

Current and future status of herbal medicines

Sheetal Verma ¹ and S.P. Singh ²

Department of Pharmacology and Toxicology,
College of Veterinary and Animal Science, Pantnagar, Uttaranchal, India.

Abstract

Nature always stands as a golden mark to exemplify the outstanding phenomena of symbiosis. In the western world, as the people are becoming aware of the potency and side effect of synthetic drugs, there is an increasing interest in the natural product remedies with a basic approach towards the nature. Throughout the history of mankind, many infectious diseases have been treated with herbals. A number of scientific investigations have highlighted the importance and the contribution of many plant families i.e. *Asteraceae*, *Liliaceae*, *Apocynaceae*, *Solanaceae*, *Caesalpinaceae*, *Rutaceae*, *Piperaceae*, *Sapotaceae* used as medicinal plants. Medicinal plants play a vital role for the development of new drugs. The bioactive extract should be standardized on the basis of active compound. The bioactive extract should undergo safety studies. Almost, 70% modern medicines in India are derived from natural products. Medicinal plants play a central role not only as traditional medicines but also as trade commodities, meeting the demand of distant markets. India has a very small share (1.6%) of this ever-growing global market. To compete with the growing market, there is urgency to expeditiously utilize and scientifically validate more medicinally useful plants.

Keywords: Herbal Medicine, Plant, Infectious Disease, Natural, Remedies.

Introduction

Nature always stands as a golden mark to exemplify the outstanding phenomena of symbiosis. Natural products from plant, animal and minerals have been the basis of the treatment of human disease. Today estimate that about 80 % of people in developing countries still relays on traditional medicine based largely on species of plants and animals for their primary health care. Herbal medicines are currently in demand and their popularity is increasing day by day. About 500 plants with medicinal use are mentioned in ancient literature and around 800 plants have been used in indigenous systems of medicine. India is a vast repository of medicinal plants that are used in traditional medical treatments (Chopra *et al.*, 1956). The various indigenous systems such as Siddha, Ayurveda, Unani and Allopathy use several plant species to treat different ailments (Rabe and Staden, 1997). The use of herbal medicine becoming popular due to toxicity and side effects of allopathic medicines. This led to sudden increase in the number of herbal drug manufactures (Agarwal, 2005). Herbal medicines as the major remedy in traditional system of medicine have been used in medical practices since antiquity. The practices continue today because of its biomedical benefits as well as place in cultural beliefs in many parts of world

and have made a great contribution towards maintaining human health (Sane, 2002).

In India around 20,000 medicinal plant species have been recorded recently but more than 500 traditional communities use about 800 plant species for curing different diseases (Kamboj, 2000). Currently 80% of the world population depends on plant-derived medicine for the first line of primary health care for human alleviation because it has no side effects. Plants are important sources of medicines and presently about 25% of pharmaceutical prescriptions in the United States contain at least one plant-derived ingredient. In the last century, roughly 121 pharmaceutical products were formulated based on the traditional knowledge obtained from various sources.

Herbal medicines obtained from plants

India has one of the richest plants medical traditions in the world. There are estimated to be around 25,000 effective plant-based formulations, used in folk medicine and known to rural communities in India. There are over 1.5 million practitioners of traditional medicinal system using medicinal plants in preventive, promotional and curative applications. It is estimated that there are over 7800 medicinal drug-manufacturing units in India, which consume about 2000 tonnes of herbs annually.

1. Research fellow

2. Professor

Table -1. Medicinal plant parts exported from India, importing medicinal plants and their parts.

Exporting of herbals		Importing of herbals	
Botanical names	Parts used	Botanical name	Parts used
<i>Acorus calamus</i>	Rhizome	Aloe vera	Dried leaf
<i>Argemone mexicana</i>	Fruit	Adhatoda vasica	Whole plant
<i>Curcuma amada</i>	Rhizome	<i>Cinnamomum iners</i>	Bark and leaf
<i>Curcuma longa</i>	Rhizome	<i>Curcuma aromatica</i>	Rhizome
<i>Curcuma aromatica</i>	Wild turmeric	<i>Garcinia indica</i>	Fruit
<i>Cassia lanceolata</i>	Leaves	<i>Gloriosa superba</i>	Tuber and seed
<i>Glycyrrhiza glabra</i>	Root	<i>Juniperus communis</i>	Fruit
<i>Withania somnifera</i>	Vegetable rennet	<i>Myrica nagi</i>	Bark
<i>Myrica nagi</i>	Leaf	<i>Strycnos nux-vomica</i>	Bark and seed
<i>Piper longum</i>	Fruit	<i>Phyllanthus amarus</i>	Fruit
<i>Rubia cordifolia</i>	Madder root	<i>Ricinus communis</i>	Seed
<i>Symplocos racemosa</i>	Bark	<i>Rauwolfia serpentina</i>	Root
<i>Swertia chirata</i>	Whole plant	<i>Ocimum sanctum</i>	Leaf and essential oil
<i>Terminalia chebula</i>	Bark and seed	<i>Tylophora purpuria</i>	Root
<i>Zingiber officinale</i>	Rhizome	<i>Vinca rosea</i>	Leaf, seed and stem
<i>Wedelia calendula</i>	Leaf and root		

Medicinal plants play an important role in the development of potent therapeutic agents. During 1950-1970 approximately 100 plants based new drugs were introduced in the USA drug market including deserpidine, reseinnamine, reserpine, vinblastine and vincristine which are derived from higher plants. From 1971 to 1990 new drugs such as ectoposide, E-guggulsterone, teniposide, nabilone, plaunotol, Z-guggulsterone, lectinan, artemisinin and ginkgolides appeared all over the world. 2% of drugs were introduced from 1991 to 1995 including paciltaxel, toptecan, gomishin, irinotecan etc. Plant based drugs provide outstanding contribution to modern therapeutics; for example: serpentine isolated from the root of Indian plant *Rauwolfia serpentina* in 1953, was a revolutionary event in the treatment of hypertension and lowering of blood pressure. Vinblastine isolated from the *Catharanthus rosesus* (Farnsworth and Blowster, 1967) is used for the treatment of Hodgkins, choriocarcinoma, non-hodgkins lymphomas, leukemia in children, testicular and neck cancer. Vincristine is recommended for acute lymphocytic leukemia in childhood advanced stages of hodgkins, lymophosarcoma, cervical and breast cancer. (Farnsworth and Bingel, 1977). Phophyllotoxin is a constituent of *Phodophyllum emodi* currently used against testicular, small cell lung cancer and lymphomas. Plant derived drugs are used to cure mental illness, skin diseases, tuberculosis, diabetes, jaundice, hypertension and cancer. Medicinal plants play an important role in the development of potent therapeutic agents. Plant derived drugs came into use

in the modern medicine through the uses of plant material as indigenous cure in folklore or traditional systems of medicine. More than 64 plants have been found to possess significant antibacterial properties; and more than 24 plants have been found to possess antidiabetic properties. *Daboia russellii* and *Naja kaouthia* used as antidote activity. Venom neutralization by lupeol acetate isolated from the root extract of Indian sarsaparilla *Hemidesmus indicus* (Chatterjee, et al., 2006). The present investigation explores the isolation and purification of another active compound from the methanolic root extract of *Hemidesmus indicus*, which was responsible for snake venom neutralization. Antagonism of both viper and cobra venom and antiserum action potentiation, antioxidant property of the active compound was studied in experimental animals. Recently, Chatterjee et al. (2004) reported that an active compound from the *Strychnus nux vomica* seed extract, inhibited viper venom induced lipid peroxidation in experimental animals. The mechanism of action of the plant derived micromolecules induced venom neutralization need further attention, for the development of plant-derived therapeutic antagonist against snakebite. However, the toxicity of plants has known for a long period of time, and the history of these toxic plants side by side with medicinal ones are very old and popular worldwide. These plants are major natural source of folk medication and also induce toxication. (Adailkan and Gauthaman, 2001; Heinrich, 2000).

Teniposide and etoposide isolated from *Podophyllum* species are used for testicular and lung

cancer. Taxol isolated from *Taxus brevifolius* is used for the treatment of metastatic ovarian cancer and lung cancer. The above drugs came into use through the screening study of medicinal plants because they showed less side effects, were cost effective and possessed better compatibility.

Market value of herbal medicines

The market for ayurvedic medicines is estimated to be expanding at 20% annually. Sales of medicinal plants have grown by nearly 25% in India in past ten years (1987-96), the highest rate of growth in the world (Masood, 1997 <<http://www.ejbiotechnology.info/content/vol7/issue3/full/5/index.html>>). But the per capita expenditure in India on medicines per annum is amongst the lowest in the world. In other developing countries too, plants are the main source of medicine. Two of the largest users of medicinal plants are China and India. Traditional Chinese Medicine uses over 5000 plant species; India uses about 7000. According to Export Import Bank, the international market for medicinal plant related trade having a growth rate of 7% per annum. China's share in world herbal market is US\$ 6 billion while India's share is only US\$1 billion. The annual export of medicinal plants from India is valued at Rs. 1200 million. All the major herbal-based pharmaceutical companies are showing a constant growth of about 15 per cent. Traditional medicine has served as a source of alternative medicine, new pharmaceuticals, and healthcare products. Medicinal plants are important for pharmacological research and drug development, not only when plant constituents are used directly as therapeutic agents, but also as starting materials for the synthesis of drugs or as models for pharmacologically active compounds (Mukherjee, 2003 <<http://www.ejbiotechnology.info/content/vol7/issue3/full/5/index.html>>). A significant number of modern pharmaceutical drugs are derived from medicinal plants. The derivatives of medicinal plants are non-narcotic with little or no side effects.

Future prospects of herbal medicine market

It is estimated that nearly three fourths of the herbal drugs used worldwide were discovered following leads from local medicine. According to WHO about 25% of modern medicines are descended from plants first used traditionally. Many others are synthetic analogues built on prototype compounds isolated from plants. Almost, 70% modern medicines in India are derived from natural products.

The basic uses of plants in medicine will continue in the future, as a source of therapeutic agents, and as raw material base for the extraction of semi-synthetic chemical compounds such as cosmetics, perfumes and food industries. Popularity of healthcare plant-derived

products has been traced to their increasing acceptance and use in the cosmetic industry as well as to increasing public costs in the daily maintenance of personal health and well being. In the dual role as a source of healthcare and income, medicinal plants make an important contribution to the larger development process. Though the efficacy of herbal requires development of quality consciousness in respect of the evaluation related evidences, supplying the demand for botanicals and herbals is a booming business.

Recently even developed countries, are using medicinal systems that involve the use of herbal drugs and remedies. Undoubtedly the demand for plant-derived products has increased worldwide. The demand is estimated to grow in the years to come fuelled by the growth of sales of herbal supplements and remedies. This means that scientists, doctors and pharmaceutical companies will be looking at countries like China, India, etc. for their requirements, as they have the most number of medicinal plant species and are the top exporters of medicinal plants.

Current Regulations for Standardization of Crude Drugs

In recent years there is a spurt in the interest regarding survival of Ayurvedic forms of medication. In the global perspective, there is a shift towards the use of medicine of herbal origin, as the dangers and the shortcoming of modern medicine have started getting more apparent, majority of Ayurvedic formulation are prepared from herbs.

It is the cardinal responsibility of the regulatory authorities to ensure that the consumers get the medication, which guarantee with purity, safety, potency and efficacy. The quality control of crude drugs and herbal formulations is of paramount importance in justifying their acceptability in modern system of medicine. But one of the major problems faced by the herbal drug industry is nonavailability of rigid quality control profile for herbal material and their formulations.

Patent proprietary Ayurvedic medicines are sold over the counter in pharmacies. These products appear to represent a major share of branded traditional medicine in India. Nevertheless systems like Ayurveda still need to gain an empirical support of modern medical sciences to make them credible and acceptable for all. An innovative research effort to define the advantage of traditional system of medicine with respect to their safety and efficacy could result in a better utilization of these complementary systems of medicine. Internationally several pharmacopoeias have provided monographs stating parameter and standard of many herbs and some product made out of these herbs. Several pharmacopoeias like :

- Pharmacopoeia Committee
- Chinese Herbal Pharmacopoeia
- United States Herbal Pharmacopoeia
- British Herbal Pharmacopoeia
- British Herbal Compendium
- Japanese Standards for Herbal Medicine
- The Ayurvedic Pharmacopoeia of India (API)

These Pharmacopoeias lay down monograph for herbs and herbal products to maintain their quality in their respective nations. Government of India too has brought out Ayurvedic Pharmacopoeia India, which recommends basic quality parameters for eighty common Ayurvedic herbal drugs.

Future investigation of tribal medicines

Tribal healers in most of the countries, where ethnomedical treatment is frequently used to treat cut wounds, skin infection, swelling, aging, mental illness, cancer, asthma, diabetes, jaundice, scabies, eczema, venereal diseases, snakebite and gastric ulcer, provide instructions to local people as how to prepare medicine from herbal (Puspangadan and Atal, 1984; Perumal Samy and Ignacimuthu, 1998).

They keep no records and the information is mainly passed on verbally from generation to generation (Dhar *et al.*, 1973; Sofowara, 1982). World Health Organization (WHO) has shown great interest in documenting the use of medicinal plants used by tribals from different parts of the world (Kaido *et al.*, 1987). Many developing countries have intensified their efforts in documenting the ethnomedical data on medicinal plants. Research to find out scientific evidence for claims by tribal healers on Indian herbs has been intensified. Once these local ethnomedical preparations are scientifically evaluated and disseminated properly, people will be better informed regarding efficacious drug treatment and improved health status (Manandhar, 1987).

Conclusion

Medicinal herbs as potential source of therapeutics aids has attained a significant role in health system all over the world for both humans and animals not only in the diseased condition but also as potential material for maintaining proper health. A major factor impeding the development of the medicinal plant based industries in developing countries has been the lack of information on the social and economic benefits that could be derived from the industrial utilization of medicinal plants. Except for the use of these plants for local health care needs, not much information has been available on their market potential and trading possibilities. As a result, the governments or entrepreneurs have not exploited the real potential of these plants.

Determining the biological (activity) properties of plants used in traditional medicine is helpful to the rural communities and informal settlements. Several authors are currently being undertaken to isolate the active compounds by bioassay-guided fractionation from the species that showed high biological activity during screening. Therefore, these scientific investigations may be utilized to develop drugs for these diseases. Further research is deserved to isolate the compounds responsible for the observed biological activity.

References

1. Adailkan, P.G. and Gauthaman, K. (2001): *The Aging Male* 4: 163-169.
2. Agarwal, A., (2005): *Pharma Times* 37(6): 9-11.
3. Chatterjee, I. Chakravarty, A.K. and Gomesa A. (2006): *Br. J. Ethnopharmacol* 106(1): 38-43.
4. Chatterjee, I., Chakravarty, A.K. and Gomes, A. (2004): *Indian J. Exp Biol* 42: 468-475.
5. Chopra, R.N., Nayar, S.L. and Chopra, I.C. (1956): In Glossary of Indian medicinal plants, *Council of Scientific and Industrial Research, New Delhi*.1;197.
6. Dhar, M.L., Dhar, M.M., Dhawan, B.N., Mehrotra, B.N. and Ray, C. (1973): *Indian J. Exp. Biol.* 7; 232-247.
7. Farnsworth, N.R. and Bingel, A.S. (1977): Problems and prospects of discovery new drugs from higher plants by pharmacological screening. *Springer Verlag, Berlin*.1-22.
8. Farnsworth, N.R., Blowster, R.N., Darmratski, D., Meer, W.A., and Cammarato, L.V. (1967): Studies on *Catharanthus* alkaloids IV Evaluation by means of TLC and ceric ammonium sulphate spray reagent, *Lloydia* 27: 302-314.
9. Heinrich, M., (2000): *Phytochemistry* 53; 619-620.
10. Kaido, T.L., Veale, D.J.H., Havlik, I., and Rama, D.B.K. (1997): *J. Ethnopharmacol.* 55; 185-191.
11. Kamboj, V.P. (2000): Herbal medicine. *Cur. Sc.* 78(1): 35-39.
12. Manandhar, N.P. (1987): *Int. J. Crude Drug Res.*, 25 (4); 236-240.
13. Masood, E. (1997): *Nature.* 385(6617); 570.
14. Mukherjee, P.K. (2002): Quality control herbal drugs: An approach to evaluation of botanicals, *Business Horizons*, New Delhi, 800.
15. Mukherjee, P.K. (2003): GMP for Indian Systems of Medicine. *Business Horizons*, New Delhi; 99-112.
16. Perumal, S.R., and Ignacimuthu, S. (1998): *J. Ethnopharmacol.* 62; 173-182.
17. Puspangadan, P., and Atal, C.K. (1984): *J. Ethnopharmacol.* 11;59-77.
18. Rabe, T. and Staden, J.V. (1997): *J. Ethnopharmacol.* 56: 81-87.