



E-ISSN: 2278-4136

P-ISSN: 2349-8234

www.phytojournal.com

JPP 2020; 9(2): 2111-2114

Received: 07-01-2020

Accepted: 09-02-2020

Aatifa Rasool

Department of Fruit Science,
Sher-e-Kashmir University of
Agricultural Sciences and
Technology Srinagar, Jammu and
Kashmir, India

Khalid Mushtaq Bhat

Department of Fruit Science,
Sher-e-Kashmir University of
Agricultural Sciences and
Technology Srinagar, Jammu and
Kashmir, India

Altaf Ahmed Sheikh

Department of Vegetable Science,
Sher-e-Kashmir University of
Agricultural Sciences and
Technology
Srinagar, Jammu and Kashmir,
India

Aarifa Jan

Department of Fruit Science,
Sher-e-Kashmir University of
Agricultural Sciences and
Technology Srinagar, Jammu and
Kashmir, India

Shaziya Hassan

Department of Fruit Science,
Sher-e-Kashmir University of
Agricultural Sciences and
Technology Srinagar, Jammu and
Kashmir, India

Corresponding Author:**Aatifa Rasool**

Department of Fruit Science,
Sher-e-Kashmir University of
Agricultural Sciences and
Technology Srinagar, Jammu and
Kashmir, India

Medicinal plants: Role, distribution and future

Aatifa Rasool, Khalid Mushtaq Bhat, Altaf Ahmed Sheikh, Aarifa Jan and Shaziya Hassan

Abstract

Medicinal plants have been used for healthcare since time immemorial. Application of plants to prepare medicine has been realized through hit and trail method, and gradually man became able to fulfill his needs from his surroundings. The use of medicinal plants was started by Japanese for carrying out rituals, food flavoring and treating various diseases. Studies have been carried out globally to verify their potential and some of the findings have given rise to what we call plant-based medicines. Being an important source of medicine, these plants have always been of utmost importance in virtually all cultures of civilizations. Medicinal plants are regarded as rich resources of traditional medicines and not only this but these plants serve as an important source for many modern medicines as well. It is the presence of secondary metabolites which is responsible for their characteristic features. By standardizing the health of active plant-derived compounds, herbal drugs can provide a huge platform for the healthcare system to treat human diseases in the future. Nowadays many people are using herbal medicines as a substitute to synthetic drugs but there are still some concerns about the safety of using them. Addressing them will make it possible for us to use the medicinal plants effectively and more efficiently.

Keywords: Herbal drugs, metabolites, traditional medicines, modern medicines

Introduction

Plants have been used for medicinal purposes long before prehistoric period. Ancient Unani manuscripts Egyptian papyrus and Chinese writings described the use of herbs. Evidence exist that Unani Hakims, Indian Vaidis and European and Mediterranean cultures were using herbs for over 4000 years as medicine. Infact, the widespread use of natural herbs and medicinal plants for treating diseases has been described in the ancient texts of Vedas and the Bible ^[1] and the Qur'an and the Ahadith ^[2]. A book entitled Duke's Handbook of Medicinal Plants of the Bible written by Duke, Duke, and duCellier in which he cataloged "faith-based farmaceuticals" ^[3] supports the fact that the use of medicinal plants is not new. Rapid explosion of human population, urbanization, deforestation, inadequate supply of medicine, unaffordable cost of treatments, side effects of synthetic medicines and development of resistance against serious diseases has led to increased use of plant materials as a source of medicine for a number of health problems.

Despite the fact that there have been great advances in Modern medicine, traditional medicine is still the basic method of healthcare in developing countries as well as for people who have access to western medicine. As the knowledge of the effect of these plants on human health is increasing their acceptance and application has increased and today there are more number of people who use plant based medicines as a substitute for synthetic drugs. As per the report by the World Bank in 1997, (technical paper number 355), it is quite evident that the importance of plant based medicines has been increasing all over the world so much so that nearly 50% of medicines in the market are made of natural plant materials. As a result, the demand for medicinal plants is expected to be high because some of the active ingredients cannot be yet synthesized artificially ^[4]. With the increasing demand for herbal drugs, natural health products, and secondary metabolites of medicinal plants, the use of medicinal plants is growing rapidly throughout the world ^[5, 6].

Medicinal plants are globally valuable sources of new drugs ^[5]. The global market of products derived from plants is estimated at \$83 billion US and continues to grow ^[7]. Analysis of the data on prescriptions dispensed from community pharmacies in the US from 1959 to 1980, indicates that 25% contained plant extracts or active principles derived from higher plants and at least 119 chemical substances, derived from 90 plant species are used as important drugs in many countries. These plant-based systems continue to play a critical role in health care.

The World Health Organization estimates that 80% or the world's inhabitants continue to rely mainly on traditional medicine systems for their health care. These can serve as a potential source for future wonder drugs ^[8].

Furthermore, it is estimated that approximately 25% of modern drugs and as many as 60% of antitumor drugs^[9] are derived from natural products^[10]. Also, up to 80 % of people in developing countries are totally dependent on herbal drugs for their primary healthcare, and over 25 % of prescribed medicines in developed countries are derived from wild plant species^[11]. Some people think that natural pharmacy has been studied to a great extent, but, the fact is, we have just started to exploit this reservoir of plants. Around 422,000 plant species exist worldwide. These are rich sources of medicinal products and can cure a wide range of diseases from cold to cancer and AIDS. Medicinal treasures from the wild may be available for future generations, but today only 50,000–80,000 flowering plants are used medicinally worldwide^[12]. Chemical compounds of medicinal properties that are scattered throughout the plant kingdom—250,000–350,000 species: 18,000 algae; 90,000 fungi (including bacteria); 15,000 lichens; 14,000–20,000 bryophytes; 6,000–9,000 pteridophytes; 675 gymnosperms; and 200,000 species of angiosperms in some 300 families^[13]. Medicinal plants are used for treatment because they have certain properties, including synergistic actions. Plant-derived compounds can dramatically improve hard-to-treat illnesses, such as cancer. Plant components are also characterized by their ability to prevent the development of certain chronic diseases^[14]. Here are some important studies on the role of medicinal plants in treating health problem.

a. Cancer

Extract from *Urtica membranacea*, *Artemisia monosperma* and *Origanum dayi* Post were investigated to test their effects on a wide range of cancer cell lines from lung, breast, colon and prostate cancers. The investigation showed the plant extracts with a combination of anticancer compounds had killing activity which was specific to cancer cells and showed no effect on normal human lymphocytes and fibroblasts. This makes plant extracts more desirable as therapeutic agents than those that are chemically derived which cause toxic complications in cancer treatment^[15]. The isoquinoline alkaloids from *Sanguinaria canadensis* L. and *Hydrastis canadensis* L. were found to be effective against *Helicobacter pylori*, the cause of stomach ulcers and linked to stomach cancer^[16].

b. Alzheimer's disease

Alzheimer's is the most common form of dementia and affects an estimated 10 million people worldwide, the effect of *Bacopa monnieri* (*Brahmi*) was found associated with the Ayurveda system of medicine, on the cognitive functions in Alzheimer's disease patients, and concluded that it could be beneficial in these patients, but more study is needed^[17].

c. Diabetes

113 species were reported to be useful for treating diabetes worldwide but these must be used in conjunction with diet and exercise^[18].

d. Gastrointestinal problems

Amara are plants with a predominant content of bitter substances and a stimulating action on gastric secretion and gastrointestinal motility^[19]. In addition to this herbal medicines such as *P. erecta* (tormentil), carob bean juice, and Diarrhoeosan

for diarrhea; peppermint oil (Colpermin) for functional abdominal pain; fennel preparations (eg, oil, tea, herbal compound ColiMil) for treating infantile colic; and psyllium fiber can be used as an adjunct while treating constipation in children with IBS^[20].

e. Anxiety and Depression

Aloysia triphylla (lemon verbena) is a medicinal plant from Verbenaceae family. It is a perennial plant and native to the western South America. It has been used in the traditional medicine from early times for some therapeutic as well as depression^[21]. The plant smoothens abdominal discomfort^[22].

f. Malaria

Malaria is the world's most important parasitic disease especially when *Plasmodium falciparum* is the causative agent^[23]. A good example against malaria is quinine, isolated from *Cinchona* bark, which has been used as a template for the synthesis of chloroquine and mefloquine. More recently, artemisinin isolated from the Chinese plant *Artemisia annua*, has been used successfully against chloroquine-resistant *P. falciparum* strains^[24].

Distribution

The traditional medicine practice is widespread in China, India, Japan, Pakistan, Sri Lanka and Thailand. In India Medicinal plants are distributed across diverse habitats, about 70% of the medicinal plants in India are found in tropical forests in Eastern and western Ghats, Chota Nagpur plateau, Aravalis, Vindhyas and the Himalayas^[25]. The Himalaya known for its loftiest and longest mountain range in the world is a well-known treasure of medicinal plants as it is bestowed with varied landscape features providing habitats for a wide range of medicinal plants. It extends from Jammu and Kashmir to Arunachal Pradesh with latitudes 27°-38°N and longitudes 72°-89° E and spread over in an area of 236,000 km²^[26]. Among the Himalayas, Kashmir Himalayan region is nestled within the Northwestern folds of the recently designated global biodiversity hotspot of the Himalayas^[25].

Future prospectus

A number of plants could be widely cultivated for local industrial production of medicines and herbal nutritional supplements. There is need to ensure that what is known is made use of, for financial gain, and for improvement of the health of our people. We need to establish the necessary expertise for development of traditional medicines and deliberate efforts should be made to encourage local industrial production of traditional/herbal medicines so that cultivation may become possible and hence contribute to poverty reduction^[27]. There is a promising future of medicinal plants as there are about half a million of plants around the world, and most of them are not investigated yet for their medical activities and the hidden potential of medical activities could be decisive in the treatment of present and future studies^[28]. Herbal medicine is effective, has lesser side effects, and affordable than the allopathic medicines. Herbal medicines include herbs, herbal materials, herbal preparations, and herbal products that contain different parts of plants or other plant materials as active ingredients. It has been well documented that herbal plants and their derivatives play critical roles in modern drug

development. Medicinal plants are the natural resources for developing new drugs [29, 30, 31]. Medicinal plants are used as a medical resource in almost all cultures. Ensuring the safety, quality and effectiveness of medicinal plants and herbal drugs very recently became a key issue in industrialized and developing countries. By standardizing and evaluating the health of active plant-derived compounds, herbal drugs can help the emergence of a new era of the healthcare system to treat human diseases in the future. Awareness of traditional knowledge and medicinal plants can play a key role in the exploitation and discovery of natural plant resources. In order to maintain this knowledge, comprehensive approach and collaboration are needed to maintain historical records on medicinal plants and use these resources in favour of human beings, before they are destroyed forever [32]. In the past, the drug discovery of the biological compounds from plant materials and the process of identifying the structures of active compounds from the extracts were problematic and used to take weeks, months or even years. Nowadays, the development of precision instruments such as high-performance liquid chromatography (HPLC/MS), liquid chromatography mass spectrometry (LC/MS), magnetic field and nuclear magnetic resonance (NMR) has become a major breakthrough for the categorization of compounds that are extremely limited in quantity in their organisms of origin [33]. On the other hand, one of the major challenges facing medicinal plants is the loss of medicinal plant species due to the indiscriminate use of these resources. According to the International Union for Conservation of Nature, there are between 50 000 and 80 000 flowering plant species that are used for pharmaceutical purposes around the world. Among these numbers, about 15 000 species are exposed to a risk of extinction due to high harvesting and destruction of habitats [34]. In India it is estimated that of the 1500 species of plants that are listed as threatened, 33 have gone extinct, 157 are endangered, 114 are vulnerable and 246 are rare [35]. More than 70% of the threatened medicinal plants are in active trade. Of the 625 medicinal plant species traded presently, 235 species (approx. 38%) are herbs, the collection of which is mostly destructive [36]. The magnitude of biodiversity loss is so large and so strong that immediate and urgent steps are needed to contain this damage. However, the conservation strategies for medicinal and aromatic plants has to take into consideration the survival of the species on one hand and sustained supply of raw material on the other, to cater to the needs of billions of people throughout the globe. Good agricultural practices (GAP) for medicinal plants have been formulated to regulate production, ensure quality, and facilitate the standardization of herbal medicine [37]. A GAP approach ensures high quality, safe and pollution-free herbal drugs (or crude drugs) by applying available knowledge to address various problems [38]. GAP include comprehensive items, such as the ecological environment of production sites, germplasm, cultivation, collection, and quality aspects of pesticide detection, macroscopic or microscopic authentication, chemical identification of bioactive compounds, and inspection of metal elements [39]. Organic farming of medicinal plants is becoming increasingly important in the long-term development and sustainability of medicinal plants [40]. Nowadays many people are using herbal medicines as a substitute to synthetic drugs but

there are still some concerns about the safety of using them. Although their contribution in treating diseases is high still many major issues need to be addressed before complete substitution of synthetic drugs by herbal medicines. Resolving these issues will make it possible for us to use the medicinal plants effectively and more efficiently.

References

1. Hoareau L, DaSilva EJ. Medicinal plants: A reemerging health aid. *Electron J Biotechn.* 1999; 2:56-70.
2. Ahmad M, Khan M, Marwat SK, Zafar M, Khan MA, Hassan TU. Useful medicinal flora enlisted in Holy Quran and Ahadith. *Am Eurasian J Agric Environ Sci.* 2009; 5:126-40.
3. Duke P, Duke A, DuCellier JL. *Duke's handbook of medicinal plants of the Bible.* Boca Raton, FL: CRC Press, Taylor & Francis Group, 2007.
4. Thomas SC. *Medicinal plants culture, utilization and phytopharmacology,* Li. United States: CRC Press, 2000, 536.
5. Nalawade SM, Sagare AP, Lee CY, Kao CL, Tsay HS. Studies on tissue culture of Chinese medicinal plant resources in Taiwan and their sustainable utilization. *Bot Bull Acad Sin.* 2003; 44:79-98.
6. Cole IB, Saxena PK, Murch SJ. Medicinal biotechnology in the genus *scutellaria*. *In Vitro Cell Dev Plant.* 2007; 43:318-327.
7. WHO (World Health Organization) The World Traditional Medicines Situation, in *Traditional medicines: Global Situation, Issues and Challenges.* Geneva. 2011; 3:1-14.
8. Farnsworth N, Akerele AO, Bingel AS, Soejarto DD, Guo Z. Medicinal plants in therapy. *Bull World Health Organ.* 1985; 63(6):965-981.
9. Brower V. Back to nature: extinction of medicinal plants threatens drug discovery. *J Natl Cancer Inst.* 2008; 100:838-9.
10. Newman DJ, Cragg GM. Natural products as sources of new drugs over the 30 years from 1981 to 2010. *J Nat Prod.* 2012; 75:311-35.
11. Hamilton AC. Medicinal plants, conservation and livelihoods. *Biodivers Conserv.* 2004; 13:1477-1517.
12. Marinelli J. *Plant: The ultimate visual reference to plants and flowers of the world.* Dorling Kindersley Publishers Ltd. New York: 2005.
13. Schultes RE. The future of plants as source of new biodynamic compounds. In *Plants in the development of modern medicine,* Ed. T. Swain. Cambridge: Harvard Univ. Press. 1972; 103-124.
14. Hassan B. Medicinal plants (importance and uses). *Pharmaceut Anal Acta.* 2012, 3(10).
15. Solowey E, Lichtenstein M, Sallo S, Paavilainen H, Solowet E, Lorberboum-Galski H. Evaluating Medicinal Plants for Anticancer Activity. *Sci. World J.* 2014; 2014:1-12.
16. Mahady, GB, Pendland SL, Stoia A, Chadwick LR. In vitro susceptibility of *Helicobacter pylori* to isoquinoline alkaloids from *Sanguinaria canadensis* and *Hydrastis canadensis*. *Phytother Res.* 2003; 17:217-221.
17. Goswami S, Saoji A, Kumar N, Thawani V, Tiwari M, Thawani M. Effect of *Bacopa monnieri* on Cognitive functions in Alzheimer's disease patients. *Int J Collab Res Intern Med Public Health.* 2011; 3:285-93.

18. Garg M, Garg C. Scientific alternative approach in diabetes-An overview. *Pharmacogn Mag.* 2008; 2(4):284-301.
19. Avau B, Rotondo A, Thijs T, Andrews CN, Janssen P, Tack J, Depoortere I. Targeting extra-oral bitter taste receptors modulates gastrointestinal motility with effects on satiation. *Sci Rep.* 2015; 2(4):284-301.
20. Cincotta DR, Crawford NW, Lim A, Cranswick NE, Skull S, South M, Powell CVE. Comparison of complementary and alternative medicine use: reasons and motivations between two tertiary children's hospitals. *Arch Dis Child.* 2006; 91(2):153-158.
21. Guerrera PM, Leporatti ML, Foddai S, Moretto D, Mercantini R. Antimycotic activity of essential oil of *Lippia citriodora* Kunt (*Aloysia triphylla* Britton). *Riv. It. EPPOS.* 1995; 15:23-25.
22. Valentao P, Fernandes E, Carvalho F, Andrade PB, Seabra RM. Studies on the antioxidant activity of *Lippia citriodora* infusion: scavenging effect on superoxide radical, hydroxyl radical and hypochlorous acid. *Biol Pharm Bulletin.* 2002; 25: 1324-1327.
23. Fisher PR, Bialek R. Prevention of malaria in children. *Clin. Inf. Dis.* 2002; 34:493-498.
24. Schwikkard S, Van Heerden FR. Antimalarial activity of plant metabolites. *Nat Prod Rep.* 2006; 19:675-692.
25. Mittermeier RA, Gil RP, Hoffman M, Pilgrim J, Brooks T, Mittermeier CG, Lamoreux J, Fonseca GAB. Hotspots revisited: Earth's biologically richest and most endangered terrestrial ecoregions. Boston: University of Chicago Press. 2005, 392.
26. Valdiya KS. Geology of Kumaun Lesser Himalaya. Dehradun: Wadia Institute of Himalayan Geology. 1980.
27. Moshi MJ. Current and future prospects of integrating traditional and alternative medicine in the management of diseases in Tanzania. *Tanzan Health Res Bull.* 2005; 7(3):159-6.
28. Singh R. Medicinal Plants: A Review. *J. Plant Sci.* 2015; 3:50-55.
29. World Health Organisation Media Centre, Traditional Medicine, 2008.
30. Heinrich M. Ethnobotany and its role in drug development. *Phytotherapy Res.* 2000; 14 (7):479-488.
31. Shakya AK, Sharma N, Saxena M, Shrivastava S, Shukla S. Evaluation of the antioxidant and hepatoprotective effect of *Majoon-e-Dabeed-ul-ward* against carbon tetrachloride induced liver injury. *Exp Toxicol and Pathol.* 2012; 64(7-8):767-73.
32. Fatemeh JK, Zahra L, Hossein AK. Medicinal Plants: Past history and future perspective. *J Herbmmed Pharmacol.* 2018; 7(1):1-7.
33. Schroeder FC, Gronquist M. Extending the scope of NMR spectroscopy with microcoil probes. *Angew Chem Int Ed Engl.* 2006; 45(43):7122-31.
34. Bentley RE. Medicinal Plants. London: Domville-Fife Press, 2010:23-46.
35. Anonymous. The Biome News. Department of Biotechnology, GOI, New Delhi. 2000; 1(1):1-6.
36. Mudappa A, Oommen S. Problems and prospects of India's wild medicinal plants in trade-a current understanding. *Amruth.* 1998; 2(3):10-13.
37. Chan K, Shaw D, Simmonds MS, Leon CJ, Xu Q, Lu A, Sutherland I, Ignatova S, Zhu YP, Verpoorte R, Williamson EM, Duezk P. Good practice in reviewing and publishing studies on herbal medicine, with special emphasis on traditional Chinese medicine and Chinese materia medica. *J Ethnopharmacol.* 2012; 140:469-475.
38. Muchugi A, Muluvi GM, Kindt R, Kadu CAC, Simons AJ, Jamnadass RH. Genetic structuring of important medicinal species of genus *Warburgia* as revealed by AFLP analysis. *Tree Genet Genome.* 2008; 4:787-795.
39. Makunga NP, Philander LE, Smith M. Current perspectives on an emerging formal natural products sector in South Africa. *J Ethnopharmacol.* 2008; 119:365-375.
40. Macilwain C. Organic: is it the future of farming? *Nature.* 2004; 428:792-793.