Herbal plants, Medicinal plant and their derivatives as health promoter

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Abstract

The purpose of this review to confine the importance, effectiveness and application of different herbs and medicinal plants and their depravities. Use of herbal plants as medicine is one of the oldest form of treatment in human history. The different medicinal plant synthesis hundred of chemical compound which used for curing different human disease and play important role in healing. Different herbs and their extract contain different phytochemicals which can provide therapeutic effects. Herbal and medicinal plants help to reduce high blood pressure, protect against cancer and maintain health of human and animals. Culinary herbs are used to add flavour in food but they also contain certain active phytochemicals which improve health and protects against some terrible diseases. Medicinal plants refer to using a plant seeds, roots, leaves ,bark ,berries and flowers for medicinal purpose. Some phytogenic compound shows similar effect as other antibiotics and organic compounds on gut health. Gut microflora has significance effect on host health and growth by interacting with nutrition utilization and good health of gut system. Basically the medicinal and herbal plants and their extract can be used in future as per physiological needs and consumer's preference for well being of animals and human. They have marvellous effect on animal health also. They used as food additives for increase the animal performance. Effects of these medicinal and herbal plants are very gentle and balanced. They promote homeostatic mechanisms and enhance body's efforts to heal. These herbal and medicinal plants used for treatment of some common disease. Over the past two decades, use of herbal plants as medicine has been tremendously increased.

Key words

Antimicrobial, phytogenic, herbal plant, resistance, health

Introduction

In different country plant used as medicine because they rich in phytochemicals, which are healthful plantchemicals. Traditional medicine used for cure different infections and diseases. The herbs/plants treat different disease more impeccably than conventional drugs(chemicals)[1].Certain medicinal herbs/plants have disinfectant property, which destroy diseases causing bacteria, microorganisms. They have ability of inhibit the growth of pathogenic bacteria. Medicinal, plant useful for maternal and child health care for mental and oral health. They also used as alternative of Antibiotic growth promoter(AGPs). Antibiotic growth promoters (AGPs) are used for stimulate growth of animal, increase productivity and for increase immunity against various pathogens. Use of AGP shows development of antibiotic resistance in humans and many animals[2].Resent research on herbal plants or medicinal plants shows that medicinal plant contain different secondary metabolites or compound such as tennins paranoids, flavonoids, alkaloids; that responsible for therapeutic nature of plants such as antifungal, antibacterial, antimicrobial properties. Drugs and extracts derived from plants are used to cure skin diseases, blood pressure, jaundice, mental illness. The use of traditional medicine and medicinal plant in different developing countries as regular basis for maintain good health, has been widely observed (UNESCO,1996) [3].Obviously antibiotics are one of the most leading discovery in 20th century. Because of outbreak of multi drug resistant pathogenic strains one of the major challenge is how to control drug resistance pathogenic bacteria strains and this problem lead us to explore the better and innovative drug source for decrease side effects and drug resistance. These marvellous properties of plant and their derivatives drawn attention of researchers to explore more about medicinal plant, their properties and applications[4].Several studies identified several compounds which are present in herbal plants and that are very effective as antibiotics[21]. Around the world many studies on healing system utilize that herbal and medicinal plant remedies are excellent source foe discovering the new antibiotics[22].There are many other traditional remedies that are produce such a chemical compounds that are very effectible against antibiotic-resistant strains[23].The plant kingdom is excellent source of active ingredient that used for cure many disease. Herbal plants are highly active and that can combined with other inactive substance and shows high efficiency against microbial organism[24].Many popular herbs like garlic, ginseng, saw palmetto ,aloe Vera used today for several purposes, Research continue for use different herbs for treating different infections such as ginger for motion sickness; peppermint oil for treating bowel syndrome; feverfew for relieving migraine and headaches. Culinary herbs are used as flavour foods since decade. These flavours are provided by aerometic ingredients. Saffron, paprika, and turmeric are examples of herbs that bring colour to food. For maintain optimal health we should reduce use of salt in our food items for decreasing use of salt we can use culinary herbs like caraway, cilantro, cumin, dill, oregano, rosemary, sage and others\herbal seasonings as alternative [28].

Phytochemicals

Phytochemicals or phytonutrients are the biological active substance present in plants that have protective or disease preventive properties. These are divide in to primary metabolites, such as sugar and fats, amino acids, nucleic acids And secondary metabolite which are not essential for basic function and found in smaller range of plants. Secondary metabolites have important role like defence against predators, parasites and disease, for interspecies competition and to facilitate reproductive process. Plant secondary metabolites are very large group of compounds, their bioactivity biochemistry and other properties are depends on their components. They are in charge of adding colour to the food. They are not known to be essential for health, but they toward keep us healthy. These different chemicals can be categorized into different group of chemical such as alkaloids, essential oils, steroids, saponins, acids [5]. Plant secondary product which are produce by secondary metabolic pathway are define as chemical which have not a vital biochemical role in maintaining and building a plant cells. They are defensive against pathogen attack, herbivory and inter-plant competition. These secondary products are very attractive toward some organism such as pollinators and symbionts [20].

Phytogenic properties

Herbal plants always useful for human and livestock in form of therapy and healing compounds.They also contain features of ethenoveterinary medicine. Characteristic of herbal plants and their derivatives in animal nutrition such as antimicrobial [6], antioxidant [7], antistress [8]. immune enhancement [9] , nutrigenomic effect [10]. These all properties of phytochemical are helpful for growth performance and health of animals. Phytogenic properties of herbs and medicinal plants also used as phytogenics feed additives (PFA) in animal feed. Phytogenics feed additives are plants origin compound which used in to animal feed for enhance the productivity of livestock because it improve the digestibility, absorption of nutrients and for resist the pathogenic activity in animal gut. PFAs are good replacement of AGPs in animal feed. PFAs can be combine with Probiotics for enhance the performance [19]. Herbs in various forms, such as essential oils, are used as food additives. Essential oils are also secondary metabolites and those are enriched in isoprene structure compound that are known as terpenes. Studies show that components of herbs have potential to become an alternative to antibiotic growth promoters. There is still further study needed to evaluate mechanism of action and to determine the optimal dietary level in order to optimize growth and enhance health of birds [25].

Herbal plants as antioxidant and antibiotic

Oxidation process is most important routes for producing free radicals. Free radicals are oxygen-containing with an uneven electron which lead to health problems such as inflammatory disease, cataract and other. Antioxidants scavenge free radicals. Different herbal plants also act as natural antioxidant such as Flavonoids which are group of poly phenolic compounds, which include free radical scavenging, oxidative enzyme and anti-inflammatory action [11]. The antimicrobial activity of plant extracts and oils has spawned a slew of novel approaches such as food preservation, pharmaceuticals, antimicrobial, antibacterial, antifungal, natural therapies and health promoters[12].There are different plants which show antibacterial activity against some pathogens. Different species of plant genus *Hypericum*,used as traditional medicine ,it contain hyperenone A, hyperenone B and hyperphorin which are responsible for antibacterial activity on resistance *Staphylicoccus aureus* and *Mycobacterium tuberculosis* [13,14].

Antifungal activity of herbs

Human fungal infections are a difficult problem to treat, especially in immunocompromised people, because therapeutic choices are limited by major limitations such as medication resistance and toxic side effects [50]. As a result, there is a strong desire for innovative therapeutic techniques based on plant-derived compounds that can be employed directly or as a model for producing better molecules. More than 600 plants had been recognised for their antifungal activities before to 2009, but only a few were actually used and investigated for active compounds [51]. It has also been established that terpinen4ol, rather than 1,8cineole, is the most likely mediator or, at the very least, a major contributor to AntiCandida activity in tea tree oil. In traditional Chinese medicine, the genus Paeonia is one of the most important sources of medications. C. albicans growth was inhibited by its extracts and certain of its components [52]. Eugenol and cinnamaldehyde, molecules from the phenolic group of essential oil compounds, exhibited promising action against C. albicans biofilm development in vitro and also demonstrated synergy with fluconazole[53].

Main antibacterial phytochemicals

Mostly secondary plant metabolite contains therapeutic value. They have wide activity range according their origin, categories of active principle and species. Some main photochemical extracted from medicinal plants are examined to check pharmacological activity such as,

Flavonoids

There are 14 classes of flavonoids. They are distinguished by their chemical nature and the presence of distinct substances..They are commonly found in fruite, vegitable, nuts,seeds,stem, flower. Antibacterial ability of flavonoids have ability to form complexes with both extracellular and soluble proteins as well as with bacterial membranes [12]. Flavonoids, a class of polyphenolic chemicals, are responsible for free radical scavenging, anti-inflammation, inhibition of hydrolytic and oxidative enzymes, and a variety of other properties identified from various plants. Oxidative stress and oxygen-free radicals lead to several chronic disorder and cell death [26].

Alkaloids

Alkaloids are nitrogen compounds that have a heterocyclic structure. They contain different antimicrobial activities. Analysis shows that leaf extract of *Gymnema montanum* and ethanol extract of *Tabernaemontana catharinensis* root contain antimicrobial activity[12].Several alkaloids contain significant effect, such as relieving action of ephedrine for asthama, the pain-relieving action of morphine and anticancer effect. Alkaloide is most important active component of several herbal and medicinal plants. Some of those compounds already developed as chemotherapeutic drugs. Alkaloieds widely distributed in natural herbs and it has several bioactivities such as antibacterial, anti-inflammatory, antiulcer, antidiabetes, protection of myocardial ischemia-reperfusion injuries, expansion of blood vessels, inhibition of platelet aggregation and neuroprotective effects [27].

Phenolics and Polyphenols

Phenolic compound are present in plants where they protect plants from microbial infection. They are large group of aromatic compound.Flavanols containing one carbonyl group,quinones with two carbonyl group, tannins, polymeric phenolic substance and coumarins and pyrone group[12].Different investigation have shown that antioxidant activies of these herbal and medicinal plant could be beneficial due to their phenolic compounds.these plants help in the maintenance of health and protects from some dangerous disorder such as cancer and coronary heart disease[26].

Herbal plants as growth promoters

Different herbs contain different substance and different effect. Mechanisms of those substances are also different. Phytogenic substance is very beneficial for digestive ecosystem of microflora. Phtogenic substance control potential pathogens, improve the digestion. Some herbal plants play a role as digestive medicine such as *vulgare, Foeniculum(fennel)* for vomiting and nausea, *Petroselinum crispum(parsley)* for digestive aid and vomiting, *Cimicifuga racemosa* (black cohosh) for joint pain and nausea, *Aloe barbadensis* (aloes) for abdominal cramps ,constipation and diarrhoea[15].There are many more herbs which are work as antimicrobial agent against different pathogenic bacteria and having several medical application like Ginger used for anti- diabetic and gastrointestinal infections; Turmeric used as antioxidant, anticoagulant, anti-inflammatory, anticancer; Garlic as cardio protective, anticancer, anti-diabetic; Mint as antioxidant and anti-inflammatory[18]

Some foods are also use as food supplements such as Onion and Garlic. Studies showed that consumption of Garlic and Onion reduced the risk of gastric ulcer .Garlic and its chemical components such as Allicin, Dially Disulfied, Diallyl Trisulfiedmare chemopreventive agent for lung cancer and breast cancer [29]. Onion and Garlic oil inhibited tumour promotion in mouse skin [30, 31].

Herbal plants for prevent coronary heart disease

Coronary heart disease is the leading contributor to disease and mortality worldwide. Researcher now concentrates on identifying new alternatives to prevent Coronary heart disease. Most relevant recommendation is involving healthy changes in diet and exercise. Medicinal and herbal plants are most relevant option for prevention and treatment. Studies on some medicinal plant show that including some

Herbs	Active compounds	Application	Reference
Clove	Eugenol, eugenyl acetate,α humulene, β-caryophyllene , 2-heptanone,	Antioxidant, antimicrobial, anti-inflammatory, anti-allergic and anti-cancer.	[54,55]
Cinnamon	Cinnamaldehyde and eugenol	Anti-inflammatory, anticancer, cholesterol-lowering, cardiovascular, antioxidant, antimicrobial.	[56-58]
Fennel	Phenolic components'	Antioxidant, antimicrobial and anti-inflammatory	[59]
Eucalyptus	Flavonols, hydroxybenzoic acids , tannins	Antioxidant, anti-inflammatory, antimicrobial.	[60,61]
Lemon balm	thymol , carvacrol	Antimicrobial, anti-Alzheimer, anti-inflammatory, anticancer, Anti-cardiovascular, antispasmodic, anti-stress.	[62,63]
Chamomile	Flavonoids, terpenoids, phenolic compounds, apigenin, matricin	Antioxidant, antimicrobial, analgesic, anti-hypoglycemic,	[64,65]

dietary summliment useful to reduce the risk of Coronary heart disease.Such plant includes garlic,gingko,tea,guggul and hawthorn[29].Garlic (*Allium sativum L.)*has been used as food and medicine From many years.Allicin which is present in garlic that is release when intact cells of a clove are cut or crushed and allicin is most active compound of garlic.Allicin can inhibits many becterias, molds, yeast and viruses.Many studies shows that garlic can reduce the risk of heart attck and strock because it lowers total and LDL- chelostrol and concentaration of triacyglycerol without affecting HDL- chelostrol concentration[32,33].Garlic increase fribrinolytic activity and inhabits platelate aggragation because of realising ajoenes,allyl methyl trisulfied, vinyldithiins and other sulfure compounds from breakdown of allicin. Lipid concentration of blood also altered in noemocholesterolemic subject if we take garlic [34-37].

Table 1. A list of herbal antimicrobial agents, their medical uses, and the primary biological substances they include

		hepatoprotective, anti-inflammatory, anticancer.	

Anticancer activity of herbal plants

National Cancer Institute have been identify some commonly use herbs which are contain anticancer properties. These herbs are garlic, onion, chives, basil, mints, oregano, rosemary, sage, turmeric, ginger, carrot, fennel, paesley, cumin, celery and many more[38].Many herbs contain veriety of phytosterols, triterpenes ,flavonoids, saponins and carotenoids which are present in legumes ,fruits, vegetable to be cancer chemoprotective[39]. These substance act as antioxidant, inhibit nitrosation and formation of DNA adducts with carcinogens,inhibite hormonal actions and metabolic pathways responcible for development of cancer[28]. Isoprenoids compound which is present in some plants is inhibite tumor growth in direct proportion to their ability to inhibit the activity of HMG-CoA reductase .Isoprenoids can affect tumor growth without producing ant change in blood lipid concentration[40].

Use of herbs for Digestive Disorders

Plant extracts are frequently utilised in the traditional symptomatic approach to constipation therapy. Senna and aloes contain anthraquinones, which are known to have stimulants and laxative qualities. Dietary fibre, such as isphagula husk, has a bulkforming laxative effect, while plant polysaccharides, such as psyllium, can be used to increase stool water [46,47]. In a controlled experiment for the treatment of opiate-induced constipation in palliative care, the Ayurvedic herbal cure Miskakasneham was found to be as well-tolerated, efficacious, and safe as a standard senna-based laxative, Sofsena [48]. Because of the global morbidity caused by peptic ulcer disease and dyspepsia, low-cost, conveniently accessible remedies will always be in demand. The popularity of the spice ingredient curcumin has prompted more research into its pharmacological effects (see below), but herbal therapies are unlikely to compete effectively against H2-receptor blockers and, in particular, proton pump inhibitors in developed countries [49].

Food application of herbal plants

Microorganisms are one of our planet's oldest and most successful organisms, owing to their high adaptability and survival capabilities in comparison to other organisms that die out after a while. Antibiotics generated by other bacteria may cause harmful microbes to evolve resistance mechanisms; thus, it is unsurprising that mankind fosters the ever-increasing troublesome issues in the control of microbes[16]. It is predicted that 10-20% of the plant population could be employed as pharmaceuticals to support health-care operations such as herbal drug isolation, purification, and extraction, which could result in the manufacture of a group of biologically active components [41, 42]. Pharmaceutically extracted substances are phenolic compounds, vitamins, and tannins with strong antioxidant action, according to recent research findings [43]. Medicinal plants' antibacterial properties against gram positive and gram negative bacteria have been the subject of several studies. Various illnesses could be caused by both negative and positive gram bacteria. Gram (+) bacteria, such as Staphylococcus aureus, can cause wound infection, toxic shock syndrome, and food poisoning, whereas gram (-) bacteria, such as E. coli, are the most common cause of diarrhoea in humans and can also cause coleocystis or septicaemia[44]. Methicillin-resistant Staphylococcus aureus (MRSA) infections are among the most newly discovered diseases, owing to their high adaptability in overcoming practically all therapeutically accessible drugs [45]. As noted previously, one of the challenges in killing microorganisms may be their resistance to antibiotics, and herbal therapy may be a better option for controlling them.

Conclusion

Due to their antibacterial properties as well as their ability to scavenge radicals, replacing chemical antimicrobial agents with natural herbal antimicrobial agents is an excellent alternative. Because of their unique qualities, herbal materials have spawned a new intriguing topic in all sciences, particularly medicine, for future research. Their medical applications have already prompted the creation of new medical products. Due to the importance of antimicrobial medications in human life, these new areas of the pharmaceutical sector are becoming increasingly accepted. Designing novel antimicrobial medications with fewer adverse effects, on the other hand, would not only open up new research avenues but will also help address growing human demands. As a result, these materials can be recommended for improving drug delivery, cancer therapy, infection, and healing speed. Traditional medicine also makes extensive use of a mixture of these plants. As a result, future study can focus on effect of herbal combinations and characterisation of the active component for future therapeutic breakthroughs and pharmaceuticals.

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Conflicts of interest

The authors declare no conflicts of interest.

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