

Invited commentary

Evidence-based medicinal plant products for the health care of world population

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Even today, plants remain a primary source of health care for majority of the population in the world. More than 80% population in the rural areas of the world is dependent on plant based traditional medicines including traditional systems of medicine such as Ayurveda, Unani and traditional Chinese medicine. These medical practices originated from time immemorial and established imbibing ancient knowledge and wisdom. Although the traditional medical practices are time tested, there are limitations and drawbacks; there is a need to create new knowledge with scientific evidence from the ancient knowledge and integrate it with conventional medicine.

Many plants produce toxic secondary metabolites. They cause toxicities such as neurotoxicity, reproductive toxicity and liver toxicity. For example, hepatotoxic pyrrolizidine alkaloids are present in many traditional medicinal plants. In some cases, toxic compounds as well as medicinally important compounds co-exist in the same plant (Ifeoma and Oluwakanyinsola, 2013).

Interaction of herbal drugs with conventional drugs as well as other phytochemicals is an important area to be studied in detail. Herbal products, possibly, mimic, increase or decrease the effects of medications. For example, ephedra (medicinal preparation from *Ephedra sinica*) used with amphetamines increase the therapeutic effect of amphetamines.

As a plant's metabolism and secondary metabolite production changes with age, time of year (climatic conditions), nutritional status and ecological conditions including association with microbes, its chemical profile changes. Consequently, the plant's biological and therapeutic effects will change in an unpredictable, non-reproducible manner. Therefore, chemical standardization is essential. Tight quality control will ensure regulatory acceptance in global marketing of evidence-based traditional medicine products. Achieving excellent standard of botanical and chemical identification requires modern DNA-based plant analysis and phytochemical-based analytical chemistry (Cordell and Colvard, 2012).

It is important to use appropriate dose of herbal medicines as well as nutraceuticals like conventional drugs. For example, resveratrol, a nutraceutical present in grapes, peanuts, etc., have many beneficial biological effects depending on the dose used. Experiments on animals have shown that this compound has a protective effect at

relatively low doses against cardiovascular injury, gastric lesions, ischemic strokes, Alzheimer's disease and osteoporosis, but an adverse effect or no beneficial effect was observed at high doses in these medical conditions (Calabrese *et al.*, 2010). In the case of the extract of *Trichopus zeylanicus* (Arogya pacha), high concentrations showed very low beneficial effects on energy metabolism compared to relatively low effective doses (Evans *et al.*, 2001). Doses should be fixed based on animal experiments and follow up human clinical trials and made available to the consumers.

Synergistic or additive effects of relatively low doses of plant products with other plant medicines could enhance effectiveness, mirroring the philosophies of multiple-medicine regimens for many diseases including liver diseases, cancer and HIV/AIDS (Cordell and Colvard, 2012). Rationally combined evidence-based combination of bioactive herbs with multiple beneficial effects is also in good demand. For instance, Triphala extract (Ayurvedic formula) containing *Terminalia bellerica*, *Terminalia chebula* and *Phyllanthus emblica* (*Embilica officinalis*) has been standardized as a digestive aid and marketed by Sami Labs Ltd. NOW Sleep by NOW Foods is a combination of herbs that help the consumer sleep better. It comprises standardized extracts of valerian (*Valeriana officinalis*) and hops (*Humulus lupulus*) traditionally used to relax the nervous system.

To safeguard public health, multifaceted persistent scientific studies are required to provide evidence for efficacy and safety of medicinal plant products. At least major active principles have to be identified to facilitate chemical standardization and pharmacokinetic and pharmacodynamic studies. Chemical and/ or pharmacological standardization must be followed by pre-clinical pharmacological assessment and elucidation of mechanisms of action and, then, efficacy and safety assessment on humans. If successful, the phytomedicine can be integrated with conventional medicine with global acceptability.

At present, scientific validation as well as standardisation of medicinal plant preparations / herbal drugs is grossly inadequate. Less than 10 % of herbal products in the world market are truly standardized to know active principles (Agrawal *et al.*, 2013). Monographs are available only on a small number of important medicinal plants. There is a need for detailed studies on each plant and to prepare monographs on them.

It has been reported that 20 % of Ayurvedic medications purchased via the internet contained detectable levels of lead, mercury and arsenic (Agarwal *et al.*, 2013). Adulteration of herbal drugs with modern drugs has also been reported. Furthermore, irrational use of

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medicinal plant drugs is also rampant in certain rural parts of India (Samal, 2016). Yardstick should be made available to establish authenticity of the herb and to check adulterations as well as contamination with toxic materials including pesticides, heavy metals, microbes, aflatoxin and radioactive substances.

The education of health care professionals and patients/consumers is vital for the prevention of potentially serious risks from misuse of herbal medicines. Furthermore, individual health care provider should also show sufficient commitment towards understanding the use of herbal medicines.

The world's biggest consumer countries of herbal products and food supplements include the USA, Japan, Germany, France and the Republic of Korea whereas the major raw plant materials producers include China, India, Mexico, Bulgaria, Chile, Egypt and Morocco (Lange, 2006). In India, to a large extent, the plant materials are exported without much processing. An estimated 95% of these medicinal plants are gathered from the wild. The cost of raw plant materials are relatively very low compared to properly processed plant materials or value added plant health products. At present, medicinal plant resources are not used evenly as per demand across the world. Although demand for medicinal plants and medicinal food is increasing, only a relatively small number of plant species are used in large quantities. For example, more than 800 medicinal plants are used in India in significant quantities, but only about 50 medicinal plant materials are exported from India. During 2015, North America dominated the functional food and nutraceuticals market and accounted for 40% of the total market share.

One of the hindrances in the development of plant based medicines is non-availability of authentic plant materials as per requirement. Plant populations in the wild are increasingly depleting due to unsustainable commercial collection and habitat loss. In general, collection of plants from the wild is not sustainable; further variations do occur in quality. Medicinal plant cultivation requires expertise, time (sometime more than 10 years), appropriate land and financial resources. Cultivation is often done under contract. Certain medicinal plants have to be cultivated in its natural habitat by expert farmers or trained locals after making buy-back arrangements with the companies (pharmaceutical, phyto-pharmaceutical and herbal health products companies) and/or agents (distributors and exporters) concerned. Large scale cultivation of medicinal plants can be done in this way. Many of the medicinal plants are weed like plants; they can be grown easily in villages without much financial input. Medicinal plants can be grown under appropriate conditions even in pots/bags by each family. Medicinal plant producers, particularly very small scale growers, have to set up co-operative or collaborative ventures at the village, district and/or state levels. A co-operative system should be developed to collect such plant produce locally and supply to the companies and/or agents concerned. This will not only help to achieve higher prices, but also provide sustainable income to the families. Further, consistent supply of medicinal plants will be ensured.

Agrotechniques (suitable cultivation conditions) have to be developed keeping in view with the medicinal properties of plants. Agrotechniques have not been developed to most of the medicinal plants. Pharmacological activities and/or active principles should be monitored in the development of agrotechniques. Sami Labs is involved in field studies and large scale cultivation of certain medicinally important plants.

The global acceptance and use of herbal medicines and related products continue to assume exponential increase. To globalize traditional medicines, among other things, efficacy and safety should be demonstrated and consistency is to be provided. As with other medicines for human use, herbal medicines should be used in every country of the world with required standards of safety, quality, and efficacy (Ekor, 2013). Consumers should be assured that the herbal medicinal products they are using are safe and contain what they are supposed to contain. There should be science-based information on dosage, contraindications, and efficacy of herbal medicines. Improper preparation and use should be checked with the help of science and technology-backed regulatory measures. To achieve this, global harmonization of legislation is needed to guide the responsible production and marketing of herbal medicines. Standardization should be a uniform international process to avoid problems between countries importing and exporting herbal products. WHO is actively participating in the regulation of herbal medicines, but for this process to be successful, the active participation and co-operation of all countries is needed (Rayn *et al.*, 2014). Regulatory policies on herbal medicines need to be standardized and strengthened on a global scale to ensure that all herbal medicines approved for sale are safe and of suitable quality. Regulatory harmonization becomes essential to avoid the delays in commercialization across countries.

In view of human health, there is an urgent need to utilize the medicinal plants properly and expeditiously throughout the world. Authentic good quality medicinal plants and plant products including extracts are only scarcely available for the present day world population, particularly for the urban population. If sufficient scientific evidence of benefit is available for an herb, then the appropriate use of that herb should be promoted so that these benefits can be realized for the promotion of public health and the treatment of disease globally (Wachtel-Galor and Benzie, 2011). Incorporation of evidence-based traditional medicines in clinical practice will help to provide quality health care to all. It is essential to make available science-backed medicinal plant products (phytomedicines) to the world population. Sami Labs Ltd. and Sabinsa group of companies are contributing to a significant extent, towards this noble task. More than 100 standardised phyto-products are in the international markets from these 2 companies. Commercially successful and patented standardized phytoextracts (phytomedicines) in the international market from Sami/Sabinsa group of companies include Bioperine from *Piper nigrum* (nutrient absorption enhancer), C³ Reduct from *Curcuma longa*, (anti-oxidant and anti-inflammatory), ForsLean from *Coleus forskohlii* (weight management and sports medicine), GarCitrin from *Garcinia cambogia* (lowering weight /obesity management), Gugulipid from *Commiphora mukul* (cardiovascular health and wellness support), Policosanol from *Saccharum officinarum* (cardiovascular health and wellness), Polybos/Polysal from *Boswellia serrata* (anti-inflammatory) and SelenoForce containing selenium and alliin from *Allium sativum* (antioxidant, cancer preventive and antidiabetic).

With enhanced global collaboration and leadership, applying contemporary science and technology, numerous evidence-based medicines could be developed from traditional herbal medicines and these medicines could provide a reliable source of medication to bridge the gap in access to drugs for the majority of the world's population. Some of the promising areas for herbal drug research

include liver diseases, arthritis, metabolic syndrome and obesity, old age related problems, cancer, piles, constipation disorders and certain viral infections. Proper utilization of medicinal plants including nutraceuticals for human health care will result in multi-dimensional socio-economical progress of the world.

In the proper dissipations of emerging new scientific knowledge, scientific journals play key roles by publishing properly scrutinized and reviewed good quality research papers and review articles. It is heartening to note that, currently, important journals are indexed and the journal contents are rapidly made available online to the world. In today's competitive world, the success of a journal depends on, to a large extent, getting good quality research findings including scientific concepts in the form of well-presented manuscripts as well as availing the services of efficient, experienced and unbiased reviewers. The journals should serve as a source of encouragement and inspiration to the scientists, young researchers in particular. Phytomedicine is truly multidisciplinary involving botany, chemistry, pharmacology, pharmacy, modern medicine, biochemistry, molecular biology, biophysics, and statistics. Successfully running a multidisciplinary journal like **Annals of Phytomedicine** is really difficult and challenging. The excellent progress, **Annals of Phytomedicine** made within a short period of 5 years is remarkable. I am very happy to note that **Annals of Phytomedicine** is contributing towards, among other things, popularizing and globalizing evidence-based herbal medicines and health care products by publishing quality relevant research papers.

References

- Agarwal, P.; Alok, S.; Fatima, A. and Verma, A. (2013). Current scenario of herbal technology worldwide: An overview. *International Journal of Pharmaceutical Sciences and Research*, **4**:4105-4117.
- Calabrese, F. J.; Matton, M. P. and Calabrese, V. (2010). Resveratrol commonly displays hormesis: Occurrence and biomedical significance. *Human and Experimental Toxicology*, **29**:980-1015.
- Cordell, G. A. and Colvard, M. D. (2012). Natural products and traditional medicine: Turning on a paradigm. *Journal of Natural Products*, **75**:514-525.
- Ekor, M. (2013). The growing use of herbal medicines: Issues relating to adverse reactions and challenges in monitoring safety. *Frontiers in Pharmacology*, **4**:177-192.
- Evans, D. A.; Subramoniam, A.; Rajasekharan, S. and Pushpangadan, P. (2001). Effect of *Trichopus zeylanicus* extracts on the energy metabolism of mice at rest and during exercise. *Indian Journal of Pharmacology*, **34**:32-37.
- Ifeoma, O. and Oluwakanyinsola, S. (2013). Screening of herbal medicines for potential toxicities (<http://creativecommons.org/licenses/by/3.0>).
- Lange, D. (2006). International trade in medicinal and aromatic plants. In: Bogers, R.T.; Craker, L.E. and Lange, D. (eds), *Medicinal and Aromatic Plants*. Springer, Netherlands, pp:155-170.
- Rayn, C.A.; Fernando, R.C.; Laura, J.P.F.; Fernando, D.L.S. and Jose, A.M.E. (2014). Relevance of chemical standardization and innocuousness in the process of development of herbal medicines: A review. *Asian Journal of Plant Sciences*, **13**:1-7.
- Samal, J. (2016). Medicinal plants and related developments in India: A peep into 5-year plans of India. *Indian Journal of Health Sciences and Biomedicine Research*, **9**:14-19.
- Wachtel Galor, S. and Benzie, I.F.F. (2011). Herbal medicine: An introduction to its history, usage, regulation, current trends and research needs. In: Wachtel-Galor, S. and Benzie, I. F. F. (eds), *Herbal Medicine: Biomolecular and Clinical Aspects*. 2nd edition, CRC Press, Taylor and Francis Group, Boca Raton, FL, USA.



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Dr. Muhammed Majeed was born in Kerala, India. After graduating in Pharmacy from Kerala University, he immigrated to the US in 1975. While pursuing his MS and Ph.D. studies in Industrial Pharmacy at St. John's University, New York, he worked in research and development divisions of Pfizer Inc., Carter Wallace and as Head of Product Development at Paco Research, New Jersey, USA.

He founded **Sabinsa Corporation**, a Research Oriented Nutraceuticals and Cosmeceuticals Marketing Company in 1988. Sabinsa Corporation is based in New Jersey, USA. It has a sale, distribution and manufacturing set-up in Utah, USA. In 1991, Dr. Majeed set up **Sami Labs Limited**, a Research and Manufacturing Group at Bangalore, India. Sami Labs combines the research and manufacturing of nutraceuticals, fine chemicals, cosmeceuticals, drugs and probiotics. At present, Sami has five manufacturing factories (4 located in the state of Karnataka and 1 in Hyderabad, India) and Sale and Distribution Offices in Europe, Australia, Japan, Korea, South Africa, Dubai and China. Sami/Sabinsa group of companies have over 1200 people working for them.

Dr. Majeed holds a large portfolio of Intellectual Property, a total of 127 US and International patents. Three of Dr. Majeed's patents were adjudged as the "Best Patent" by The Research and Development Council of New Jersey, USA. Sami Labs has two approved drugs in the international market. One is a naturally derived drug for treatment of open Angle Glaucoma and a natural gum extract for Psoriasis amongst other new products.

The transition from an excellent researcher and academician to running a marketing company was a tremendous challenge. Dr. Majeed handled it very successfully. Dr. Majeed while combining elements of Ayurvedic traditions with his scientific training

introduced Ayurveda to America and Americans to Ayurveda single handedly. In last 28 years or so through writings, lecturing and conducting clinical trials extensively, he has established the scientific basis of Ayurveda creditably in the West. A whole new exports industry of standardized natural extracts has been developed in India due to his leadership. More than 100 science-backed medicinal plant products (phytomedicines) are made available to the world population

Sami Lab's research based developmental efforts have been recognized by several prestigious awards. For example, in 2002 Sami Labs received National R&D Award from Government of India, DSIR and a Basic Drug Award for Quality and Innovation from the Honorable President of India, in 1995. In 1996, he received the Entrepreneur of the Year award by the National Federation of Asian Americans.

For his outstanding contributions to the community, Dr. Majeed was honoured by the NECO Group (sanctioned by the US Congress) in 2004 by the award of Ellis Island Medal of Honour. This prestigious award is presented to Americans of diverse origins recognizing their leadership, commitment and extraordinary service to their own ethnic group and to the American Society.

In his personal habits, he continues to be hard working, inquisitive and wants to spread the cultivation of medicinal plants to save them from extinction and for sustainable utilization by giving buy-back arrangements to farmers to grow medicinal plants. Sami Labs under his guidance is the leader in contract farming for medicinal plants in India.

Today, Dr. Majeed gives back to the society in many ways, perhaps most significantly through the Dr. Majeed Foundation.