

MEDICINAL PLANTS AND HERBAL MEDICINES IN AFRICA

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Contents

1. Introduction
 2. Medicinal Plants and Herbal Medicines in Africa
 3. Traditional Medicinal Practitioners in African Herbal System of Medicine
 4. Relationship between Medicinal Plants and Herbal Medicine in Africa and Modern Medicine
 5. Effectiveness of Herbal Medicines in Africa
 6. Medicinal Plants and Herbal Medicines for the Treatment of Bacteria Diseases
 7. The Role of Nutrients in African Plants on the Immune System Functions
 8. African Medicinal Plants and Herbs Used in Treating Central Nervous System Disorders
 9. African Plants and Phytochemicals with Antifungal and Antidiabetic Activities
 10. Safety and Adverse Effects of Medicinal Plants Used in Herbal Medicines
 11. Conclusion
- Acknowledgement
Glossary
Bibliography
Biographic Sketches

Summary

Traditional medicine in Africa is a general system of healthcare partly systematized into herbalism and use of medicinal plants and their products. This chapter introduces some important plants used in herbal medicine in Africa and presents their relevance to modern medicine and drug development. Traditional healers in Africa and the medicinal products from native plants play important roles in the healthcare sectors all over the continent, with over 85% of the entire African population using them as primary healthcare and first treatment. Several plants in Africa with promising potentials for use in pharmaceutical industries and drug development include

- *Acanthospermum hispidum*,
- *Balanites aegyptiaca*,
- *Cajanus cajan*,
- *Calotropis procera*,
- *Jatropha curcas*, etc.,

as promising sources of anticancer agents, while

- *Aframomum melegueta*,
- *Chasmanthera dependens*,
- *Garcinia kola*,
- *Hypoxis hemerocallidea*,
- *Nuclea latifolia*, *Xylopia aethiopica*,
- *Sutherlandia frutescens*, etc.

have been used as effective traditional remedy against various health conditions. Phytochemicals (bioactive compounds) in plants responsible for their numerous medicinal and therapeutic effects are phenols, sterols, coumarins, acids, tannins, glycosides, alkaloids, etc. Several modern pharmaceuticals and drugs are modeled and derived from these bioactive compounds, e.g., aspirin is made with salicylic acid obtained from *Salix alba* bark and *Filipendula ulmaria* (meadowsweet plant); artemisinin from *Artemisia annua* and quinine from the bark of *Cinchona pubescens* are anti-malarial medicines. Vinblastine and vincristine are anticancer drugs obtained from *Catharanthus roseus*, and are used for leukemia treatment. Codeine and morphine, obtained from *Papaver somniferum*, are used for pain relief and treating diarrhea, whereas a cardiac glycoside called digitoxin is obtained from *Digitalis purpurea* (foxglove plant). Severe adverse effects may result from misuse, misidentification, or abuse of medicinal plants and herbal medicines. Medicinal plants and herbal medicines require thorough research and clinical studies to characterize the bioactive compounds responsible for their healing and therapeutic effects, and to establish their required doses, efficacies, safety, and use in treatment of many conditions.

1. Introduction

The use of medicinal plants and herbal treatment are very common all around the world, especially in developing countries in Africa, Asia, and South America. Traditional medicine in Africa is a general system of healthcare partly systematized into herbalism and use of medicinal plants and their products. Traditional healers provide healthcare services which rely on their beliefs, attitudes, knowledge, religious background, and culture prevalent in their communities. Herbal medicine forms the basis of traditional and most modern medicines but might include animal parts and minerals. The plants used in herbal medicines contain bioactive compounds known as phytochemicals, which are the basis of their healing and curative properties. Herbal medicine was considered ineffective and primitive by western system of medicine, however, through scientific-based studies there has been better development in the knowledge about its therapeutic properties and efficacies to the extent that several pharmaceuticals, medicines, and nutraceuticals are modeled on the phytochemicals (especially bioactive compounds) obtained from medicinal plants and herbal medicines. The main challenges to using medicinal plants in Africa and other developing parts of the world are often due to safety and poor quality control, as well as unproven and exaggerated claims made by the sellers. The practices of traditional medicines are still shrouded to some extent, with a few documentations and reports of adverse reactions and side effects. In spite of this, the future is bright for African traditional medicine due to its employment creation, economic potentials, contribution to healthcare coverage, healing potentials, service provision, and basis for

development of most drugs. The formal integration and recognition of herbal medicines into modern medicine is promising.

Traditional healers in Africa and the medicinal products from native plants play important roles in the healthcare sectors all over the continent, with over 85% of the entire African population using them as primary healthcare and first treatment in Sub-Saharan region of the continent. In Sub-Saharan Africa, there are on average about 100 traditional practitioners for each doctor trained in a university. This is equal to one traditional healer/practitioner for each 200 individuals in the Southern region of Africa; it is greater ratio of doctor-to-patient than is reported North America and some other parts of the world. Majority of African population have unflinching belief in use of herbal medicines for various reasons. Without traditional healers and herbal treatment in Africa, most individuals will be unable to get treated when sick. Using plants for medicinal purposes offers important benefits for the treatment of several chronic conditions. In Nigeria and most other countries in Africa, *Rauvolfia vomitoria* and its medicinal products are used for the treatment of nervous conditions such as hypertension, while *Ocimum gratissimum* and its medicinal products are used for the treatment of diarrhea and related diseases. Other plants are *Aloe vera* for treatment of skin diseases, seeds of *Garcinia kola* for the treatment of inflammation and pain, seeds of *Carica papaya* for treating intestinal parasites, and seeds of *Citrus paradise* for treating resistant urinary tract infection. The knowledge and belief of the curative properties of herbs were accumulated and documented for decades/centuries, usually from observations based on evidence, which may or may not necessarily be scientific.

Treatments and medications provided by modern pharmaceutical industries are capital intensive and most times unavailable for a large number of populations in Africa. Several rural communities in Africa cannot afford the cost of pharmaceuticals and modern medicines, and they may not be readily available even when they are affordable, especially for rural dwellers, who make up the largest population of sub-Saharan Africa; consequently, herbal healers constitute their main medical consultants. Some researchers discouraged excessive plants usage, citing an ecological risk, since it might result in extinction of plants. However, this effect is unlikely, as most of the herbal medical practitioners cultivate and grow these plants and even commercialize them for trading and income generation. In Africa and most other regions of the world, traditional healers provide medical care to the communities they live in, using herbs (medicinal plants), animal parts, minerals, etc., which most based on the beliefs, norms, and cultures of their communities. They may include herbalists, seers or spiritualists, midwives, diviners, witch doctors, high priests, and priestesses. However, traditional medical practitioner (TMP), is the acceptable term by the African Union (AU)'s Scientific Technical and Research Commission (STRC).

The healing and medicinal properties of herbs (medicinal plants) have been validated with scientific studies, which explore the active chemistry and bioactive constituents of these plants. Plants' therapeutic activities are based on their complex chemical compositions which usually may concentrate more on some certain parts of the plants, with different plant parts providing some medicinal and/or therapeutic effects. Phytochemicals (bioactive compounds) in plants responsible for their numerous medicinal and therapeutic effects are phenols, sterols, coumarins, acids, tannins,

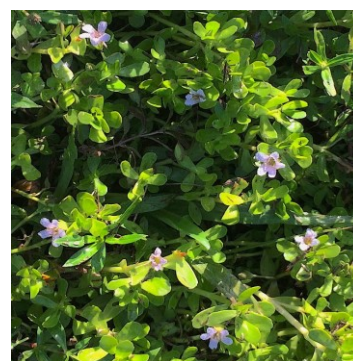
glycosides, alkaloids, etc. Several modern pharmaceuticals and drugs are modeled and derived from these bioactive compounds, e.g., aspirin is made with salicylic acid obtained from *Salix alba* bark and *Filipendula ulmaria* (meadowsweet plant); artemisinin from *Artemisia annua* and quinine from the bark of *Cinchona pubescens* are anti-malarial medicines. Vinblastine and vincristine are anticancer drugs obtained from *Catharanthus roseus* (Madagascar periwinkle), and are used for leukemia treatment. Codeine and morphine, obtained from *Papaver somniferum* (opium poppy), are used for pain relief and treating diarrhea, whereas a cardiac glycoside called digitoxin is obtained from *Digitalis purpurea* (foxglove plant). In addition, medicinal plants are significant to cosmetic industry. Herbal drugs and medicinal plants usage reduced toward 19th century because of the arrival of synthetic chemistry. But, recently, there has been a resurgence in the use of plant medicines, because most synthetic drugs have become less effective as a result of high resistance levels and also as a result of high cost, toxicities, and side effects. Therefore, this chapter focused on exploring the major plants used in herbal medicine in Africa and presents their relevance to modern medicine and drug development. At least 50% synthetic drugs currently used today are derived from plants. Figure 1 shows some common medicinal plants used in Africa. The applications of these plants in the treatment of various diseases in Africa have been extensively discussed in the following sections of this chapter.



Curcuma longa



Cyperus rotundus



Bacopa monnieri



Withania somnifera



Cynara cardunculus



Dandelions



Lettuce sativa



Echinacea



Calendula officinalis



Centella asiatica



Morinda citrifolia



Piper cubeba



Cannabis sativa



Grape-seed (*Vitis vinifera*)



Garlic (*Allium sativum*)



Ginger (*Zingiber officinale*)



Holy Basil (Tulsi)



Ginkgo (*Ginkgo biloba*)



Saint John's Wort (*Hypericum perforatum*)



Chamomile (*Anthemis nobilis*)



Echinacea purpurea



Tanacetum parthenium



Valeriana officinalis



Panax ginseng



Lavandula angustifolia



Goldenseal (*Hydrastis canadensis*)



Milk Thistle (*Silybum marianum*)



Achyranthes aspera



Enhydra fluctuans



Chrysactinia mexicana



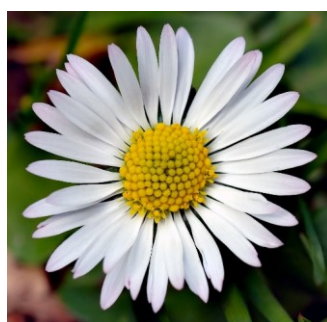
Glossocardia bosvallia



Cyanthillium cinereum



Tridax procumbens



Bellis perennis

Figure 1. Some common medicinal and aromatic plants used in Africa

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