

Recent trends in natural product research and Bangladesh perspective

Mohammad A. Rashid
University of Dhaka, Bangladesh

Background: Natural products, especially those derived from higher plants, have attracted scientists from ancient time because of their potential therapeutic values. Drug development from natural sources showed that natural products or natural product-derived drugs comprised about 28% of all new chemical entities launched to the market. These are originated from terrestrial plants, microbes, marine organisms, etc. However, until recently an insignificant part of the plants has been scientifically evaluated for their medicinal properties. Bangladesh is a rich repository of medicinal plants, many of which are widely used in the Ayurvedic, Unani, herbal and other traditional systems of medicines. The study programs were initiated to investigate some of the traditionally used medicinal plants of Bangladesh, including *Corypha taliera*, the only living wild species of tali palm for the discovery of novel drug candidates as well as to isolate and identify bioactive compounds from several microbial strains and marine samples.

Methods: The samples were collected, properly authenticated and then extracted with solvents of various polarities. The concentrated extracts were subjected to repeated separation and purification processes, including HPLC. The structures of the purified molecules were elucidated by extensive spectroscopic studies and chemical derivatization, when required. The extracts were also subjected to appropriate assay techniques to establish the bioactivities.

Results: We have investigated over 50 medicinal plants and several microbial strains that have resulted in the isolation and characterization of 150 compounds, including 50 new molecules. Terpenoids, alkaloids, flavonoids and glycosides were the major classes of constituents. The crude extracts and several purified molecules demonstrated statistically significant inhibition of growth of microorganisms as well as cytotoxicity, antioxidant and antidiabetic activities. On the other hand, usnic acid, a lead compound obtained from the lichen, *Parmelia kamtschandalis*, showed potent antimicrobial activity, whereas dehydroaltenusin and ovatodiolide extracted from a *Streptomyces* sp. and *Anisomeles indica*, respectively exhibited significant HIV-inhibitory effects.

Conclusion: The series of studies which we conducted in our laboratory have resulted in the isolation and characterization of numerous chemically unique and biologically interesting secondary metabolites from medicinal plants, microbes and marine organisms. Some of these results are in conformity with the traditional and folk uses of the investigated plants.

Phytosomes: A novel safety and efficacy drug delivery system for herbal support

Adesh A. Bawane and Jugal Sutradhar
Harish Chandra PG College, Institute of Pharmacy, India

Over the past century, phytochemical and phytopharmacological sciences established the compositions, biological activities and health promoting benefits of numerous plant products. Most of the biologically active constituents of plants are polar or water soluble molecules. However, water soluble phytoconstituents (like flavonoids, tannins, terpenoids, etc.) are limited in their effectiveness because they are poorly absorbed and poor bioavailability. The use of phytosomes is a novel formulation technology which helps to overcome these problems. The term “phyto” means plant while “some” means cell-like. Phytosomes exhibit better pharmacokinetic and pharmacodynamic profile than conventional herbal extracts. They are produced by a patented process whereby the standardized plant extract or its constituents are bound to phospholipids, mainly phosphatidylcholine, producing a lipid compatible molecular complex. The phytosome process has been applied successfully too many popular herbal extracts including *Ginkgo biloba*, grape seed, hawthorn, milk thistle (*Silybum marianum*), green tea (*Thea sinensis*) and ginseng (*Panax ginseng*). The flavonoids and terpenoids components of these herbal extracts are able to directly bind to phosphatidylcholine. These drug-phospholipid complexes can be formulated in the form of solution, suspension, emulsion, syrup, lotion, gel, cream, aqueous microdispersion, capsule, powder, granules and chewable tablet. The system is so designed to deliver more of the bioactive compounds to human body for effective therapy, better disease management and to give new dimension to herbal system of medicine. Phytosome also forms a bridge between the conventional delivery system and novel delivery system. Thus, it can be employed as a vital tool in the novel drug delivery system.

Biography

Adesh A. Bawane has completed his M.Pharm at the age of 28 years from RGUHS, Karnataka. He is associate Professor of the HCPG College, Institute of Pharmacy, Varanasi. He has published 3 international and 1 national papers in reputed journals.