SOME MEDICINAL PLANTS OF THE FAMILY VERBENACEAE COMMONLY USED IN JOS, NIGERIA - A REVIEW

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ABSTRACT

Verbenaceae represent a very important family of medicinal plants of commonly used especially in Jos, Plateau State, Nigeria. This review was carried out in order to identify and document the reported medicinal and ethnomedicinal uses of some plants of the family Verbenaceae that are used for ethnomedicine in Jos. Twelve (12) common medicinally useful plants of the family Verbenaceae used by the inhabitants of Jos, Plateau State, Nigeria were identified and discussed. They include Aloysia gratissima Linn. (Gillies & Hook.), Clerodendrun capitatum Schum & Thonn., Clerodendrum thomsonae Balf., Duranta repens Linn., Gmelina arborea Roxb., Lantana camara Linn., Lantana involucrata Linn., Lippia multiflora Mold., Tectona grandis Linn., Stachytarpheta cayennensis (Rich.) Vahl., Verbena officinalis Linn., Vitex doniana Sweet. Some the plants species possess antimicrobial, antimalarial, antihypertensive, anti-inflammatory, antidiarrhoeal, sedative, ulcerogenic, fungicidal and antitumour activities. Medicinal properties of these plants are attributed to their chemical constituents. Useful information on these plants including parts used, constituents, and medicinal uses of plants are listed. The information contained in this review would be useful for further studies and development of the medicinal plants of this family, especially in drug discovery research.

Key words: Verbenaceae, medicinal plants, Nigeria

INTRODUCTION

Medicinal plants are available in abundance especially in the tropics, and are used in the treatment of illnesses. The success of any healthcare system depends on the availability of suitable drugs on a sustainable basis, and the use of herbal drug product is playing significant roles towards attaining wider
coverage and better access to healthcare in developing countries (Rahman et al., 2008). Verbenaceae species are economic plants and may be grown as ornamentals. They are also popular in traditional medicine thus the need for their study and conservation (Gill, 1988). Members of these genera exist as herbs, climbers, shrubs and trees producing many diterpenes, iridoids and flavonoids (Wiart, 2006). Plants of the family Verbenaceae have been used traditionally as tonic, anticonvulsant and sedative. It has been reported in the treatment of diabetes, cold and dysentery, among other uses (Akanmu et al., 2005).

Herbal medicines have provided one of the early therapeutic agents before the advent of modern scientific medicine and as a result they have been incorporated into modern (orthodox) medicinal practice in many parts of the world (Egharevba et al., 2015). Plants of the family Verbenaceae are widely used in northern and central parts of Nigeria including Plateau State for the treatment of various ailments and diseases. The leaves, stem, bark, fruits, seeds and roots of these plants are used depending on where the activity resides. It is generally necessary for plants growing in a given locality or geographical area to be identified and preserved especially for taxonomic researches (Kunle et al., 2013).

Verbenaceae Family

Verbenaceae, commonly known as verbena or vervain, is a family of tropical and subtropical flowering plants with few temperate species. The family currently comprises about 41 genera and 950 species of trees, lianas, shrubs and herbs (Mabberley, 1997). The principal genera are Lantana L. (approx. 150 species), Lippia L. (approx. 200 species) and Verbena L. (approx. 200 species). The genera Clerodendrum, Karomia, Premna and Vitex have recently been moved from Verbenaceae to Lamiaceae. (Fernandes, 2005). Some members of the Verbenaceae family are cultivated as ornamentals (Gill 1988), while others are medicinally useful. During the last few decades, there has been increasing interest in the study of medicinal plants and their traditional uses in different parts of the world. Today, according to the World Health Organization, as many as 80% of the world's population depend on traditional medicine for their primary healthcare needs, and about 85% of the world's population are estimated to depend on traditional medicine for the treatment of various ailments (Egharevba et al., 2015). Studies have shown that plants of the Verbenaceae family have been used in traditional medicine for several years as antimalarials, antipsychotics, anticonvulsants, anti diarrhoeal, antimicrobials, antidiabetic, antioxidants, antiasthmatics, antipyretic, antihypertensives, anti ulcer (Akanmu et al., 2005). A vast knowledge of how to use these plants against different ailments may be expected to have accumulated in areas like Nigeria where the use of plants is still of great relevance.

**Medicinal Plants of Verbenaceae Family**

Medicinal plants are either “wild” or “domesticated” plants species, some of which considered to be harmful to humans, but contain substances that can be used for therapeutic purpose, and are commonly used in treating and preventing specific ailments and diseases (Nwachukwu et al., 2010). The study of medicinal plants is crucial and ethnomedicine has no doubt played a central role in the search for and development of new drugs (Balunas and Kinghorn, 2005). Medicinal plants are so regarded because they are sources of well-known and medically useful secondary products. Generally, drug plants are unique in containing compounds that are end-products of long biosynthetic pathways and are usually not needed in metabolic processes of the plant. Davis and Heywood (1963) reported that these compounds, called secondary metabolites, include alkaloids, glycosides, essential oils and other organic constituents. They are usually produced in different parts of the plant like the roots, leaves, fruits and seeds (Ankanna et al., 2012; Kochhar, 1981). Knowledge about these medicinally active constituents makes their application in therapy possible as contained in the various pharmacopoeias. Some important medicinal plants of Verbenaceae family used in Nigeria and their medicinal properties are listed in the Table 1.
### Table 1: Some medicinal plants of the family Verbenaceae commonly used by Jos settlers

<table>
<thead>
<tr>
<th>Plant</th>
<th>Ethnomedicinal uses</th>
<th>Plant parts used</th>
<th>Chemical constituents</th>
<th>Investigated Biological Activities</th>
<th>References</th>
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<tbody>
<tr>
<td><em>Aloysia gratissima</em> (Gillies &amp; Hook.)</td>
<td>Antimicrobial, Antioxidant,</td>
<td>Leaves</td>
<td>Essential oil rich in 1,8-cineole (13.7%), germacrene (13.4%), β-cryophyllene (12.7), β-pinene (11.7%). Ferulic acid, <em>trans</em>-cinnamic acid and <em>p</em>-coumaric acid, <em>trans</em>-b-carotene and lutein</td>
<td>Antimicrobial, antibacterial, antifungi, anti-depressant, neuro-protective, anti-proliferative activities.</td>
<td>Santos <em>et al.</em>, 2015</td>
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<td>Bersan <em>et al.</em>, 2014</td>
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<td>Zeni <em>et al.</em>, 2013</td>
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<td>Hister, 2009</td>
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<td><em>Clerodendrun capitatum</em> Schum &amp; Thonn.</td>
<td>Brain disorder, malaria, tuberculosis, epilepsy, fever, asthma, cough, snake bite, hernia, bronchitis, wound healing, oedema, tumour</td>
<td>Roots, leaves, seeds</td>
<td>alkaloid, tannins, saponins, flavones saponins, triterpenes, sesquiterpenes, anthraquinone, iridoid glycosides, lupeol clerodendrin, phytoesters, ferulic acid, arabinose, ,</td>
<td>Brain disorder, Genus known to possess anti-inflammatory, antidiabetic, antimarial, antiviral, antihypertensive, hypolipidemic and antioxidant activities.</td>
<td>Ngo, 2013</td>
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<td>Shrivastava and Patel, 2007a</td>
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<tr>
<td><em>Clerodendrum thomsonae</em> Balf.</td>
<td>Inflammation, malignant tumor, epilepsy, gonorrhea, mental illness, constipation, infantile hyperthermia, oedema, expectorant, asthma, pyretic, cataract, malaria, and diseases of blood, skin and lung.</td>
<td></td>
<td>Melittoside, aucubin, 8-O-acetylharpagide, reptoside, ajugoside, α-amyrin, β-amyrin, caryoptin, 3-epicarpyoptin, 16-hydroxy epicarpyoptin, clerodendrin A, B and C, clerodin, clerodermic acid, cleroinermin, friedelin, gramisterol, iridoids (inerminoside A, B, C and D, melittaside, ugandoside, obtusifoliol, oleanolic acid, royleanone, dehydroroyleanone, sammangiaoside A and B, uncinitatone, Mi-saponins-A, friedelanone, lupeol, betulinic acid, royleanone and dehydroroyleanone, and botulin.</td>
<td>Antidiabetic, antimarial, antiviral, antihypertensive, hypolipidemic and antioxidant activities.</td>
<td>Lammel and Rimpler, 1981</td>
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<td>Shrivastava and Patel, 2007a</td>
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<td>Nikkon <em>et al.</em>, 2009</td>
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<td>Iqbal <em>et al.</em>, 2004</td>
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</table>
clerodadien-16,15-olid-18-oic acid, (-)-6β-hydroxy-5β,8β,9β,10α-cleroda-3,13-dien-16,15-olid-18-oic acid

Alkaloids

**Gmelina arborea** Roxb.
- Antihelmintic, piles, hallucination, fevers, gastrointestinal disturbances, wounds, leprosy, anaemia, ulcers; headache, hypertension, diarrhoea, appetite stimulant, gout, snakebite, scorpion sting, cardiotonic, laxative, diabetes, aphrodisiac, fungal infections.
- Root, bark, fruits, flowers, leaves.
- Alkaloids, flavonoids, saponins, steroids, glycosides
- Arboreol, isoarboreol, luteolin, gummadiol, methylarboreol, gmelanone, arborone, 7-oxodihydrogmelinol, premnazol, melinol, lignans.
- Essential oil rich in (Z)-3-hexanol (17.9%) and 1-octen-3-ol (8.6%)
- Antipyretic, analgesic, immunomodulatory, antidiabetic, cardioprotective, diuretic, antimicrobial, anthelmintic, anti-hyperlipidemic, antioxidant activity

**Lantana camara** Linn.
- Yellow fever, mental illness, headache, malaria fever, constipation, diarrhoeic, febrifuge, hypertension, asthma, tetanus, skin itch, leprosy, chickenpox, ulcer, measles, swelling, bilious fever, rheumatism, emesis, jaundice, dysentery, tuberculosis, tumour.
- Leaves, fruits, flowers, roots, stem bark
- Lantanoside, lantanone, lancomaric acid, lantadene A, B, C, D, betulonic acid, betulinic acid,
  22β-acetoxylantic acid, 22β-dimethylacylroyloxylantanolic acid, 22β-angeloyloxy-3β-hydroxyolean-12-en-28-oic acid, 22β-dimethylacylroyloxy-3β-hydroxyolean-12-en-28-oic acid, 22β-hydroxyoleanonic acid
- Essential oil rich in β-caryophyllene (27.0%), α-humulene (11.8%), sabinene (9.7%), bicyclogermacrene (8.1%) and davanone (4.7%)
- Essential oil rich in bicyclogermacrene (26.1%), β-caryophyllene (24.4%), germacrene D (19.2%) and valecne (12.0%)
- Antibacterial, anticancer, antiproliferative, hemolytic, antioxidant, antifungal, antihyperglycemic, anti-inflammatory, antimutagenic, antifulerogenic, antimotility, antiulcerogenic, Mosquito larvicidal, antifilarial, anti-fertility, insecticidal, fungicidal, nematicidal, antiseptic, activities.

Kaswala et al., 2012  
Moronkola et al., 2012  
Munira et al., 2013  
Anil and Ranjan, 2011  
Sausa et al., 2012  
Reddy, 2013  
Sausa and Costa, 2012
<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Diseases/Uses</th>
<th>Active Constituents</th>
<th>Medical Actions</th>
<th>References</th>
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<tbody>
<tr>
<td>Lantana involucrata</td>
<td>Colic, vomit, cough, fever, congestion, sedative, heat rashes, mild insect bites.</td>
<td>isopropenylfurano-β-naphthoquinones, isoprenyl-α-naphthoquinone, lantalucratins A, B, C, D, E, F.</td>
<td>Antibacterial, antitumor</td>
<td>Kalam et al., 2014</td>
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<td>Essential oil rich in citronellol, geraniol, isopiperitenol, γ-ionone, pipertone.</td>
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<td>Sausa and Costa, 2012</td>
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<td>Hussain et al., 2011</td>
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<tr>
<td>Lippia multiflora</td>
<td>Respiratory and gastrointestinal disorders, bronchial inflammation, malaria fever, conjunctivitis, fatigue-relieving, diuretic, mouth disinfectant, hypertension, venereal diseases, laxative, ear-troubles, rhino-pharyngeal, eye-troubles.</td>
<td>Lignins, cellulose, tannins, starch, oxalates, flavonoids, saponin glycosides, peptides, caffeine, terpenes and alkaloids.</td>
<td>Analgesic, antipyretic, pediculocidal, scabicidal, antimicrobial, antioxidant and radical scavenging, hypotensive, antimalarial</td>
<td>Kunle and Egharevba, 2012</td>
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<td></td>
<td>Leaves</td>
<td>Essential oils chemotype include linalool(29%) and germacrene D (28%) rich oil, 1,8-cineole (43-47%) and sabinen (12-15%) rich oil, high farnesol (camphoraceous) rich oil, high sesquiterpenes (45-70%) rich oil and high monoterpenes rich oil (ρ-cymene 14-19%, thymol 30-40%, thymol acetate 14-17%)</td>
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<td>Tectona grandis</td>
<td>Dyspepsia, sore throat, menstrual disorder, hemorrhage, bilious headaches, vermifuge, acute dermatitis, bronchitis, expectorant, anti-inflammatory, hyperacidity, diabetes, leprosy, astringent, and helmintiasis, haemoptysis, diuretic, skin itches, bronchitis, urinary discharges, scabies, antihelmintic.</td>
<td>Acetovanillone, E-isofuraldehyde, evofolin A, 3-hydroxy-1-{(4-hydroxy-3,5-dimethoxyphenyl)propan-1-one, syringaresinol, medioresinol, 1-hydroxyphinoresinol, larchiresinol, balaphon, zhebeiresinol, Tectonoelin A or (7Z)-9′nor-3′,4′,4′-trihydroxy-3-methoxylign-7-ene-9,7′-lactone, Tectonoelin B or (7Z)-9′nor-3′,4′,4′-trihydroxy-3,5-dimethoxylign-7-ene-9,7′-lactone, tectoionols A, tectoionols B, gallic acid, ellagic acid, rutin, quercitin</td>
<td>Antioxidant, anti-inflammatory, analgesic, allelopathic, antimicrobial, cytotoxic, anti-haemolytic anaemia, adverse cutaneous reaction, hair growth, hypoglycemic, antifungi, anthelmintic, diuretic, anti-ulcer, wound healing</td>
<td>Ramesh and Mahalakshmi, 2014</td>
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<td>Species</td>
<td>Uses</td>
<td>Active Constituents</td>
<td>Benefits</td>
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DISCUSSION

Verbenaceae family appears as a very important plant family for Jos settlers and neighboring communities as members of the family are involved in the management of virtually all ailments in the community. Almost all the plant parts are used as medicine for the treatment of various ailments. These diseases/ailments include malaria, hypertension, diarrhea, microbial infections, skin diseases, stress, inflammation, snake and insect bites, ulcer and respiratory disorders. Other uses include woods for timber, construction work, furniture making and fuel, essential oils used in perfumery, leave used as flavouring agent, and flowers as ornamentals. Leaves, roots and stem bark are used in form of decoction or infusion. Others like Lantana salvifolia, Lantana camara and Vitex doniana produce edible fruits while leaves of L. salvifolia are used as spice/flavoring. Lippia multiflora produces scented flowers and just like Lantana camara can yield essential oil from leaves and flowers. The medicinal properties of these plants are attributed to their chemical constituents especially glycosides, alkaloids, flavonoids, terpenoids, steroids, tannins, carbohydrates, etc., (Jigam 2004).

CONCLUSION

The review has x-rayed the chemical constituents and pharmacological properties of plants of the family of Verbenaceae, which are commonly used in Jos, Plateau State, Nigeria, with a view to expose the knowledge gaps for further research and development especially in drug discovery research. Some of these medicinal plants with proven pharmacological activities but without much knowledge in their chemical constituents need to be investigated further to identify the molecule(s) responsible for observed activity.

REFERENCE

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