

Review Article

Review of Phytochemical Analysis of Selected Traditional Medicinal Plants in Ethiopia

Alemu Talema

Chemistry Department, College of Natural and Computational Sciences, Injibara University, Injibara, Ethiopia

Email address: alemu212121@gmail.com

To cite this article:
Alemu Talema. Review of Phytochemical Analysis of Selected Traditional Medicinal Plants in Ethiopia. International Journal of Homeopathy & Natural Medicines. Vol. 6, No. 2, 2020, pp. 23-31. doi: 10.11648/j.ijhnm.20200602.13

Received: November 16, 2020; Accepted: November 30, 2020; Published: December 16, 2020

Abstract: The aim of this review is to identify which types of selected medicinal plants for phytochemical characteristics were analyzed and which one is not analyzed as Ethiopian levels. In this review, the most traditional medicinal plant species found and used in Ethiopia are chosen. The state of the phytochemical characteristics of selected medicinal plants was stated under the literature. The qualitative phytochemical characteristics, some of which are the most important phytochemicals such as Tannins, Alkaloids, Saponins, Cardiac Glycosides, Steroids, Terpenoids, Flavonoids, Phlobatannins, Anthraquinones, and Reducing Sugars are studied by researcher. Most studies reviled that some phytochemical properties present in some medicinal plants while some of phytochemical properties are absent in some medicinal plants as well as the phytochemical properties of some species were studied like Opuntia ficusindica (L.) Miller (Yebereha Kulkual), Eucalyptus globules Labill (Nech Bahir Zaf), Cordia Africana Lam. (Wanza), Foeniculum vulgare. (Ensilal). However, some most important phytochemical properties of medicinal plants like Barleria eranthemoides R. Br. Ex C. B. Cl. (Yesetaf), Premna schimperi Engl. (Chocho), Capparis tomentosa L. (Gumero), Tragia pungens (Forssk.) Mull. Arg. (Abla lit) and Cymbopogon sp. (Serdo), Tribulus terrestris L. (Kurinchit) are not studied in Ethiopia. This review has shown that traditional medicinal plants those phytochemical properties are not studied have various medicinal purpose like treating mastitis, preventing boils, Haemorrhoids, congestion, headache, hepatitis, liver, vertigo, stomatitis, kidneys, liver, and vision for treating anemia, hemorrhoid coughs, fluxes, and stomatitis in most animals and human beings. So that identifying the plants based on the investigation and analysis of phytochemical properties of such plant species are more important as Ethiopian levels.

Keywords: Medicinal Plants, Phytochemicals, Bioactive Compounds, Traditional Medicines, Ethiopian Levels

1. Introduction

From the various plant species, medicinal plants have very vital in medication purpose, drug development and economical services. Medicinal plants are used to treating and diagnose the disease and infection. From ancient times, plants have been rich sources of effective and safe medicines [1]. The main phytochemical components, present in medicinal plants are Tannins, Alkaloids, Saponins, Cardiac Glycosides, Steroids, Terpenoids, Flavonoids, Phlobatannins, Anthraquinones, and Reducing Sugars. As proposed by WHO, the primary health care of most population of developing countries depend on the traditional medicines and mostly natural plant products [2]. Like worldwide countries, Ethiopia use the traditional medicines in both rural and urban area (3). Traditional practice and activities have a long history in many areas in Ethiopia and it will continue to give useful and applicable tools for treating disease.

According to World Health Organization, traditional medicine (TM) is the total of the knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures and nations. It is used in the maintenance of health, prevention, diagnosis, or treatment of disorders. Traditional medicine is popular in the developing world and its use is rapidly spreading in the developed nations [4]. Different traditional medicinal plant species studied by different researchers in the world and in the Ethiopian. Ethiopia comprises people with many languages, cultures, and beliefs. This makes for a rich and diverse knowledge and practice of traditional medicine, including herbal
remedies [3]. There are different literature reviews which investigated and studied the Ethnobotanical and Ethnopharmacological evidences of some Ethiopian medicinal plants traditionally used for the Treatment of Cancer, skin problem, leprosy, and external parasites, Evil eye and wound treatment in the Ethiopia. However, there is no report that could show phytochemical composition and its expanded pharmacological application in folk medicine of some traditional medicinal plants in the country of Ethiopia. Moreover, this knowledge of identifications of studied and unstudied phytochemical composition of medicinal plants in Ethiopia can serve as the baseline data for researcher and analyzer for the further study of traditional medicinal plants in Ethiopia.

2. Materials and Methods

In this review, the data and information on the traditional medicinal plants in Ethiopia were collected from the preferred documents (published paper) which are available in the online in different form such as books, published article and researcher reports. Different online sources such as Google Scholar and gray literature was the source of published articles by browsed the different words or terms like medicinal plants and Ethiopian traditional plants, articles that collected from the online sources were published from the January 2006 to the June 2020 on the traditional medicinal plants in the Ethiopia and some samples are collected from the December 2011 to the December 2014. For this review, scientific name, family name and local name also obtained from the published articles that obtained from the online and the data are shown in the form of Table.

There are various traditional medicinal plants used to treat different illness and disease in the Ethiopia which did not describe plants species by scientific names; and review articles, are excluded. In this review paper, almost a total of 30 plant species that recognized and grown in Ethiopia are documented. From those plant species, the phytochemical composition of some plant species are studied by a researcher and some are not studied. The most important components of the medicinal plant were isolated by the extraction methods by using the right solvent. Each researcher in the published articles in this review, different methods of extraction such as ethanol, methanol, chloroform, acetone, hexane, petroleum ether, ethyl acetate and aqueous (water) were used to the phytochemical composition of plant species.

Outcomes: The main outcomes of this review were to collect and summarize the information about the medicinal plant and to classify the plants based on the studies of their phytochemical composition as well as this provides information for the research community to conduct further scientific investigations in the Ethiopia medicinal plants.

3. Results and Discussion

3.1. Phytochemical Analysis

Traditional medicine plays a significant role in the healthcare of the people in developing countries, including Ethiopia, and medicinal plants provide valuable contribution to this practice [5]. In this review, around 30 medicinal plants species identified from the published articles and the literature reviews mentioned the different parts of the plant such as root, leaves, and fruit in which these different parts have many traditional values, pharmacological uses, and phytochemical constituents. From few medication values of plant parts, to treat rheumatism, madness, snakebite, chest pain, jaundice chest pain, malaria, headache, coughs etc. All the medicinal plants are shown in the Table form with the scientific name, families, local name and growth forms. Most plants were reported and investigated from Amhara, Oromia, SNNP and Tigray region. As the reported by many authors [6-12], some medicinal plants with their scientific name, family, local name and their habitat are shown in Table 1 and these plant species listed this review were often used by the people in the Ethiopia.

| Scientific name       | Family               | Local name | Habitat                                      |
|-----------------------|----------------------|------------|----------------------------------------------|
| Aloe pulcherrima       | Aloeaceae            | Eret       | Steep bare mountain slopes [6]               |
| Brucea antidysenterica J. F. Mill. | Simaroubiaceae | Abalo     | Mountain and in green forest margins        |
| Premna schinperi Engl. | Lamiaceae            | Choko      | Degraded and secondary forests, grassy meadows and along paths in forests [6] |
| Calotrops procera (Ait.) Ait. f. | Asclepiadaceae | Qimbo     | Wild                                         |
| Capparis tomentosa Lam. | Capparidaceae       | Gumoro     | Wild                                         |
| Cybopogonsp.          | Poaceae              | Serdo      | Wild                                         |
| Lepidiums atmviumL.   | Brassicaceae         | Fetto      | Wild                                         |
| Otostegia integrifolia Benth. | Lamiaceae        | Tinjut     | Wild                                         |
| Phytoalca dodocandrU’H erit. | Phytolaccaceae | Endol     | Wild                                         |
| Rumex abyssinusJacq.  | Polygonaceae         | Meqonko    | Wild                                         |
| Vernonia amygdalina Del. | Asteraceae          | Girawa     | Bush/woodland, forest habitats, home gardens [7, 8] |
| Tragia pungens (Forsk.) M’ull. Arg. | Euphorbiaceae | Ablatil    | Among open rock bushlands [8]                |
| Zehneria scabra (L. f) Sond. | Cucurbitaceae       | Aregresa   | Wild                                         |
| Ocimum lamiofiliumi Hochst. ex. Benth. | LippiaadonisHochst. | Damakesie | Acacia-Commiphora bush- and woodland, limestone slopes, home gardens [6] |
| Achyranthes asperaL. | Amaranthaceae        | Telenj     | Wild                                         |
| Hagenia abyssinica (Bracco) T. F. Gmel. | Rosaceae         | Kosso      | Montane forest and grassland Moist evergreen forest [6] |
| Justicia schimperiana (ex. A. (Nees) T. Anders. | Acanthaceae | Sensel     | Open woodland, riverine vegetation, live fence of house [6] |
| Moringa stenopetala (E. G. Baker) Cufod. | Moringaceae       | Shiferaw   | Cultivated in terraced fields, gardens, small towns, in riverine |
3.2. Phytochemicals

Analysis of the phytochemical properties of the medicinal plants used to show and isolated the drug lead compounds and components from the parts of the plant. The unique biological activity of the plants can be identified by the phytochemical properties such as alkaloids, L'stachydrine, saponin glycosides, alkaloids, phytosterols, terpenoids, tannins, sterol, polyphenols, flavonoids, and anthranoids. The most parts of the plants used for the analysis of the phytochemicals properties were leaves, roots, barks, and fruits. In this review, the medicinal plants were investigated for phytochemical constituent of ethanol, methanol, chloroform, acetone, hexane, petroleum ether, ethyl acetate and aqueous (water) extraction of different phytochemicals.

The medicinal power of traditional plants species lies in phytochemical components that cause definite pharmacological action on human body [13]. Based on their metabolism activity of the plants can be identified by the phytochemicals components from the parts of the plant. The unique biological activity of the plants can be identified by the phytochemical properties such as alkaloids, L'stachydrine, saponin glycosides, alkaloids, phytosterols, terpenoids, tannins, sterol, polyphenols, flavonoids, and anthranoids. The most parts of the plants used for the analysis of the phytochemicals properties were leaves, roots, barks, and fruits. In this review, the medicinal plants were investigated for phytochemical constituent of ethanol, methanol, chloroform, acetone, hexane, petroleum ether, ethyl acetate and aqueous (water) extraction of different phytochemicals.

The medicinal power of traditional plants species lies in phytochemical components that cause definite pharmacological action on human body [13]. Based on their metabolism activity in the plant, phytochemicals components are generally can be divided into two groups, which are primary which has mainly sugars, amino acids, chlorophyll and proteins and secondary constituents while secondary constituents consists of alkaloids, flavonoids, saponins, tannins, phenolic compounds and many more [14]. In this review, the most published articles recognized the presences of specific phytochemical components in the plants was indicated by the positive sign (+) and the absence of phytochemical components in the plants, by the negative sign (-).

### 3.2.1. Alkaloids

Alkaloids are one of the main and largest components that produced by plants, and they were a metabolic by-product that derived from the amino acids [13]. Based on the published articles in these reviews, alkaloids were extracted from the different parts of the plants by using different chemicals such as ethanol, methanol, chloroform, acetone, hexane, petroleum ether, ethyl acetate and aqueous (water) and these components were present in most parts of the medicinal plant like leaves, roots and fruits while in some parts of plants were not present (Ocimum lamiifolium, Brucea antidysenterica J. F. Mill., and Zehneria scabra).

### 3.2.2. Flavonoids

Flavonoids also called bio-flavonoids are polyphenol antioxidants found naturally in plants, and they are secondary metabolites meaning they are organic compounds that have no direct involvement with the growth or development of plants [15]. In this review, flavonoids were detected in most plant species except in some medicinal plants and for different solvent give a different response for the same plant species Zehneria scabra (L. f) Sond and Rumex abyssinicus plant species.

### 3.2.3. Tannins

Tannins are the complex organic, non-nitrogenous derivatives of polyhydroxy benzoic acids which are widely distributed in the plant kingdom. Most of the true tannins have the molecular weight in between 1000 and 5000 [13]. They probably serve as a protective to the plant during growth and destroyed or deposited as end product of metabolism in some dead tissues of the mature plants [13]. In this review, Tannins were detected in most plant species like Cordia Africana Lam., Brucea antidysentericaJ. F. Mill., Hagenia abyssinica (Brucie) T. F. Gmel., except in some medicinal plants and also for different solvent give different response for the same plant species like Zehneria scabra (L. f) Sond and Tribulus terrestris L., plant species. Tannins are generally used in tanning process and used as healing agents in inflammation, burn, piles and gonorrhoea [16].

### 3.2.4. Saponins

Saponins contain the polycyclic aglycones and it is derived from the Latin word of ‘sapo’, which means the plant consisting of frothing agent. Saponins are an important group of glycosides which are widely distributed as plant constituents and which are neutral and soluble in water [13]. As the reported the authors in this review, saponins were detected in most medicinal plants like Phytolacca dodecandraL’Hér., Cordia Africana Lam., Ocimum lamiifolium Hochst. ex. Benth., Moringa stenopetala (E. G. Baker) Cufo., and Tribulus terrestris L., common plant species while in some plant species were show variable result that depends on the given solvents and not totally detected in the parts of the plants.

### 3.2.5. Phenols

Phenols are widely found in most plants and highest groups of secondary plant metabolites. As the reported the authors in this review, saponins were detected in most medicinal plants like Foeni culum vulgare., Withania somnifera (L.) Dunal.,
Phytolaccadodecandra L’Hérit., Eucalytusglobules Labill., Hagenia abyssinica (Brucie) T. F. Gmel., while in some plant species were show variable result that depends on the given solvents and not totally detected in the parts of the plants.

3.2.6. Steroids
Steroids are organic compounds with four cyclohexane rings. These steroidal compounds have been used to cut stress, reduce cholesterol levels, activate immune system, and enhance memory and learning and to treat tumor cells in cancer cases [17, 18]. Based on the given data from the Tables, Steroids were detected in some plant species while in some plants its result depends on the types of solvents.

3.2.7. Terpenoids
Terpenoids are small molecular products synthesized by plants and are probably the most widespread group of natural products. Terpenoids show significant pharmacological activities, such as antiviral, antibacterial, antimalarial, anti-inflammatory, inhibition of cholesterol synthesis and anti-cancer activities [19]. Based on the given data from the Tables, Terpenoids were detected in most analysis plant species while in some plants its result depends on the types of solvents.

Even though there are so many medicinal plants in Ethiopia, this review of the phytochemical analysis show that some medicinal plants were studied by investigator in different area of Ethiopia while some traditional plants are not studied. According to the data of published articles, the extraction techniques of the medicinal plants were mainly digestion and aqueous-alcohol extraction. The following Tables show that among the inadequate phytochemical investigation results available in the Ethiopia area levels.

| S. N | Chemical Constituent | Chloroform extract | Ethanol extract |
|-----|----------------------|--------------------|----------------|
| 1   | Phenols              | +                  |                |
| 2   | Alkaloids            | +                  |                |
| 3   | Saponins             | +                  |                |
| 4   | Carbohydrates        | +                  |                |
| 5   | Terpenoids           | +                  |                |

+ = the presence and - = the absence of chemical constituents.

Table 2. Phytochemical Screening of Petroleumether, chloroform, acetone and ethanol extracts of O. Integrifolia Benthleaves [20].

| S. N | Plant Constituent | Petroleumether extract | Chloroform extract | Acetone extract | Ethanol extract |
|-----|-------------------|------------------------|--------------------|-----------------|----------------|
| 1   | Alkaloids         | +                      | +                  | +               | -              |
| 2   | Coumarins         | +                      | +                  | +               | +              |
| 3   | Flavonoids        | +                      | ++                 | +++             | ++             |
| 4   | Phenolics compound| +                      | ++                 | +++             | ++             |
| 5   | Terpenoids        | +                      | +                  | ++              | ++             |

+ = the presence and - = the absence of chemical constituents.

Table 3. Phytochemical screenings of chloroform/methanol crude extract of L. Sativum seeds [21].

| S. N | Chemical Constituent | Chloroform/ Ethanol extract |
|-----|----------------------|-----------------------------|
| 1   | Phenols              | +                           |
| 2   | Alkaloids            | +                           |
| 3   | Phytosterols         | +                           |
| 4   | Steroids             | +                           |
| 5   | Saponins             | +                           |
| 6   | Carbohydrates        | +                           |
| 7   | Terpenoids           | +                           |
| 8   | Glycosides           | +                           |
| 9   | Tannins              | +                           |
| 10  | Proteins             | +                           |
| 11  | Cholesterol          | +                           |
| 12  | Flavonoid            | +                           |

+ = the presence and - = the absence of chemical constituents.

Table 4. Phytochemical screenings of crude extracts of D. stramonium leaves [22].

| S. N | Chemical Constituent | Crude Extracts |
|-----|----------------------|----------------|
|     |                      | Chloroform extract | Acetone extract | Petroleumether extract | Hexane extract | Ethanol extract |
| 1   | Flavonoid            | +                  | +              | +                  | +             | +              |
| 2   | Cholesterol          | +                  | +              | +                  | +             | -              |
| 3   | Tannins              | +                  | +              | +                  | +             | +              |
| 4   | Glycosides           | +                  | +              | +                  | -             | +              |
| 5   | Alkaloids            | +                  | +              | +                  | +             | +              |
| 6   | Phenols              | +                  | +              | -                  | +             | +              |
| 7   | Saponins             | +                  | +              | +                  | +             | +              |
| 8   | Proteins             | +                  | +              | +                  | +             | +              |
| 9   | Carbohydrates        | +                  | +              | +                  | +             | +              |
| 10  | Terpenoids           | +                  | +              | +                  | +             | +              |

+ = the presence and - = the absence of chemical constituents.
### Table 5. Phytochemical components of ethanol extracts of *Ocimum lamiifolium* [23].

| S. N | Chemical Constituent | Ethanol extract |
|------|----------------------|-----------------|
| 1    | Anthraquinones       | -               |
| 2    | Terpenoids           | +               |
| 3    | Flavonoids           | +               |
| 4    | Saponins             | +               |
| 5    | Tannins              | +               |
| 6    | Alkaloids            | -               |
| 7    | Steroids             | +               |

+ = the presence and - = the absence of chemical forms.

### Table 6. Phytochemical screening of *Sidarhombifolia* aqueous methanol extract of aerial part [24].

| S. N | Chemical Constituent | Results |
|------|----------------------|---------|
| 1    | Terpenoids           | +       |
| 2    | Saponins             | -       |
| 3    | Alkaloids            | +       |
| 4    | Polyphenols          | +       |
| 5    | Flavonoids           | +       |
| 6    | Cardiac glycosides   | -       |
| 7    | Quinine              | +       |

“+” stands for the presence and “-” stands for the absence of the chemical constitutes.

### Table 7. Antibacterial activities of selected medicinal plants extracted by soaking method (conc. 100 mg/ml) [25].

| Tests | Name of medicinal plants | Eucalyptus globules | Withania somnifera | Phytolacca dodecandra | Bruea antisenterica | Otostega integrifola | Verbena officinalis | Cordia Africana | Foeniculum Vulgar.
|-------|--------------------------|---------------------|--------------------|------------------------|--------------------|----------------------|--------------------|----------------|----------------|
| Alkaloids | +                        | +                   | +                  | -                      | +                  | -                    | -                  | -              | -              |
| Tannins | -                        | -                   | +                  | ±                      | +                  | +                    | +                  | -              | -              |
| Saponins | -                        | -                   | +                  | -                      | -                  | +                    | +                  | +              | +              |
| Flavonoids | +                        | +                   | +                  | +                      | +                  | -                    | -                  | +              | +              |
| Cardiac glycosides | +                        | +                   | -                  | +                      | -                  | ±                    | -                  | +              | +              |
| Phenols | +                        | +                   | +                  | -                      | -                  | +                    | +                  | -              | ±              |

Where - Indicate absence; + Indicate presence; ± Indicate slight presence/absence.

### Table 8. Phytochemical tests results of tuber and leaves of *Zehneria scabra* in different solvents [26].

| Sn. | Phytochemicals | Solvents | Tuber | Leaf |
|-----|---------------|----------|-------|------|
|     |               | Aqueous | Ethanol | Chloroform | Methanol |
| Phenol | +            | +       | +      | -     |
| Steroids | +           | +       | -      | -     |
| Tannins | -            | -       | +      | +     |
| Flavonoids | -           | -       | +      | -     |
| Alkaloids | -            | -       | -      | -     |
| Saponins | -            | -       | +      | +     |
| Glycosides | +           | +       | -      | +     |
| Proteins | +            | +       | +      | +     |
| Amino acids | +          | +       | +      | +     |
| Anthraquinone glycosides | +          | +       | +      | +     |
| O-anthraquinones | +         | +       | +      | +     |
| Phlobatannins | +        | +       | +      | +     |
| Diterpenes | +           | +       | +      | +     |
| Carbohydrates | +        | +       | +      | +     |

(+ = Present, (-) = Absent.)
Table 9. Phytochemical screening of the fractions of the rhizomes of Rumex abyssinicus [27].

| SN. | Secondary Metabolite       | Solvents      | Solvents | Solvents |
|-----|---------------------------|---------------|----------|----------|
|     |                           | Aqueous fraction | MeOH fraction | EtOAc fraction |
| 1   | Saponins                  | +             | +         | -         |
| 2   | Phenolic Compounds        | +             | +         | +         |
| 3   | Terpenoids                | -             | +         | +         |
| 4   | Tannins                   | +             | +         | +         |
| 5   | Flavonoids                | -             | -         | +         |
| 6   | Steroids                  | -             | -         | +         |
| 7   | Anthraquinones            | -             | +         | +         |
| 8   | Cardiac glycosides        | +             | +         | +         |

(+): Present; (-): Absent.

Table 10. Qualitative phytochemical analysis of diethyl ether, chloroform, ethyl acetate, and ethanol leaves extract of R. nervosus [28].

| SN. | Phytoconstituents | Solvent leaves extract of R. nervosus                  |
|-----|-------------------|-----------------------------------------------------|
|     |                   | Diethyl ether | Chloroform | Ethyl acetate | Ethanol |
| 1   | Alkaloids         | +            | +          | +++          | +       |
| 2   | Flavonoids        | +            | +          | ++           | +++      |
| 3   | Tannins/phenols   | -            | +          | ++           | 0        |
| 4   | Cardiac glycosides| +            | +          | +            | +        |
| 5   | Terpenoids        | ++           | +          | ++           | ++       |
| 6   | Saponins          | +            | +          | -            | +        |
| 7   | Steroids          | +++          | +          | +            | +        |
| 8   | Carbohydrates     | +            | +          | +            | +        |
| 9   | Amino acids and proteins| +   | +          | +            | +        |
| 10  | Oils and fats     | +            | -          | -            | -        |

(+): Score indicates slight positive reaction for primary and secondary metabolites, (++): Score indicates definitive positive reaction for primary and secondary metabolites, (+++): Indicate significant reactions were obtained for primary and secondary metabolites, (-): Indicate absences of primary and secondary metabolite. R. nervosus: Rumexnervosus.

Table 11. Phytochemical analysis result of Aloe pulcherrima [29].

| S. N | Chemical Constituent | Results |
|------|----------------------|---------|
| 1    | Anthraquinones       | +       |
| 2    | Flavonoids           | +       |
| 3    | Saponins             | +       |
| 4    | Glycosides           | +       |
| 5    | Tannins              | +       |
| 6    | Phenols              | +       |
| 7    | Alkaloids            | +       |
| 8    | Steroids             | -       |

Abbreviation: +, present; −, absent.

Table 12. Photography of some Ethiopian medicinal plants [30-32].

| Scientific name | Family        | Local name | Photograph | Scientific name | Family        | Local name | Photograph |
|-----------------|---------------|------------|------------|-----------------|---------------|------------|------------|
| Aloe pulcherrima| Aloaceae      | Eret       | [Image]    | Justicia schimperiana Hochot, ex A. (Nees) T. Acanthaceae Anders. | Sensel |
| Brucea antidysenterica| Simaroubiaceae | Abalo | [Image] | Moringa stenopetala(E. G. Baker) Cufod. | Moringaceae | Shiferaw |
| Premna schimperi Engl. | Lamiaceae | Chocho | Not found | Opuntia ficusindica (L.) Miller | Cactaceae | Yebereha Kulkual |
| Scientific name                     | Family                        | Local name | Photograph | Scientific name                     | Family                        | Local name | Photograph |
|------------------------------------|-------------------------------|------------|------------|------------------------------------|-------------------------------|------------|------------|
| Calotropis procera (Ait.) Ait. f.  | Asclepiadaceae                | Qimbo      | ![Qimbo](image) | Tribulus terrestris L.            | Zygophyllales                  | Kurnchit   | ![Kurnchit](image) |
| Capparis tomentosa Lam.            | Capparidaceae                 | Gumoro     | ![Gumoro](image) | Datura stramonium L.              | Solanaceae                     | Astenagir  | ![Astenagir](image) |
| Cymbopogon sp.                     | Poaceae                       | Serdo      | ![Serdo](image) | *Allium sativum*                  | Amaryllidaceae                 | Nech-shinkurt | ![Nech-shinkurt](image) |
| Lepidium sativum L.                | Brassicaceae                  | Fetto      | ![Fetto](image) | *Euclea racemosa* L.              | Ebenaceae                      | Dedeho     | ![Dedeho](image) |
| Otostegia --integrifolia Benth.    | Lamiaceae                     | Tinjut     | ![Tinjut](image) | *Berleria eranthemoides* R. Br. ex C. B. Cl. | Berberidaceae                  | Yesetaf    | ![Yesetaf](image) |
| Phytolacca dodecandra L'Hèrit.     | Phytolaccaceae                | Endod      | ![Endod](image) | Tamarindus indica al.             | Fabaceae                       | Roka       | ![Roka](image) |
| Rumex abyssinicus Jacq.            | Polygonaceae                  | Meqmoko    | ![Meqmoko](image) | *Withania somnifera* (L.) Dunal. | Solanaceae                     | Gizewa     | ![Gizewa](image) |
| Vernonia amygdalina Del.           | Asteraceae                    | Girawa     | ![Girawa](image) | *Ximenia Americana* L.            | Olacaceae                      | Enkoy      | ![Enkoy](image) |
| Tragia pungens (Forssk.) M‘ull. Arg. | Euphorbiaceae                | Ablalit    | ![Ablalit](image) | *Cucumis ficifolius*              | Cucurbitaceae                  | Yemidir    | ![Yemidir](image) |
| Zehneria scabra (L. f.) Sond.      | Cucurbitaceae                 | Aregresa   | ![Aregresa](image) | *Rumex Nervosus*                  | Polygonoideae                  | Embuacho   | ![Embuacho](image) |
| Ocimum lamiifolium Hochst. ex. Benth. | Lippiaodoensis Hochst.        | Damakesie  | ![Damakesie](image) | *Eucalyptus globules* Labill      | Myrtaceae                      | Nech Bahirzaf | ![Nech Bahirzaf](image) |
| Achyranthes aspera L.              | Amaranthaceae                 | Telenj     | ![Telenj](image) | *Cordia africana* Lam.            | Boraginaceae                   | Wanza      | ![Wanza](image) |
| Hagenia abyssinica (Broc) T. F. Gmel. | Rosaceae                     | Kosso      | ![Kosso](image) | *Foeniculum vulgare*              | Apiaceae                       | Ensielal   | ![Ensielal](image) |
In the Ethiopia, there is increasing demands for many most popular, more available and effective plant species by the people. As stated by the different authors in the above Tables, different phytochemicals were investigated in different plant species with different solvent concentration. Even though different phytochemicals were analysis for different plant species, their concentration was varied from one plant species to other plant species for different parts of the plant. Based on the above on formation from the Table, one types of phytochemical cannot be detected in all plant species and the concentration of one phytochemical contents vary from one parts of the plant to other parts that means the concentration of one phytochemical contents in leave can vary from the concentrations of phytochemical contents in root and fruits. Generally, even though there are various medicinal plants in the Ethiopia, there are no studies shows that enough information about qualitative and quantitative phytochemical contents for most plant species in the country.

This may be due to the lack of enough laboratory facility and modern technology available in the country for improve the synthesis and extract of phytochemical components for developing the new drug product and drug leading compounds from the different parts of the medicinal plants by the government and private company.

4. Conclusions and Recommendations

Human beings in the world pass their life for a long time to discover new drug to diagnoses, prevent and treat various disease. To save their lives from dangers disease, a new and powerfully drug must be discovered and develop from the different parts of the plant. In order to future promote for developing of new drug synthesis and extract of bioactive components from the parts of plant, availability and valuable of information is very important. Based on the above data available in the review, most phytochemical components of traditional medicinal plants in the Ethiopia do not analysis. This leads to more traditional plants in Ethiopia do not recognized by international scientific organization, and they do not have scientific names. This review recommended finding further most common medicinal plants to investigate in scientific researches and to governing them in the scientific naming system and as well as further studies should focus on green synthesis of heavy metals on different types of medicinal plants in Ethiopia. Based on this review, the studied phytochemical characteristics of medicinal plants in the Ethiopia are a few, so further study could be needed for examine and characterize the properties of unrecognized plants species in the Ethiopia.

Acknowledgements

First and foremost, I would like to praise the Almighty God and his mother St. Marry for bestowing up on my health, strength, patience and protection throughout my study period.

Conflicts of Interest

The author declares that I have no competing interests.

Funding

No funding has been received to conduct this study.

References

[1] Russell-Smith, J., Karunaratne, N. S. and Mahindapala, R., 2006. Rapid inventory of wild medicinal plant populations in Sri Lanka. Biological conservation, 132 (1), pp. 22-32.

[2] Vines, G., 2004. Herbal harvests with a future: towards sustainable sources for medicinal plants. Plantlife International.

[3] Helen B., Haftom G., Kald B. T., Mariamawit Y. Y., 2019. Ethiopian medicinal plants traditionally used for wound treatment: A systematic review. Ethiop. J. Health Dev.; 33 (2).

[4] Ayele, T. T., 2018. A review on traditionally used medicinal plants/herbs for cancer therapy in Ethiopia: current status, challenge and future perspectives. Organic Chemistry: Current Research, 7 (2), p. 8.

[5] Tesfahuneyn G., and Gebregeziabher G., 2019. Medicinal plants used in traditional medicine by ethiopians: A review article. Journal of Respiratory Medicine and Lung Disease, 4 (1), pp. 1-3.

[6] Moges, A. and Moges, Y., 2019. Ethiopian Common Medicinal Plants: Their Parts and Uses in Traditional Medicine-Ecology and Quality Control. In Plant Science-Structure, Anatomy and Physiology in Plants Cultured in Vivo and in Vitro. Intech Open.

[7] Abera, B., 2014. Medicinal plants used in traditional medicine by Oromo people, Ghimbi District, Southwest Ethiopia. Journal of ethnobiology and ethnmedicine, 10 (1), pp. 1-15.

[8] Tolossa, T. and Megersa, M., 2018. Ethnobotanical study of medicinal plants used to treat human diseases in Berbere District, Bale Zone of Oromia Regional State Southeast Ethiopia. Hindawi Evidence Based Complementary and Alternative Medicine.

[9] Lulekal, E., Kelbessa, E., Bekele, T. and Yineger, H., 2008. An ethnobotanical study of medicinal plants in ManaAngetu District, southeastern Ethiopia. Journal of ethnobiology and Ethnomedicine, 4 (1), p. 10.

[10] Awas, T., 2007. Plant diversity in Western Ethiopia: ecology, ethnobotany and conservation.

[11] Birhanu, T., Abera, D., Ejeta, E. and Nekemte, E., 2015. Ethnobotanical study of medicinal plants in selected HorroGudurruWoredas, Western Ethiopia. Journal of Biology, Agriculture and Healthcare, 5 (1), pp. 83-93.

[12] Doffiana, Z. D., 2017. Sacred natural sites, herbal medicine, medicinal plants and their conservation in Sidama, Ethiopia. Cogent Food & Agriculture, 3 (1), p. 1365399.
31 Alemu Talema: Review of Phytochemical Analysis of Selected Traditional Medicinal Plants in Ethiopia

[13] Naseem U., Muhammad Z., Farhat Ali K. and Shazeb K., 2014. A review on general introduction to medicinal plants, its phytochemicals and role of heavy metal and inorganic constituents. Life Sci.; 11 (7s): 520-527. (ISSN: 1097-8135). http://www.lifesciencesite.com.109.

[14] Krishnaiah, D., Sarbatly, R. and Bono, A., 2007. Phytochemical antioxidants for health and medicine a move towards nature. Biotechnology and Molecular Biology Reviews, 2 (4), pp. 97-104.

[15] Slimestad, R., Fossen, T. and Vågen, I. M., 2007. On ions: a source of unique dietary flavonoids. Journal of agricultural and food chemistry, 55 (25), pp. 10067-10080.

[16] Serrano, J., Puupponen-Pimiä, R., Dauer, A., Aura, A. M. and Saura-Calixto, F., 2009. Tannins: current knowledge of food sources, intake, bioavailability and biological effects. Molecular nutrition & food research, 53 (S2), pp. S310-S329.

[17] Grandhi, A., Mujumdar, A. M. and Patwardhan, B., 1994. A comparative pharmacological investigation of Ashwag andha and Ginseng. Journal of ethnopharmacology, 44 (3), pp. 131-135.

[18] Panda, S. and Kar, A., 1997. Evidence for free radical scavenging activity of Ashwagandha root powder in mice. Indian journal of physiology and pharmacology, 41 (4), p. 424.

[19] Boroushaki, M. T., Mollazadeh, H. and Afshari, A. R., 2016. Pomegranate seed oil: a comprehensive review on its therapeutic effects. Int J Pharm Sci Res, 7 (2), p. 430.

[20] Kidu H., Tekleweyni T., Tesfay., Gopalakrishnan V., Kamalakararao K., Krishna C., 2020. In vitro antibacterial potential of acetone leaf extract of Otostegia integrifolia Benth against human selected bacterial pathogens. Int. J. Res. Pharm. Sci., 11 (3), 3024-3033.

[21] Berehe SG and Boru AD., 2014. Phytochemical screening and antimicrobial activities of crude extract of Lepidiumsativum seeds grown in Ethiopia. Int J Pharm Sci Res; 5 (10): 4182-87. doi: 10.13040/IJPSR.0975-8232.5(10).4182-87.

[22] Habtom, S. and Gebrehiwot, S., 2019. In vitro antimicrobial activities of crude extracts of two traditionally used Ethiopian medicinal plants against some bacterial and fungal test pathogens. The International Journal of Biotechnology, 8 (2), pp. 104-114.

[23] Nigus AS, Lijalem HA and Leta DT., 2018. Chemical composition and antimicrobial activity of leave extract of Ocimumlamiiifolium (Danakese) as a treatment for urinary tract infection. Cogent Chemistry, 4: 1440894.

[24] Debalke, D., Birhan, M., Kinubeh, A. and Yayeh, M., 2018. Assessments of Antibacterial Effects of Aqueous-Ethanoic Extracts of Siderhombifolia’s Aerial Part. The Scientific World Journal, 2018.

[25] Fentahun M., AyeleYilik B., Amsalu N., Alemayehu A., Amsalu G., 2017. Antibacterial Evaluation and Phytochemical Analysis of Selected Medicinal Plants against Some Pathogenic Enteric Bacteria in Gozamin District, Ethiopia. J Pharmacovigil 5: 244. doi: 10.4172/23296887.1000244.

[26] Bayu, E., Assefa, G. and Alemseged, M., 2018. Medicinal use, method of administration and phytochemicals in Zehneriascabra. Journal of Medicinal Plants, 6 (5), pp. 114-116.

[27] Gethahun, M. and Engidawork, E., 2015. Evaluation of the Diuretic Activity and Phytochemical Screening of Different Solvent Fractions of the Rhizomes of Rumexa by ssicus Jacq (Polygonaceae) in Rats. Ethiopian pharmaceutical Journal, 31 (1), pp. 35-48.

[28] Gebreslassie, H. B., Hintsa, K., Weletnasa, T. and Chaithanya, K. K., 2020. Phytochemical screening and 2, 2-diphenyl-1-picrylhydrazyl radical scavenging activities of ethyl acetate leaf extract of Rumexnervosus. Drug Invention Today, 13 (4).

[29] Gedefaw GA., Birhanu GM., and Yaschilal MB., 2020. Phytochemical screening and 2,2-diphenyl-1-picrylhydrazyl radical scavenging activities of ethyl acetate leaf extract of Rumexnervosus. Drug Invention Today, 13 (4).

[30] Busse, H. and Tefera, G., 2013. Handbook of SidamaTraditional Medicinal Plants. A Service Learning Project School of Medicine and Public Health.

[31] Udochukwu, U., Omeje, F. I., Uloma, I. S. and Oseiw e, F. D., 2015. Phytochemical analysis of Vernoniaamygdalina and Ocimumgratissimum extracts and their antibacterial activity on some drug resistant bacteria. American Journal of Research Communication, 3 (5), 225-235.

[32] Endale, A., 2012. Studies on Antimalarial Activity of the Leaf Constituent of Otostegia Integrifolia Benth. (Lamiaceae) Against Plasmodium Berghei in Mice. (Doctoral dissertation, Addis Ababa University).