

The Journal of Phytopharmacology

(Pharmacognosy and Phytomedicine Research)

Future needs and thrust areas of research in natural product studies

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Natural products have always helped in maintenance of life and good health. Even today natural products are becoming increasingly important as alternative medicine and as a source of pharmacotherapeutics for the treatment of many diseases; they are also excellent raw materials from which complex chemical structure with particular biological activity can be isolated.¹

During the past few years, as a result of the intense concern with all aspects of ecology, there has been a renewed interest in so called “natural” food and drugs. Scientific strategies for the study of natural products from plants have changed substantially in the past few years for number of reasons including advances in technology, new molecule of substantial interest, changing ethical principles for organism collection and heightened awareness of the chemical and biological potential of the natural resources.

The last couple of years have seen a resurgence of interest in the use of herbal products. Since more than 80% of the world’s population use plants as their primary source of medicinal agents, it is not surprising to find that in many countries of the world there is well-established system of traditional medicine.²

India is perhaps the largest producer of medicinal herbs and is rightly called the “Botanical Garden of the World”. There are very few medicinal herbs of commercial importance, which are not collected or cultivated in this country. Medicinal herbs have been in use for thousands of years in one form or another, under the indigenous

system of medicine. The main Indian traditional systems of medicine namely Ayurveda, Siddha and Unani are primarily plant based systems.

Since independence in 1947, India has made tremendous progress in agro technology, process technology, research and development, quality control and standardization of natural products.

An herb is a plant or plant part valued for its medicinal, aromatic or savory qualities while herbal medicine referred to as herbalism or botanical medicine, is the use of herbs for their therapeutic or medicinal value.^{1,3}

Our country is blessed with natural conditions, which enables the growth of practically every type of medicinal or aromatic plants. Modern pharmacopoeia still contains at least 25% of drugs derived from plants and many others, which are synthetic analogous built on prototype compounds isolated from plants. The demand on plant based therapeutics is increasing in both developing and developed countries due to the growing recognition that they are natural products, being non narcotic having no side effects, easily available at affordable prices and some time the only source of healthcare available to the poor.

The medicinal plant sector has traditionally occupied an important position in the social, cultural, spiritual and medicinal area of the rural and tribal sector of India. Now in a wider context there is a growing demand from plant based medicines, health products pharmaceuticals, food supplements, cosmetics etc. in the national and international market. The substantial scientific work of herbal medicine provides valuable information and insight into the sources isolation and standardization of natural products.

Almost every modern drug owes its origin to some medicinal plant of the numerous potent phytopharmaceuticals that have been used in medicine .One can site morphine (opium poppy), digitoxin(foxglove), diosgenin(mexicam yalm), atropine (night shades), colchicine (autumn crocus),quinine (cinchona tree), reserpine (Indian snake root), vincristine -periwinkle plant, podophyllin, castoroil (castor oil plant), anthraquinones (cascara), artemensimin (artemesia), taxol (himalayan yew)and the numerous.⁴

Future needs:

Natural health products (NHP) are one of the major components of health care throughout the globe. For the development of (NHP) natural product studies (NPS) is the major field and one of the most important thrust areas in the modern era of drug development where the pharmaceutical scientist has a great role to play. Various facets of NPS have developed globally to highlight the evaluation and development of botanicals to assess their quality, safety, efficacy and regulatory perspectives.

Identification and quality evaluation of crude drugs is a fundamental requirement of industry and other organizations dealing with NHP. The fact must be taken into account that the plant material to be examined has a complex and inconsistent composition based on its contents of secondary metabolites. Therefore the analytical limits are not as precise as for the single chemical entity. Adequate standards using biological, chemical, instrumental and physicochemical methods required to be developed which has a major impact on pharmaceutical research. In this regard development of chemo profiles of individual plant is utmost important, which will not only help in development of standardization

protocols for NHP but also their biomarker profiling.

Safety and efficacy of herbal medicinal products is also a cause of concern. Post marketing surveillance and pharmacovigilance studies could help to monitor these aspects of NHP. Pharmacovigilance accounts the adverse drug reactions, drug – drug interactions, food-drug interactions and other desired and undesired effects of the medicinal products, which helps to establish safety and efficacy profile of the product. Pharmacovigilance and quality control through marker analysis will help to retain the traditional knowledge on one hand and rationalize use of NHP on other. So the thrust areas in the field of NPS includes:⁵

- ❖ Screening of natural products
- ❖ Evaluation of natural products
- ❖ Formulation of natural products for drug development
- ❖ Quality control and standardization of natural products formulation
- ❖ High throughput screening for the lead finding in natural products
- ❖ Phytochemical and phytopharmacological studies for lead finding in natural product

- ❖ Herbal therapeutics – pharmacokinetics
- ❖ Safety evaluation of natural products.

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