit, G. Timotewos and U. Kelbessa, 1999. Perception of modern and traditional health practitioners about traditional medicine in Shirka District, Arsi Zone, Ethiopia. *Ethiopian J. Health Dev.*, 16: 19-29.
- Getachew, A., A. Dawit and U. Kelbessa, 2001. A survey of traditional medicinal plants in shirka district, arsi zone, Ethiopia. *Ethiopian Pharm. J.*, 19: 30-47.
- Getaneh, G., 2011. An ethnobotanical study of traditional use of medicinal plants and their conservation status in mecha wereda, west gojjam zone of amhara region. M.Sc. Thesis, Addis Ababa University, Ethiopia.
- Gidey, Y., T. Mekonen and K. Mezgebe, 2011. Survey of medicinal plants used to treat human ailments in Hawzen District, Northern Ethiopia. *Int. J. Biodiv. Conserv.*, 3: 709-714.
- Haile, Y. and Y. Delenasaw, 2007. Traditional medicinal plant knowledge and use by local healers in sekoru district, Jimma Zone, Southwestern Ethiopia. *J. Ethnobiol. Ethnomed.*, 3: 24.
- Hamilton, A.C., 2004. Medicinal plants, conservation and livelihoods. *Biodivers Conserv.*, 13: 1477-1517.
- Heinrich, M., 2000. Ethnobotany and its role in drug development. *Phytother. Res.*, 14: 479-488.
- Kebu, B., K. Ensermu and A. Zemedede, 2004. Indigenous medicinal utilization, management and threats in Fentale area, Eastern Shewa, Ethiopia. *Ethiopian J. Biol. Sci.*, 3: 1-7.
- Kurt, H. and M. Andrew, 2002. Twenty years of research into medicinal plants. *Phytochem. Rev.*, 1: 275-285.
- Martin, G.J., 1995. Ethnobotany: A Method Manual. Chapman and Hall, London, pp: 276-347.
- Medhin, Z., G.M. Tsige and A. Kaleab, 2001. Global perspectives of medicinal plants. In: Medhin, Z. and D. Abebe (Eds.), Conservation and sustainable use of medicinal plants in Ethiopia. Proceeding of the National Workshop on Biodiversity and Sustainable Use of Medicinal Plants in Ethiopia. IBCR, Addis Ababa, pp: 198-203.
- Mesfin, T. and D. Sebsebe, 1992. Medicinal Ethiopian Plants. Inventory, Identification and Classification. In: Edwards, S. and Zemedede Asfaw (Eds.), Plants used on African traditional medicine as practiced in Ethiopia and Uganda, East Africa. Botany 200: NAPRECA, Monograph Series No. 5: 1-19. Addis Ababa University, Ethiopia, 5: 1-19.
- Mirutse, G. and A. Gobena, 2003. An ethnobotanical survey of plants of veterinary importance in two woredas of Southern Tigray, Northern Ethiopia. *SINET: Ethiopian J. Sci.*, 26: 123-136.
- Mirutse, G., A. Zemedede, E. Thomas and W. Zerihun, 2003. An ethnobotanical study of medicinal plants used by the zay people in Ethiopia. *J. Ethnopharmacol.*, 85: 43-52.

- Mirutse, G., A. Zemedu, W. Zerihun and T. Tilahun, 2009. Medicinal plant knowledge of the bench ethnic group of Ethiopia: An ethnobotanical investigation. *J. Ethnobiol. Ethnomed.*, 5: 34.
- Nayyar, P. and Y. Suman, 2010. Ethnopharmacology of single herbal preparations of medicinal plants in Asendabo District, Jimma Ethiopia. *Indian J. Trad. Knowl.*, 9: 724-729.
- Ohigashi, H., 2008. Utilization and Production of Medicinal Plants. In: Makiu (Ed.), *Medicinal Crops in Ethiopia Current Status and Future Potential*. JAICAF, pp. 4-6.
- Perumal, S.R. and P. Gopalakrishnakone, 2008. Therapeutic potential of plants as anti-microbials for drug discovery. *eCAM*, 7(3): 283-294.
- Phillips, O., 1996. Some Quantitative Methods for Analyzing Ethnobotanical Knowledge. In: Alexiades, M.N. (Ed.), *Selected Guidelines for Ethnobotanical Research: A Field Manual*. The New York Botanical Garden, New York, pp: 171-197.
- Ragunathan, M. and M. Solomon, 2007. Ethnomedicinal survey of folk drugs used in Bahirdar Zuria District, Northwestern Ethiopia. *Indian J. Trad. Knowl.*, 8: 281-284.
- Seyoum, G., 2009. Ethnobotanical study of medicinal plants in debre libanos wereda, north shewa zone of oromia region, Ethiopia. M.Sc. Thesis, Addis Ababa University, Ethiopia.
- Sofowora, A., 1993. Medicinal plants and traditional medicine in Africa. *J. Ethnobiol. Ethnomed.*, 6: 8.
- Stepp, J.R. and D.E. Moerman, 2002. The importance of weeds in ethnopharmacology. *J. Ethnopharmacol.*, 75: 19-23.
- Tafesse, M. and L. Mekonnen, 2001. The role of traditional veterinary herbal medicine and its constraints in animal healthcare system in Ethiopia. In: Medhin, Z. and D. Abebe (Eds.), *Conservation and sustainable use of medicinal plants in Ethiopia*. Proceeding of the National Workshop on Biodiversity and Sustainable Use of Medicinal Plants in Ethiopia, IBCR, Addis Ababa, pp: 168-175.
- Tesfaye, A. and D. Sebsebe, 2009. Ethnobotanical study of medicinal plants in Kafficho people, Southwestern Ethiopia. In: Birhanu, T. and B. Shiferaw (Eds.), *Proceedings of the 16th International Conference of Ethiopian Studies*. Addis Ababa, Ethiopia.
- Tesfaye, H., D. Sebsebe and A. Zemedu, 2009. An ethnobotanical study of medicinal plants used by local people in the lowlands of Konta special Wereda, Southern Nations, nationalities and peoples regional state, Ethiopia. *J. Ethnobiol. Ethnomed.*, 5: 26.
- Teshale, S., B. Merga, A. Girma and K. Ensermu, 2004. Medicinal plants in the ethnoveterinary practices of borana pastoralists, Southern Ethiopia. *Int. J. Appl. Res. Vet. Med.*, 2: 220-225.
- Trotter, R. and M. Logan, 1986. Informant Consensus: A New Approach for Identifying Potentially Effective Medicinal Plants. In: Etkin, N.L. (Ed.), *Plants in Indigenous Medicine and Diet: Biobehavioural Approaches*. Redgrave Publishers, Bedford Hills, New York, pp: 91-112.
- WHO, 2003. African traditional medicine: Our culture, our future. *Afr. Health Monitor*, 4(1).
- Wright, C.W., 2005. Plant derived antimalarial agents: New leads and challenges. *Phytochemistry*, 4: 55-61.
- Zemedu, A., 1999. *Ethnobotany of Nations, Nationalities and Peoples in Gambella, Benishangul-Gumuz and Southern Regions of Ethiopia*. Addis Ababa University Press, Addis Ababa, Ethiopia.