
Preface

The incidence of various diseases is on the rise world over. This may be due to early detection and accessibility to medical care, change in life style and exposure to a large number of environmental carcinogens. However, on the other hand the discovery of new drugs is slow because the new drug development is a complex and lengthy process and quite expensive one. It takes about 10–12 years and costs about 1 billion US dollar for one drug. In this scenario, there is a need to adopt an integrated approach where Ayurvedic wisdom and traditional or tribal knowledge can synergize the drug discovery from plant sources. Thus there is a need of change in paradigm to involve different disciplines like combinatorial chemistry, analytical chemistry, biological assay, microarray analysis and genetic engineering for new chemical entities. New chemical entity or novel bioactive molecule can be isolated from the right kind of plant through sequential or parallel extraction. This will save time and cost and will also enhance the success rate. Phytochemicals including the secondary metabolites are important source for biomedicines for various diseases, due to their safety and low toxicity. Similarly, phytochemicals can be good sources of effective and environmentally safe biopesticides for the control of insect pests, which cause about 40 % crop loss in field and store.

India is blessed with a 5000-year-old Ayurvedic system and one of the 12 mega biodiversity centres having over 45,000 plant species, including about 3000 plant species of medicinal importance and 23,000 fungi, 25,000 algae, 1600 lichens, 1800 bryophytes and 30 million microorganisms. This gives us ample opportunity for drug development and for the discovery of new drugs. Unfortunately, this has not been exploited gainfully and India has lagged behind. Herbal drug industry is one of the fastest growing industries in the world. Many chemotherapeutic drugs for cancer like paclitaxel and vinca alkaloids were developed from plant materials. There are many others like toxoids, flavonoids, saponins, anthracene derivatives, cardiac glycosides quinolone, indole alkaloids, aromatic and laxatives, which are very much in demand in the world market. Herbal medicines worth 3500 US dollar are produced annually, whereas 1200 single ingredient and 10,500 polyherbal formulations are registered in India. Export-Import Bank of India has estimated the trade in medicinal plants at Rs 5500 crore, which is likely to grow to Rs 20,000 crore by the year 2030.

Herbal medicines for various ailments are preferred in India and elsewhere because of their safety and low cost. There is a need to utilize India's herbal heritage in better ways. This requires quality science in herbal medicine

based on our traditional knowledge of medicinal plants. For this, we to have to systematically work on the identification of active constituents from the right kind of plant material and ensure correct amount of the active ingredients in the formulation through adopting proper quality control and good manufacturing practices (GMP).

We should comply with the WHO guidelines for quality assessment of plant material, plant preparation and finished products, and documentation on safety assessment through toxicological studies and ensure stability or shelf life of the formulation and efficacy assessment in animal models. We should focus on polyherbal formulations for multi-target therapeutics rather than one disease—one drug approach. Then the selected medicinal plants need to be cultivated in an organized way involving the farmers and using tissue culture technology. This will not only provide substantial business both locally and globally but also make the traditional medicines available to a large number of rural people who have no access to modern medicine. We sincerely hope that this book will be useful for the development and commercialization of high-quality herbal products.

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