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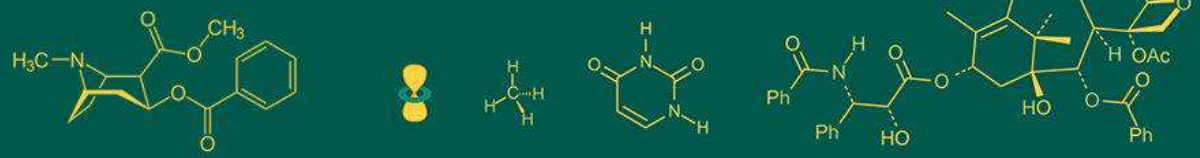

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Effect of herbal medicine and its biochemical implication

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Abstract
Medicinal plants are those that have curative qualities or have positive pharmacological effects on the human body. Herbal-drug interactions are more likely when medicinal plants are taken at the same time as prescription medications. The specific plant, medicine, and patient profile all influence how clinically significant herbal-drug interactions are. As they alter bodily processes, herbs have the potential to be powerful. As herbal medicines and supplements are not subject to NAFDAC assessment, using them can be harmful. We attempt to explore potential causes, kinds, and reported examples of toxicities associated with the use of herbal therapy alone as well as some herbal drug interactions. Additionally, several strategies to lessen the negative effects of herbal medicines have been discussed.

Keywords: Toxicities, herbal, medicine, biochemical, implication, profile, drug

Introduction
Generally speaking, medicinal plants are those that have curative qualities or have positive pharmacological effects on the human body. Alkaloids, sterols, terpenes, flavonoids, saponins, and glycosides are just a few of the secondary metabolites that medicinal plants naturally produce and accumulate. Cyanogenics. Quinines, volatile Oils, resins, lactones, tannins, etc. Since the beginning of time, medicinal plants have been utilized to treat illnesses and diseases. Hieroglyphics on papyrus from Egypt and ancient Chinese texts both discuss the therapeutic properties of plants. Herbal therapies were used in traditional medical systems such as Ayurveda and Traditional Chinese Medicine, which were developed by indigenous cultures such as African and Native American. Recently, the World Health Organization (WHO) estimated that of people worldwide rely on herbal medicines partially for their primary healthcare. Researchers have discovered that people in different parts of the world tend to use the same or similar plants. About 70% of German doctors prescribe plant-based medications, which are readily available in Germany. Herbal medicine use has increased over the past 20 years in the United States as a result of public discontent with the high expense of prescription drugs and a desire to revert back to natural or organic treatments. Worldwide demand for and use of medicinal plants has grown during the past three decades. Medicinal plants' significance in addressing healthcare issues, as well as their effectiveness and safety in treating a variety of ailments, are now widely accepted. As a result of this increased awareness, the global commerce in medicinal plants is exploding, frequently at the expense of the mother populations and natural ecosystems in the nations of origin.

According to records, around 450 plants grown or readily accessible in Nigeria and Asian nations have medicinal benefits (Yusuf *et al.*, 1994 and Ghani, 1998). People in isolated, hilly areas of Africa, like ethnic communities, primarily rely on herbal remedies. Recognizing the enormous potential of natural therapies. The related sectors around the world need about 6,000 metric tons of medicinal plants yearly to produce traditional medicines. Local producers are forced to use therapeutic plants and plant parts on a regular basis because there is no structured production of medicinal plants in many nations.

Drugs created through chemical synthesis and their widespread manufacture over the past century have completely changed the way that most people access healthcare worldwide. Large swaths of the populace in underdeveloped nations continue to rely on conventional doctors and herbal remedies for their primary care, nevertheless.

Up to 90% of the people in Africa and 70% in India rely on herbal medication to aid with their healthcare needs. Around 40% of all healthcare services are provided in China using herbal medicine, and more than 90% of general hospitals have herbal medicine departments (WHO 2005) [5]. However, the use of herbal therapy is not just practiced in underdeveloped nations; over the past 20 years, the usage of ethnobotanicals has expanded and there has been a significant rise in public interest in natural remedies in industrialized nations. In the United States, in 2007, over 38% of adults and 12% of children used herbal medication in some capacity (Ernst *et al.*, 2005; Barnes *et al.*, 2008) [21, 3]. Herbal therapy or the use of natural items other than vitamins and minerals was found to be the most often utilized alternative medicine, according to a survey by the National Center for Complementary and Alternative Medicine. When compared to Western medicine, 40% of the respondents to a poll performed in Hong Kong in 2003 exhibited a notable faith in herbal therapy (Chan *et al.*, 2003) [12]. In a survey of 21,923 American adults, 12.8% reported using at least one herbal supplement (Harrison *et al.*, 2004) [28]. In a different survey (Qato *et al.*, 2008) [45], 42% reported using dietary or nutritional supplements, with multivitamins and minerals being the most popular, followed by saw palmetto, flax, garlic, and ginkgo. The most frequent justifications for using herbal medicine are that it is more cost-effective, more in line with the patient's ideology, allays fears about the side effects of chemical (synthetic) medications, satisfies a desire for more individualized health care, and makes health information more accessible to the general public.

Herbal remedies are primarily used for chronic, as opposed to life-threatening, diseases and for health promotion. However, the use of traditional treatments rises when modern medicine fails to treat a condition, as is the case with advanced cancer and emerging infectious diseases like HIV and COVID. Traditional medicines are also widely regarded as being natural, harmless, and non-toxic. This is not always the case, particularly when taking herbs along with prescription pharmaceuticals, over-the-counter remedies, or other herbs, which is fairly common (Canter and Ernst 2004; Qato *et al.*, 2008; Loya, *et al.*, 2009) [11, 45, 39].

Some plants, like the Africa flower, which are the keepers of traditional herbal medicine, have been used for decades to treat the wasting signs of HIV in Africa (Tilburt and Kaptchuk, 2008) [59]. There is a time call. Herbal medicine, sometimes called herbalism or botanical medicine, is a form of alternative medicine that relies on the use of plants or plant extracts that can be consumed or applied topically to treat illnesses. It has a strong foundation in medical practice. Since ancient times, physicians have gathered knowledge on the use of herbs to cure a range of ailments and support normal biological functions. As a result, these same ancient plants serve as the source of active components in more than 25% of all medicines currently in use. Despite the fact that herbal medicine is not a regulated profession in the United States, healthcare providers may suggest herbal medicines in the form of extracts, tinctures, capsules, and tablets, as well as teas, to prevent the spread of diseases in local populations (De Smet 2005) [17].

The distinction between food and medicine is hazy in herbal medicine. One of the best methods to benefit from their therapeutic ability is to use herbs and spices that have a disease-preventive effect in dishes. Almost all medical conditions have been treated or alleviated using it. The most widely utilized ailments and herbal treatments are some of the following.

The whole herb, in tea forms, syrup, essential oils, ointments, salves, rubs, capsules, and tablets that contain a pulverized or powdered version of a raw herb or its dried extract are just a few of the numerous ways that herbs and plants can be processed and consumed. For example, alcoholic extracts (tinctures), vinegars (acetic acid extracts), hot water extracts (tisanes), long-term boiled extracts, typically of roots or bark (decoctions), and cold infusion of plants (macerates) are different ways that plants and herbs might be extracted (Cohen and Ernst, 2010 [14].

2.0 Herbal medicine

There is a long history of using herbal therapy to treat many diseases (Holm *et al.*, 1998). Man has used them for the treatment of disease for a very long time, and they are still commonly used today (Kokwaro, 1993). Before the advent of conventional medicine, humans had long amassed a body of empirical data pertaining to the therapeutic benefits of regional flora. These herbalists and their apprentices have amassed a substantial body of knowledge on medicinal plants over periods of trial, error, and success. The first generation of plant medications, according to Iwu *et al.*, (1999), were often simple botanicals used in a more or less raw form. A number of potent drugs that are utilized in their natural form have been chosen as therapeutic agents based on empirical research into how traditional communities from throughout the world use them.

A lot of the products that are marketed as "traditional herbal medicines" have a long history of usage, which is implied by the term "traditional" use of herbal remedies. A significant section of the populace in many developing nations rely on traditional healers and their arsenal of medicinal plants to address their healthcare needs. The use of herbal medicines has frequently remained popular due to historical and cultural factors, even when modern medicine coexists alongside such ancient practices.

Herbal remedies are primarily used for chronic, as opposed to life-threatening, diseases and for health promotion. However, the use of traditional treatments rises when modern medicine fails to effectively treat an illness, as is the case with advanced cancer and emerging infectious diseases.

2.1. Herbal medicine in modern pharmacy

Herbal medicine is the practice of using plant-based ingredients for medicinal purposes to treat a variety of bodily ailments and maintain overall wellness and good health. These chemicals are known to contain very active components, making them a very effective way to treat illnesses and disorders of the body. With the years, herbal medicine has always been a reliable source for finding treatment from a variety of diseases, but it can be claimed with certainty that the way these herbal compounds are used today has evolved over time. Traditional healers assist people in making sense of the natural plants they encounter that may be beneficial to their health. As a result, they have an advantage over the majority of current healthcare professionals, especially pharmacists, in terms of this understanding.

2.1.1 Contrast between herbal medicine and modern medicine

Most often, people believe that because these medications are taken in their natural states, they are less powerful and cannot be utilized in the precise quantities required. The use of these herbs in their full form as opposed to when their components are isolated has been found to have a greater impact, according to traditional practitioners.

Due to the fact that these herbal substances are frequently used in their entirety, they are occasionally more effective and less harmful than scientifically created pharmaceuticals, which frequently include just a single active ingredient that supports a particular bodily function.

The production and consumption of aspirin, which is made from the salicylic acid found in the plant "meadowsweet," is a prime example of this. Aspirin can cause bleeding in the abdominal lining. However, if the meadowsweet plant is consumed directly in its herbal form, this negative effect is not present.

2.1.2 Medicinal use of specific herbs

Numerous herbal ingredients have proven to have highly positive effects on people after use over the years. These herbs work in diverse physiological systems to carry out various bodily activities. The body also frequently uses natural herbs for a boost in energy production. Examples of herbs that can be utilized to improve the health of the body include;

Garlic: People frequently utilize this form of herbal substance, which is fairly common. Its innate qualities, in particular its antiviral and antibacterial qualities, are highly helpful in the efficient management of the common cold and other types of respiratory infections in people. Garlic use has been shown to be quite successful in lowering blood fat and cholesterol levels, which significantly lowers a person's chance of getting heart disease.

Ginseng: This is another another form of herbal substance that is widely used by individuals, particularly by those in the Asian region of the planet. The use of this herb has been closely linked to lower blood cholesterol levels and has also been shown to be a successful treatment for weariness in people. However, ginseng has also been strongly linked to a rise in blood pressure, thus when using it, utmost caution must be exercised.

Ginger: Ginger has been shown to be quite helpful in reducing nausea in humans, making it a great remedy for motion and morning sickness. Ginger tea is one of the greatest everyday natural self-care products because it is vitamin-rich.

Dang gui: This herb is renowned for its capability to effectively treat a variety of gynecological ailments, including the cluster of symptoms that accompany women's menopausal and premenopausal stages.

Echinacea: These herb is highly effective at enhancing one's immune system. As a result, it is common to see this herb used to treat boils, fever, and other types of internal infections.

2.1.3 Adverse effects of herbal medicine

Following the consumption of herbal substances, adverse effects are frequently observed. These undesirable outcomes include signs like diarrhea, rashes, and vomiting. They can also manifest in the body in a variety of ways, from minor to severe. The use of these substances can occasionally lessen the effectiveness of medical medications taken by the same person by interfering with their effects. As a result, it's crucial that all herbal products, regardless of type, be utilized in conjunction with a physician advice.

Currently, herbs are used to treat both acute and chronic illnesses, as well as a wide range of disorders, including inflammation, cardiovascular disease, prostate issues, depression, and immune system support, to mention a few. Traditional herbal remedies were heavily involved in China's 2003 effort to control and treat the severe acute respiratory syndrome (SARS), and in Africa, the Africa flower has long been used to treat HIV-related wasting symptoms (De Smet, 2005; Kaptchuk, 2008) [17, 59]. At most industrialized nations, one can find essential oils, herbal extracts, or herbal teas being sold in pharmacies alongside conventional drugs. Essential oils, herbal extracts, and herbal teas are also quite popular in Europe, with Germany and France leading the continent in over-the-counter sales.

The whole herb, teas, syrup, essential oils, ointments, salves, rubs, capsules, and tablets that include a pulverized or powdered form of a raw herb or its dried extract are just a few of the processed and consumed forms of herbs and plants. Alcoholic extracts (tinctures), vinegars (acetic acid extracts), hot water extracts (tisanes), long-term boiled extracts, typically of roots or bark (decoctions), and cold infusions of plants are among the different ways that plants and herbs are extracted (macerates). The components of herbal extract or product may differ greatly across batches and producers because there is no standardization in place.

A wide range of chemicals are abundant in plants. The majority of them are phenols or their oxygen-substituted derivatives, such as tannins, and many of them are secondary metabolites (Hartmann 2007; Jenke-Kodama, Müller, and Dittmann 2008) [29, 33]. The antioxidant capabilities of several of these chemicals are discussed in Chapter 2 on herbs and spices. When plant components are used directly as therapeutic agents, ethnobotanicals are important for pharmacological research and drug development. They are also useful as building blocks for the synthesis of drugs or as models for pharmacologically active compounds (Li and Vederas 2009) [37]. The first pharmacologically effective pure chemical, morphine, was created some 200 years ago using opium that was derived from the *papaver somniferum* poppy's seed pods.

This discovery demonstrated that, independent of the source or age of the material, medicines derived from plants may be refined and delivered in precise quantities (Rousseaux and Schachter 2003; Hartmann 2007) [51, 29]. As a result of the discovery of penicillin, this strategy was improved (Li and Vederas 2009) [37]. The commercial medicine preparations of today have been profoundly influenced by compounds derived from plants and other natural sources (such as fungi and marine microorganisms) or analogs inspired by them. Examples include reserpine, an antipsychotic and antihypertensive medication from Rauwolfia spp., antibiotics (e.g., penicillin, erythromycin), the cardiac stimulant digoxin from foxglove (Digitalis purpurea), salicylic acid, a precursor of aspirin, derived from willow bark (Salix spp.), quinine, an antimalarial from

Cinchona bark, and lipid (Rishton, 2008, Schmidt *et al.*, 2008; Li and Vederas, 2009) [50, 49, 37]. Additionally, more than 60% of cancer treatments that are available or being tested are based on natural ingredients. More than 70% of the 177 cancer medications licensed globally for use are based on natural substances or their mimics, many of which have undergone combinatorial chemistry improvement. The Pacific yew tree's paclitaxel, the Chinese "happy tree" Camptotheca acuminata's camptothecin, which is used to make irinotecan and topotecan, and the South African bush willow's combretastatin are three examples of plants that have been employed as cancer therapies (Brower 2008) [9]. Additionally, 121 active chemicals derived from plants are used in approximately 25% of medications that are given globally (Sahoo *et al.*, 2010) [54]. About thirteen (13) medications made from natural materials were authorized in the US between 2005 and 2007. More than 100 natural product-based medications are currently undergoing clinical trials and 11 percent of the 252 medications on the World Health Organization's (WHO) list of essential medicines are solely derived from plants (Li and Vederas, 2009; Sahoo *et al.*, 2010) [37, 54].

2.2 Herbal medicine and the aging population

In many affluent countries, the average life expectancy at birth has climbed from roughly 41 years in the early 1950s to almost 80 years. As a result, the proportion of seniors (those 65 and over) in our populations is rising. As our population ages, the burden of chronic age-related illness and reliance grows. Aging is linked to a gradual loss of physiological function and a higher risk of pathological alterations that can result in cancer, cardiovascular disease, dementia, diabetes, osteoporosis, and other diseases. Lifestyle factors, such diet and exercise, are crucial in defining the quality and length of a healthy life as well as in the management of chronic diseases (Bozzetti, 2003, Benzie and Wachtel-Galor 2010) [8, 6]. The likelihood that there is no one cause of aging is high, and various aging theories have been put out over time. Of all the metabolic theories of aging, the oxidative stress theory is the most widely accepted, but genetic variables are obviously significant (Harman 1992, Beckman & Ames 1998) [27, 4]. According to this idea, the interaction of reactive oxygen species with the DNA, lipid, and protein constituents of cells results in oxidative stress, which accumulates over time and contributes to aging. The widely widespread chronic age-related disorders all exhibit elevated oxidative stress, even if the aging process itself is proven to be unrelated to it (Holmes, *et al*., 1992, Beckman & Ames 1998, Finkel & Holbrook, 2000, Rajah *et al*., 2009) [31, 4, 25, 46]. Herbs' claimed medicinal properties may be at least partially attributed to their antioxidant content (Balsano & Alisi 2009, Tang & Halliwell 2010) [2, 58].

The "conventional" procedures of identifying and preparing herbs need to be replaced with more precise and repeatable techniques in light of the rising popularity of herbal medicine in order to guarantee the product's quality, safety, and consistency. The regulation of the production and marketing of herbal supplements and medications needs to be given attention given their market worth, possible toxicity, and growing consumer demand, particularly among the sick and elderly parts of our communities.

2.3 Herbal medicines: Challenges and regulations

WHO has acknowledged traditional medicine's significant role in delivering critical care (World Health Organization,). The European Scientific Cooperative on Phytotherapy (ESCOP) was founded in 1989 with the aim of advancing the scientific status and harmonization of phytomedicines at the European level. In 1989, the U.S. Congress established the Office of Alternative Medicine within the National Institutes of Health to encourage scientific research in the field of traditional medicine. Both the National Canadian Institute and the National Center for Complementary and Alternative Medicine at the National Institutes of Health in the United States have dedicated significant sums of money to the study of a variety of conventional therapies. Although this level of expenditure is modest in comparison to the pharmaceutical sector's overall research and development costs, it nonetheless demonstrates genuine interest on the part of the public, industry, and government in this field (Li and Vederas, 2009) [37].

Two key areas of worry emerge that pose significant difficulties when traditional medicine use and interest both increase dramatically worldwide. The regulation of the manufacture and use of herbs (and other complementary medicines), as well as their quality, safety, and scientific support for health claims, are governed by national and international diversity (WHO 2005, Sahoo *et al*., 2008) [5].

2.4 Side effect of the use of herbal medicine

WHO has acknowledged the significant role that herbal medicine plays in delivering critical care (World Health Organization,) The European Scientific Cooperative on Phytotherapy (ESCOP) was founded in 1989 with the goal of advancing the scientific status and harmonization of phytomedicines at the European level. In 1989, the U.S. Congress established the Office of Alternative Medicine within the National Institutes of Health to encourage scientific research in the field of herbal medicine. There are two primary areas of worry that come with the enormous growth in the interest in and usage of traditional medicines globally and present significant issues. The regulation of the manufacture and use of herbs (and other complementary medicines), as well as their quality, safety, and scientific support for health claims, are governed by national and international diversity (WHO 2005; Sahoo *et al.*, 2008) [5].

In the production of pharmaceutical, non-pharmacopoeial, or synthetic medications, medicinal plants are regarded as rich sources of components. Aside from that, these plants are essential to the growth of human cultures all across the world. Plants are a significant source of medication and are essential to maintaining global health. It has long been known that medicinal herbs or plants can be a valuable source of therapies or curative help. All around the world, the usage of medicinal herbs has come to dominate the health care system. In this, medicinal plants are used not just to treat illnesses but also as potential resources for preserving health and conditions. Two-thirds of the world's population, or many countries, rely on herbal medicine as their primary form of healthcare. This is due to the fact that they are more socially acceptable, better suited to the human body, adaptable, and have less negative side effects. Aspirin, atropine, artimesinin, colchicine, digoxin, ephedrine, morphine, physostigmine, pilocarpine, quinine, quinidine, reserpine, taxol, tubocurarine, vincristine, and vinblastine are a few of the medications said to be derived from plants.

3.0 Biochemical relevace of herbal medicine

A way of treating health-related problems based on the use of plants or plant extracts that may be consumed or used topically is known as herbal medicine, sometimes known as herbalism or botanical medicine. The use of herbal treatments is long established in medicine. Since ancient times, physicians have gathered knowledge on the use of herbs to cure a range of ailments and support normal biological functions.

As a result, these same ancient plants serve as the source of active components in more than 25% of all medicines currently in use. Although herbal medicine is not a licensed profession in the United States, medical experts may suggest herbal medicines in the form of extracts, tinctures, capsules, and tablets, as well Safetys. The distinction between food and medicine is hazy in herbal medicine. One of the best methods to benefit from their therapeutic ability is to use herbs and spices that have a disease-preventive effect in dishes. Almost every conceivable medical issue has been treated or relieved using herbal therapy.

Aloe: Aloe is applied topically for small burns, sunburns, and skin irritation, is one of the most common herbal remedies and ailments for which they are utilized.

Chamomile: Tea made from chamomile flowers is consumed to treat colic, heartburn, and upset stomach. Colds, the flu, and sore throats can all be treated with echinacea.

Garlic: Garlic is consumed to possibly lower blood pressure and cholesterol as well as treat colds and fungus infections.

Ginger: Ginger is consumed as an anti-inflammatory and for motion sickness. Peppermint tea is consumed to treat indigestion, motion sickness, and other digestive issues.

Chai tree for fungal diseases of the toenails and fingernails as well as athlete's foot, oil is used topically. Taken internally, turmeric fights inflammation and guards against cancer and Alzheimer's disease.

3.1 Herbal medicine and synnthetic

The primary treatment in the conventional medical system has shown to be herbal medications. In India, the majority of herbs and medicinal plants are gathered from the forest. From the year 1950-1970, the USA drug market saw the introduction of almost 100 novel plant-based medications, including vincristine, deserpidine, and reseinnamine, which are derived from higher plants. Despite the development of synthetic drugs, medicinal plants have given mankind a wide range of effective medications to reduce or eliminate infections and disease-related suffering. Some of these medications still hold significance and relevance today. Drugs made from plants are becoming more and more popular worldwide. There have been significant advancements in the pharmacological analysis of numerous plants utilized in conventional medical systems thanks to recent studies on herbal plants or medicine. A wide range of secondary metabolites or compounds, including tannins, terpenoids, alkaloids, and flavonoids, are found in medicinal plants. These compounds determine the therapeutic potency of the plants, especially their antimicrobial activities. The use of plant-derived remedies as an indigenous treatment in traditional systems of medicine has been related to the advent of plant-derived medications in contemporary medicine. Significant antibacterial, antifungal, anticancer, antidiuretic, anti-inflammatory, and anti-diabetic effects have been discovered in some of the plants (Bozzetti, 2003; Brower, 2008, Benzie and Wachtel-Galor, 2010) [8, 9, 6].

Drugs made from plants are used to treat cancer, diabetes, jaundice, TB, mental illness, and skin conditions. It has been well recognized that most developing countries employ traditional medicine and medicinal plants as a normative basis for the preservation of good health. Dental caries and periodontal disorders are two of the most common, avoidable infectious diseases in the world, and oral diseases are serious health issues. The entire quality of life is influenced by dental health, and systemic disorders and chronic problems are linked to poor oral health. Due to the lack of even basic health care, numerous people worldwide perish every day from diseases that may be prevented or treated. Malnutrition is frequently linked to diseases in these nations. The developing world is not a monolithic entity; rather, it is made up of many very diverse nations and regions that are in various phases of development.

Therefore, it is impossible to overstate the value of plants in traditional medicine and as raw materials for the pharmaceutical industry. Nearly all non-industrialized communities employ herbal medicine to treat illness. Opium, aspirin, digitalis, and quinine are just a few of the medications that are currently available to doctors and have a long history of use as herbal treatments. Due to the enormous growth of traditional medicine and the rising popularity of herbal therapies, the usage of medicinal plants is expanding globally. In addition to being used to cure certain conditions, plants are utilized in medicine to maintain and improve physical, mental, and spiritual health. Traditional medications that have been modified are known as "complimentary" or "alternative" medicines in industrialized nations. The practice of traditional medicine has remained popular throughout the developing world, and it is expanding quickly in developed nations. When compared to medicinal plants, which work in an integrated or pro-biotic manner with little to no negative effects on the body, chemically manufactured medications may act swiftly, but they have side effects that negatively impact the human body over time (Chan *et al.*, 2003) [12].

As human society has evolved, the usage of medicinal plants has taken on magical and religious importance, and each culture has had its own conceptions of health and disease.Since three thousand years ago, many plants have been used in medical procedures, such as Traditional Medicine in China, India, and Africa. The majority of these plants have therapeutic properties that have been verified as such by Western standards. According to the World Health Organization (WHO), 80% of people on earth rely on traditional medicine for their primary healthcare needs. The majority of this therapy uses plant extracts and their active ingredients (Table 1).

Table 1: List of some plants which are most commonly used in herbal drugs in Africa.

Plants Name	Plants Parts use in Disease
Abutilon indicum (Kanghi)	Seeds are used as laxative and in piles and leaves are locally applied on ulcer and boils.

Acacia catechu (Khair)	The bark of the tree is used in chronic diarrhea.
Acacia nilotica (Babul)	The twig is used as natural tooth brush. The fresh bark extract is used as tonic.
Adhatoda vasica (Vasaka)	The decoctions of leaves are given to cure asthma and other bronchial troubles.
Aloe vera (Gwarpatha)	The leaves used in skin burn and gel is orally in ulcers. Fleshy part used in facial creams.
Andrographis paniculata (Kalmegh)	The plant is used for malarial fever and as liver tonic.
Anisomelos indica (Bhandari)	Leaves used in cough and cold.
Anogeissus latifolia (Dhawra)	Leaves are used in diarrhoea. Gum is used as tonic.
Argemone mexicana (Pili Katari)	The extract for various skin diseases. The latex is applied in eyes conjunctivitis.
Azadirachta indica (Neem)	Seed oil is used in skin diseases and in lice. Bark for malarial fever and tooth brush.
Boerhaavia diffusa (Punarnava)	Plant used in jaundice, urinary troubles and in skin diseases.
Catharanthus roseus (Sadabahar)	The leaves and white flowers are used to reduce sugar level.
Chlorophytum spp. (Safed Musli)	The roots of the plant are used for general weakness, as tonic and aphrodisiac.
Curculigo orchoides (Kali Musli)	Roots are used as tonic and aphrodisiac; in leucorrhoea and menstrual irregularities.
Curcuma caesia (Kali Haldi)	Rhizomes are used in sprains, bruises and internal injuries.
Cyperus scariosus (Nagarmotha)	The tubers are used in urinary and heart troubles.
Datura metal (Dhatura)	Smoke of seeds inhaled in bronchial troubles.
Gymnema sylvestre (Gurmar)	The leaves of the plant are used in diabetics.
Ocimum sanctum (Tulsi)	The leaves are used to cure cough and cold and also to cure boils and ulcers.
Phyllanthus amarus (Bhuiamla)	It is a common household remedy for the treatment of Jaundice.
Solanum nigrum (Makoy)	The leaves are used in skin diseases and jaundice.
Syzygium cumini (Jamun)	Seed-powder is useful in diarrhoea, dysentery and diabetics.
Tylophora indica (Antamool)	The leaves are taken orally in asthma.
Urginea indica (Jangli pyaj)	The juice of the bulb is used in respiratory disorders.
Vitex negundo (Nirgundi)	The extract of the leaves is used in body pain and in skin diseases.

Sourece:https://www.google.com/search?q=some+herbal+medicinal+plant+and+concoction+for+treatment+of+ailment+and+disease&client

Fig 1: Some Herbal medicinal plants and concoction for the treatment of ailments and diseases.

Plants, herbs, and ethnobotanicals have been utilized for health promotion and disease treatment since the dawn of humans and are being used today in many parts of the world. The foundation of contemporary medicine today is made up of plants and other natural resources, which also significantly influence how commercial drug preparations are made today. Around 25% of medicines given globally are made from plants. However, plants are frequently employed in healthcare rather than pharmaceuticals. Herbs are sometimes used as an adjuvant therapy to conventional medications and are some people's preferred form of treatment. However, in many underdeveloped societies, the only accessible or cost-effective form of healthcare is herbal medicine, which is a core component. Whatever the motivation, those who use herbal remedies should be sure the items they purchase are secure and contain what they claim to, whether this is a specific herb or a specified quantity of a certain herbal component. Science-based information on dose, contraindications, and efficacy should also be provided to consumers. Global legal harmonization is required to do this in order to direct the ethical production and distribution of herbal medicines. If there is enough scientific evidence to support the use of herb, then proper legislation should permit its promotion in order to reap the benefits for the improvement of public health and the treatment of disease.

Advantages and disadvantages of herbal medicine

Herbal medicine have been used for many years; here are a few benefits and drawbacks. Herbal remedies such as Ayurveda, naturopathy, and homeopathy have gained popularity all over the world. It's important to note that these complementary and natural medications have been utilized for a long time. The drug was used to treat a variety of illnesses. Due to the popularity of herbal medicine, it has grown into a separate sector today. Herbal medicine is more affordable and cost-effective than medications from an allopathic pharmacy. It also has the advantage of being available in any health store and can be purchased without a prescription.For some diseases, herbal medicines and cures are more effective than allopathic ones. If any, the side effects of a pharmacist's prescribed chemical medication may be less severe than those of allopathic therapy.

Herbal remedies can be used to support the body's natural detoxification processes. For example, garlic and carrot concentrate can be used to improve digestion and food absorption, cleanse the colon, and strengthen the immune system. The use of herbs can treat several digestive illnesses

such colitis, indigestion, peptic ulcers, and irritable bowel syndrome.

Herbal medicine that contains ingredients like ginger, capsicum, garlic, and motherwort helps to control conditions like high blood pressure, varicose ulcers, and other conditions connected to blood circulation. Numerous herbal remedies are used to treat coronary artery disease and lower blood cholesterol levels. The root of many health issues is obesity. Herbal medicine can control appetite and assist with weight loss.

Herbal medicine has several disadvantages, just as other complementary and alternative medical treatments. Because herbal medicines include so many chemical ingredients, utilizing them requires care and time, and one must be confident that their use won't cause an allergic reaction. There is no government regulation of herbal medicine, so there is no way to guarantee quality, and there aren't many good herbal remedies, so it's best to consult a reputable doctor before using any herbal remedies because it's possible they could have adverse effects, manifest right away, or take longer than they should. Consumers are much increasingly cautious about the processed foods they consume. Foods that contain synthetic preservatives, which have been used for years, may have detrimental effects on one's health. In addition, using synthetic substances has many disadvantages, including rising costs, handling risks, worries about residues in food, and damage to the environment. As a result, there is growing interest in using natural, potent, and safe preservatives in favor of synthetic ones. Nearly all non-industrialized communities employ plants to heal illness (Edgar *et al.,* 2002). The use of herbal medicine to treat human ailments is growing as a result of advancements in chemical and phytochemical analyses. Opium, aspirin, digitalis, and quinine are just a few of the medications that are currently available to doctors and have a long history of use as herbal treatments. According to estimates from the World Health Organization, certain Asian and African people currently use herbal medicine for some part of basic healthcare. In recent years, both the demand for and use of medications and dietary supplements made from plants has increased.

Researchers in the fields of pharmacology, microbiology, botany, and natural product chemistry are scouring the planet for phytochemicals and other potential drug "leads" that might be used to treat a variety of disorders. In fact, the World Health Organization estimates that over 25% of contemporary medications used in the United States have a botanical origin. Eighty percent of the 120 active chemicals from higher plants that have been identified and are now commonly utilized in contemporary medicine demonstrate a positive association between their modern therapeutic use and the traditional use of the plants from which they were derived (Fabricant and Farnsworth, 2001) [24].

As a byproduct of their typical metabolic processes, all plants synthesize chemical compounds. All plants contain primary metabolites like sugars and lipids, which are split into two categories: (1) primary metabolites; and (2) secondary metabolite molecules, which are found in a narrower variety of plants and have a more specialized use (Meskin, 2002) [41]. Some secondary metabolites, for instance, are poisons that are employed to ward off predators.

Three key distinctions exist between medication and herbal medicine. Employing Whole Plants Herbalists typically employ unpurified plant extracts with a variety of components. They contend that these can cooperate in a way that has a higher impact on the body as a whole than the sum of the impacts of its parts. Additionally, they assert that using whole herbs as opposed to separated active compounds (or "buffering") reduces toxicity. Although constituent compounds in two samples of a specific herbal treatment may be present in different quantities, practitioners assert that this typically does not result in clinical issues (Vickers and Zollman, 1999) [61]. In some whole plant medicines, there is some experimental support for synergy and buffering, although it is unknown to what extent this is true of all herbal treatments. Many times, multiple distinct plants are employed in herb combination. Combining herbs is said to increase effectiveness and lessen side effects. Contrary to standard practice, which normally avoids polypharmacy wherever possible (Vickers and Zollman, 1999) [61].

Diagnosis the diagnostic methods used by herbalists differ from those of traditional doctors. When treating arthritis, for instance, physicians may see "under-functioning of a patient's systems of elimination" and determine that the arthritis is brought on by "an accumulation of metabolic waste products." Herbs having anti-inflammatory characteristics might therefore be recommended along with a diuretic, choleretic, or laxative combination of herbs (Vickers and Zollman 1999) [61].

Contrary to traditional drugs, alternative therapies (such as herbs) lack a strong scientific foundation, making it difficult for doctors to advise patients on correct use or potential side effects. There are no established references, and the majority of herbal formulations are not homogeneous, have not undergone quality control, and have not been analysed. A batch can differ significantly from another. Furthermore, even if a certain herb is recognized to be hazardous, the producer might or might not inform customers. Manufacturers are not obligated to warn customers about known risks.

Differences between herbs and spices

Spice and herb are two words that have been used to refer to plant components that are used to improve the flavor or taste of food. Herbs and spices are components of plants (fresh or dried). Herbs have also been used to enhance cosmetics, preserve food, and treat diseases. Where they come from a plant determines how the two differ from one another. Herbs are made from the plant's leafy, green portion, whereas spices are made from other plant components, such as the root, stem, bulb, bark, or seeds, which are not leafy. Basil, oregano, thyme, rosemary, parsley, and mint are a few examples of herbs. Before seasoning food, spices are often dried. Spices like cinnamon, pepper, cloves, and ginger are some examples. They are grown in more tropical nations than herbs. Additionally, some spices, like turmeric, which has anti-inflammatory and antifungal effects, are used to preserve food. The definitions of spices and herbs have evolved slightly over time. Spices, which are present in plants growing in tropical and subtropical regions of the world and include cinnamon, cloves, ginger, and pepper, have historically been characterized as fragrant, aromatic plant products. While leafy crops like mint, rosemary, and thyme are cultivated in more temperate regions, herbs have long been thought of as being the most green. Some plants serve as both spices and herbs. Coriander (spice) comes

from the seeds of Coriandrum sativum, whilst cilantro (herb) is derived from the plant's leaves (Kaur *et al.*, 2013) [35].

Nutritive value and possible side effects

Many cuisines depend heavily on herbs and spices. They increase nutrients as well as flavor, aroma, color, and texture. However, the primary belief regarding the usage of herbal medicines is that "they are safe since they are natural and have fewer negative effects than prescription drugs." Herbs are frequently combined since doing so increases their effectiveness and may result in fewer negative effects. However, numerous studies have highlighted their potential negative effects, particularly when taken erratically, excessively, or in conjunction with certain medications. Medicine and herb interactions might result to unwanted effect (Stickel *et al.*, 2005) [57].

Ingredients in healthy herbs

Numerous herbs have demonstrated promising results *in vitro*, animal models, or small-scale clinical trials, according to various clinical tests (Srinivasan, 2005). A 2010 study of 1000 plants found that 356 of them had published clinical trials evaluating their "pharmacological activities and therapeutic applications," while 12% of the plants, despite being sold in the West, had "no substantial research" of their properties (Cravotto *et al.*, 2010) [16]. Herbalists bemoan the fact that historical knowledge, which has been shown valuable in drug discovery and development in the past and now, is underutilized in many scientific investigations (Fabricant and Farnsworth 2001) [24]. They contend that by using this traditional knowledge, decisions about the best species, dose, harvesting period, and target population can be made. In many instances, experts are unsure of the precise component(s) in a single herb that makes it effective in treating a condition or illness. Whole herbs are made up of a variety of components that may combine to have positive effects. The effectiveness of herb is dependent on a number of things. For instance, the sort of environment a plant grew in (temperature, pests, soil quality), as well as how and when it was harvested and processed, will all have an impact (Yarnell and Abascal, 2002) [68].

Culinary herbs like garlic and ginger, rosemary, and peppermint are wonderful additions to food since they not only give it a unique flavor and spicy taste, but also because they are rich in antibacterial and antioxidant compounds that safeguard food. Healthy herbs are used sparingly; they actually give food flavor rather than nutritional value. Some plant components and herbal leaves are being utilized more frequently to flavor drinks. Herbs that are healthy have special qualities. Herbal contain (1) Antioxidants, essential oils, vitamins, phytosterols, and a variety of other plant-derived nutrient components found in herbs aid to better prepare our bodies to fight against pathogens and poisons and to increase immunity. In fact, herbs are medicines in lesser doses; (2) it has been shown that essential oils in herbs have anti-inflammatory properties by obstructing the enzyme cyclooxygenase, which is involved in inflammatory cascade reactions in the body; (3) Numerous special chemicals in the herbs have been shown to lower blood sugar levels in diabetics due to their ability to block the enzymes involved in inflammation, such as those involved in rheumatoid arthritis, osteoarthritis, and inflammatory bowel diseases including ulcerative colitis; (4) Controlled epidemiological studies have demonstrated that some components of garlic, such as thiosulfates (allicin), can significantly lower blood pressure and total cholesterol, reducing the risk of coronary artery disease and stroke; (5) Curcumin and other antioxidants contained in turmeric have been shown to have anti-inflammatory and anti-amyloid effects. Consequently, it is believed to be successful in stopping or at least postponing the beginning of Alzheimer's disease; (6) The herbs' volatile oils, vitamins, and antioxidants have cytotoxic effects on cancer, endometrial, prostate, pancreatic, and colon cells; (7) When used as directed, the chemical constituents of the herbs have been shown to have antispasmodic, carminative, diaphoretic, analgesic, aphrodisiac, deodorant, digestive, antiseptic, lipolytic (weight reduction activity), stimulant, and stomachic effects. Medical Claims Drug development strategy for natural medicines must start with safety.

Herbal remedies are being used more frequently as an alternative to conventional medicine around the globe to treat conditions like diabetes, high blood pressure, heart disease, and even some types of cancer. Due to their widespread availability, herbal medications are used much more frequently in India (Kaur *et al.*, 2013) [35]. Herbal items are not subject to the same purity and potency regulations as medicines. Studies on their efficacy or control on the caliber and safety of these preparations are lacking.

As long as they are not marketed for the prevention of any disease, herbal products do not qualify as medications. Herbal medicines are widely available without a prescription in the market and are regarded as "food integrators." They are safer, safer, and less likely to have side effects than prescription medications. However, numerous studies have shown their potential negative effects, particularly when taken erratically, excessively, or in conjunction with other medications (Stickel *et al.*, 2005) [57]. People frequently use herbs without thinking about how they might interact with any prescription medications they may be taking or with one another. Herbal and medication interactions may create unexpected drug concentrations and undesirable effects (Kaur *et al.*, 2013) [35].

Herbs and spices in ready to eat foods

The term "ready-to-eat" refers to food that is prepared for quick consumption at the point of sale. It can be consumed in any state, including raw, cooked, heated, or cold, without additional heat treatment. In addition to providing a classification of the microbiological quality of ready-to-eat food for reflecting the hygienic status of the food in question, these guidelines specify the safety limits for nine major food-borne pathogens, including Salmonella species, Listeria monocytogenes, E. coli, and Vibrio cholera. Plants have been used as remedies since before history was recorded. Numerous herbs and spices that people use to season food also produce beneficial therapeutic components. The development of the use of herbs and spices in cooking and ready-to-eat foods is a reaction to the threat posed by food-borne diseases (Mirriam *et al.*, 2012).

However, there are a variety of dangers associated with utilizing herbs, depending on their composition, their method of use, whether they are contaminated with viruses, pesticides, heavy metals, or other contaminants, and whether they provide a direct threat to public health (Bhushan, 2005) [7]. Studies have shown that the most heavily spiced recipes are found in tropical regions, where infections are most

prevalent. Additionally, the strongest antibacterial spices are typically chosen (Billing and Sherman, 1998). Because they are more resistant to deterioration than meat, veggies are always spiced less than meat (Sherman and Hash, 2001). Numerous common weeds, including nettle, dandelion, and chickweed, have therapeutic qualities (Stepp, 2004) [7]. A more recent study found that edible ingredients that are friendlier to the environment, such herbs and spices, may be effective as antibiofilms that don't manifest adverse impacts. Anise, lemon leaves, curry leaves, and clove extracts were investigated in this investigation against the marine pathogen Vibrio parahaemolyticus. The findings showed that compared to other extracts, cloves have better action against bacteria that produce biofilm. The control and monitoring of the degree of food safety, particularly in the seafood sectors, depends on the prevention of biofilm growth in the food (Elexson *et al.*, 2013) [20].

Safety

Many plants are extremely poisonous. The danger of side effects and interactions from herbal medication is likely higher than that from any other supplementary therapy. Serious adverse events that occurred after using herbal products have been documented in case reports. The majority of the time, the herbs in question were self-prescribed, purchased without a prescription, or acquired from a source other than a licensed practitioner. The most infamous case involved numerous women who took herbs and quickly progressed to interstitial renal fibrosis (Vickers and Zollman, 1999) [61]. Herbal products may not only have negative indirect pharmacological effects but also be contaminated, adulterated, or mislabeled. Patients who routinely take herbal supplements should, in general, get close monitoring and have access to suitable biochemical monitoring. Similar to many alternative therapies, nothing is known about how common side effects are. It would seem prudent to steer clear of using herbal remedies when pregnant. There may be further debate over ginger's comparative safety to over-the-counter nausea medications, but there is no question that other herbal remedies offer little in the way of benefits and substantial potential hazards (Phil P, 2007) [44]. When advising herbs, healthcare professionals must consider a wide range of elements, including the plant's species and variation, habitat, storage and processing methods, and the presence of pollutants (including heavy metals and pesticides). For at least 30 years, traditional herbal medicines have been approved for their stated claims due to their long-standing use for these ailments.

Although according to the World Health Organization, about 80% of people today rely on herbal medication as a part of their primary health care, traditional herbal medicines currently available on the market have been found to be relatively safe by experts, there is still a lot of concern about the safety and efficacy of herbal use.

While herbal medicine may be able to progress healthcare, there are still a number of significant obstacles that need to be removed before herbal therapies may be successfully included into conventional medicine. In fact, more researchers and physicians need to be educated in both contemporary medicine and the herbal compendium that has been compiled since ancient times if the adoption of safe and effective herbs into the medical system is to become a reality.

Future of herbal medicine

Herbs that are good for us have long played a significant role in our wellness. They have been valued since antiquity, and today we rely even more on them to detoxify our body, mind, and spirit. In non-industrialized countries, using herbs to cure illness is almost universal and frequently less expensive than using pricy contemporary medications. Their usage is less widespread in clinical settings, according to studies conducted in the United States and Europe, but has increased recently as more and more scientific evidence supporting the efficacy of herbal therapy has come to light. Contrary to the United States, some European nations classify and regulate plants as pharmaceuticals. Their usefulness and safety are actively investigated by the German Commission E, an expert medical body. However, there are numerous documented dangerous incidents in Asia and India where herbal medicine may still be harmful and pose a health risk to millions (Kaur *et al*. 2013) [35].

In order to enhance the study and application of herbal medicine in the UK, the British Herbal Medicine Association was established in 1964. It encourages the use of herbal medications created in accordance with pharmaceutical standards to guarantee the consumer of continuously excellent quality and efficacy. Herbal medicine is being taught more in medical and pharmacy institutions, however it is still not commonly acknowledged. More medical professionals are becoming aware of the advantages and potential drawbacks of employing herbal remedies to treat medical ailments. Doctors and pharmacists are two healthcare professionals who have received training in herbal medicine. They can assist clients in developing treatment regimens that use natural remedies, prescription drugs, and lifestyle modifications to improve health (Sanjoy and Shukla 2003). Clinical trials should be used by researchers, manufacturers, and regulatory agencies to ensure the quality and consistency of the traditional herbal products in order to build public trust and bring them into the mainstream of today's healthcare system. The quality and uniformity of the diverse herbal items can be evaluated using contemporary technologies. The best way to demonstrate a medicinal product's efficacy and safety is through a well-designed clinical trial (Stephen 2007) [56].

Future generations will continue to use plants for their fundamental medical purposes, both as a source of medicinal medicines and as a substrate for the extraction of semi-synthetic chemical compounds used in the food, cosmetics, and fragrance industries. The growing acceptance and usage of plant-derived healthcare products in the cosmetics sector, as well as rising public costs associated with everyday maintenance of individual health and wellbeing, have all contributed to their popularity. Medicinal plants play a crucial role in the greater development process as a source of both money and healthcare (Sheetal and Singh 2008). The regulatory agencies have a significant obligation to make sure that consumers receive medications that are guaranteed to be pure, safe, potent, and effective.

Conclusions

Due to the numerous benefits of different plants and their extracts, herbal medicine is a part of alternative therapeutic approaches. It is one of the most efficient and secure therapy alternatives, and even traditional medical professionals are beginning to acknowledge its benefits. However, although

customers may benefit from using herbal supplements, they also run the risk of causing severe illnesses and major negative effects. Most of these naturally occurring herbal substances now face an increased risk of extinction; as a result, it is crucial for modern scientists and healthcare professionals to learn as much as they can about these substances and their specific applications before important information is forgotten or lost.

Contrarily, food contamination is a significant public health issue that can be managed by using natural preservatives such essential oils derived from spices. Numerous studies conducted in recent years have demonstrated that many essential oils have antibacterial activity. Depending on the product utilized and which species of bacteria or fungi should be employed against, the type and ideal concentration of essential oil will vary. However, the sensory impact should be taken into account if essential oils are anticipated to be widely used as antibacterial and antifungal agents because the usage of naturally produced preservatives can affect the taste of food or surpass accepted flavor thresholds.

Having proven that the use of herbal medicine in contemporary pharmacy is significant and potent, it should be handled with utmost caution to avoid having a negative impact on the body or even other types of medication being used. Additionally, a lot of people with liver illness use herbal medicines due to their rising popularity. The majority of the limited studies that have been published so far do not mention the occurrence of negative effects, and controlled therapy trials for diseases for which plant components are allegedly helpful are lacking. However, a number of herbal remedies have demonstrated promising results in the treatment of both acute and long-term liver problems.

Recommendation

The optimization of essential oil, crude extract mixtures, and applications should be the main emphasis of this field of study in order to achieve effective antibacterial activity at low enough concentrations. Conclusion: Both patients and doctors should be aware of the potential side effects of herbal medicines as well as how they interact with other prescription medications. It is well recognized that using herbal treatments with conventional therapy has several advantages for people.

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