

Invited commentary

Status on herbal drugs and their future perspectives

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India is one of the 12 mega biodiversity centers, having 45,000 plant species; its diversity is unmatched due to the 15 different agroclimatic zones, 10 vegetative zones, and 15 biotic provinces. Traditional medicine is the synthesis of therapeutic experience of generations of practicing physicians of indigenous systems of medicine. Traditional preparation comprises medicinal plants, minerals and organic matters, etc. Herbal drug constitutes only those traditional medicines that primarily use medicinal plant preparations for therapy. About 500 plants with medicinal use are mentioned in ancient texts and around 800 plants have been used in indigenous systems of medicine. Indian subcontinent is a vast repository of medicinal plants that are used in traditional medical treatments (Chopra *et al.*, 1956), which also forms a rich source of knowledge. The various indigenous systems such as Siddha, Ayurveda, Unani and Allopathy use several plant species to treat different ailments (Rabe and Staden, 1997). In India, around 20,000 medicinal plant species have been recorded recently (Dev, 1997), but more than 500 traditional communities use about 800 plant species for curing different diseases (Kamboj, 2000).

In traditional medicines, a large number of polyherbal formulations are used in the treatment of various chronic disease conditions such as liver diseases, diabetes, acidity kidney problems, etc. Recently, it is increasingly recognized that combination therapy is better to treat complex diseases involving several drug targets with various phytoconstituents (Pertrovska, 2012; Kalisdha *et al.*, 2013).

Currently, 80% of the world population depends on plant-derived medicine for the first line of primary healthcare 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.

Medicinal plants play a vital role for the development of new drugs. During 1950-1970, approximately 100 plants based new drugs were introduced in the market including deserpidine, reseinnamine, reserpine, vinblastine and vincristine which are derived from higher plants. From 1971 to 1990, new drugs such as ectoposide, eguggulsterone, teniposide, nabilone, plaunotol, z-guggulsterone, lectinan, artemisinin and ginkgolides appeared all over the world. 2% of drugs were introduced from 1991 to 1995

including paclitaxel, 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 roseus* (Farnsworth *et al.*, 1967) is used for the treatment of Hodgkins, choriocarcinoma, non-hodgkins lymphomas, leukemia in children, testicular and neck cancer. Indian indigenous tree of *Nothapodytes nimmoniana* (*Mappia foetida*) are mostly used in Japan for the treatment of cervical cancer. 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, antimicrobial studies of plants (Perumal Samy and Ignacimuthu, 1998), plant for antidotes activity - *Daboia russellii* and *Naja kaouthia* venom neutralization by lupeol acetate isolated from the root extract of Indian sarsaparilla, *Hemidesmus indicus* R.Br (Chatterjee *et al.*, 2006). In 2001, researchers identified 122 compounds, used in modern medicine which were derived from traditional plant sources. In 21st century, 11% of the 252 drugs, considered as basic and essential by the WHO were exclusively of flowering plant origin and with considering all the annual global export value of pharmaceutical plants in 2012 was over US\$ 2.2 billion. The mechanism of action of the plant derived micro molecules induced venom neutralization need further attention for the development of plant-derived therapeutic antagonist against snake bite for the community in need. 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, they considered the major natural source of folk medication and toxication even after arising of recent chemical synthesis of the active constituents contained by these. Teniposide and etoposide isolated from *Podophyllum* species are used for testicular and lung cancer. The above drugs came into use through the screening study of medicinal plants because they showed fewer side effects, were cost effective and possessed better compatibility.

In 1991, WHO developed guidelines for the assessment of herbal medicine, and the 6th International Conference of Drug Regulatory Authorities, held at Ottawa in the same year ratified the same. The salient features of WHO guidelines are quality assessment of crude plant materials or extract plant preparation and finished product. Stability, safety assessment, i.e., documentation of safety based on experience and toxicological studies and assessment of efficacy.

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The estimation of total phytomedicine sale reported in country wise, European Union was about US\$ 6 billion in 1991 and \$ 4 billion in 1996, of which almost half were sold in Germany \$ 3 billion, in France \$ 1.6 billion, in Italy \$ 0.6 billion and in Japan \$ 1.5 billion. The present global market is said to be US 250 billion. In India, the sale of total herbal products is estimated at \$ 1 billion and the export of herbal crude extract is about \$ 80 million, of which, 50% is contributed by Ayurvedic classical preparations. Plant derived drugs are important in Germany and Russia. Particularly, herbal drugs are imported by several countries for their usage of traditional medicinal preparation from various parts of the country. Some of the important Indian medicinal plants exported to various countries: among them, vinca, garcena, gymnema powder, phyrethrum, senna leaves and pods, rosemary, ergot, opium, etc., are important.

In the traditional system of medicine, the drugs are primarily dispensed as aqueous or ethanol extract. Fresh plant juice or crude extract are a rarity rather than a rule. The medicinal plants should be authentic and free from harmful materials like pesticides, heavy metals, and microbial and radioactive contamination. The medicinal plant should be single solvent extraction once or repeatedly or aqueous extract or as described in the ancient texts. The extract should be then checked for biological activity in experimental animal models. The bioactive extract should be standardized on the basis of active compound. The bioactive extract should undergo limited safety studies.

Tribal healers in most of the countries, where ethnomedical treatment is frequently used to treat cut wounds, skin infection, swelling, ageing, mental illness, cancer, asthma, diabetes, jaundice, scabies, eczema, venereal diseases, snake bite and gastric ulcer, provide instructions to local people as how to prepare medicine from herbals. They keep no records and the information is mainly passed on verbally from generation to generation (Dhar *et al.*, 1968). World Health Organization (WHO) has shown great interest in documenting the use of medicinal plants, used by tribals from different parts of the world. 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.

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 compound(s) 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.

Nature always stands as a golden mark to exemplify the outstanding phenomena of symbiosis. In 21st century, people are becoming more aware of the potency and side effect of synthetic drugs, and, hence, there is an increasing interest towards the natural product remedies with a basic approach towards the nature. A number of scientific investigations have highlighted the importance and the contribution of many plants, especially in the treatment of above

mentioned chronic diseases belongs to families of Asteraceae, Liliaceae, Apocynaceae, Solanaceae, Caesalpinaceae, Rutaceae, Piperaceae, Sapotaceae used as medicinal plants. Almost, 80% modern medicines in world are derived from natural products. Therefore, medicinal plants play a central role not only as traditional medicines but also as trade commodities, meeting the demand of distant markets.

All the related medicinal plants and their versatile activities are very much interesting and challenging when scientifically documented in a particular place like journals and “Annals of Phytomedicine : An International Journal” is such kind of peer reviewed journal that serve to the readers as an authoritative resource on the profession and practice of herbal medicine. The content areas of the journal reflect the interests of natural herbalists and other health professionals interested in the vast areas of botanical medicines. This journal acts as a platform where multiple research on herbal field are documented by pioneer researchers over the globe by providing an information source for herbal practitioner and other health professional with an interest in phytotherapy field. Furthermore, it is expected to encourage innovative contributions from the researchers all over the globe. Let us join hand with the editors and advisory board members, and their associates in pushing it to new heights of academic excellence and making it a quality international journal.

References

- Chatterjee, I.; Chakravarty, A.K. and Gomesa, A. (2006). *Daboia russellii* and *Naja kaouthia* venom neutralization by lupeol acetate isolated from the root extract of Indian sarsaparilla, *Hemidesmus indicus* R.Br. J. of Ethnopharmacol., **106**:38-43.
- Chopra, R.N.; Nayar, S.L. and Chopra, I.C. (1956). In glossary of Indian medicinal plants, Vol. I. Council of Scientific and Industrial Research, New Delhi.
- Dev, S. (1997). Ethnotherapeutic and modern drug development: The potential of Ayurveda. Cur. Sci., **73**(11):909-928.
- Dhar, M.L.; Dhar, M.M.; Dhawan, B.N.; Mehrotra, B.N. and Ray, C. (1968). Screening of Indian plants for biological activity: Part I. Indian J. Exp. Biol., **7**:232-247.
- Farnsworth, N.R.; Blowster, R.N.; Darmratoski, 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.
- Kamboj, V.P. (2000). Herbal medicine. Cur. Sc., **78**(1):35-39.
- Kalisdha, A.; Balasubramani, R.; Surulinathi, M. and Amsaveni, N. (2013). Indian contribution to medicinal plants research: A scientometric study. Journal of Advances in Library and Information Science. **1**(2):65-70.
- Perumal, S.R. and Ignacimuthu, S. (1998). Screening of 34 Indian medicinal plants for antibacterial properties. J. Ethnopharmacol., **62**:173-182.
- Petrovskaja, B. B. (2012). Historical review of medicinal plants' usage, Pharmacogn. Rev., **6**(11):1-15.
- Rabe, T. and Staden, J.V. (1997). Antibacterial activity of South African plants used for medicinal purposes. J. Ethnopharmacol., **56**:81-87.

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**Biography**

Professor Udupa Nayanabhiraama was at Manipal University as Professor and Head of the Institution, Manipal College of Pharmaceutical Sciences for couple of tenures since his joining as Professor from 1987. Before joining in the Manipal College of Pharmaceutical Sciences, he worked as lecturer in the Department of Pharmaceutics, Banarus Hindu University and as R & D Scientist, Citadal Fine Pharmaceuticals Ltd., Madras.

He has published more than 510 papers in peer reviewed journals, presented 411 papers in different conferences throughout the world, contributed 12 books in pharmacy field and gave more than 125 lectures. He had received more than 57 research grants and having 9 patents. He has organized more than 100 workshops and seminars and received more than 10 fellowships from Govt. of India and USA. He guided 36 Ph.D. candidates and 80 M. Pharma students for the completion of their thesis.

With vast experience in field of research, he was honored as Research Director (Health Sciences) of Manipal University in June, 2013. He has received "**Schroff Memorial National Award**" from Dr. A.P.J. Abdul Kalam, honored by Indian Hospital Pharmacists Association (IPHA) in the year, 2012. He has received prestigious "**8th STARS Award**" of American Association of Government College of Pharmacy (Bengaluru) Alumni, New York, USA for "Excellence in Academic Research" for the year, 2011. He also awarded as Pharmacy Teacher of the year 2008-2009, Pharmaceutical Scientist of the year, 2008, Dr. P.C. Dandiya Endowment Trust Research Award and Acharya P C Ray Gold Medal Award.
