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Metabolomics and ethno-pharmacology: A multidisciplinary approach in novel drug discovery from natural sources

Phytochemical screening techniques are developing fast and we now have tools available which allow us to analyze complex mixtures in ultra modern ways. The modern research era allows a systematic investigation of such complex mixtures and specifically to link phytochemical analysis with other strategies (such as *in vitro* or *in vivo* screening for biological activity or toxicity, morphological plant diversity and ecological parameters). Specifically, as it relates to the study of medicinal and food plants, the main challenge is to understand the complex effects of such extracts. Since most of these research activities are linked to plants used in traditional and local cultures, this requires an ethno-pharmacological approach coupled with modern metabolomic investigations. The potential of such multidisciplinary approach and its potential benefits for phytochemically oriented research will be discussed. The traditional medicines offer a rich and largely unexplored source of therapeutic leads for the pharmaceutical industry. Academic research and the pharmaceutical sciences may profit in many ways by including ethno-pharmacological and metabolomic investigations. One highly illuminating example is the acetylcholine-esterase inhibitor galanthamine. The early research into the botanical species was derived from *Galanthus* species. It was based on local, but poorly documented knowledge, which was then turned into a medication to treat poliomyelitis and ultimately resulted in a novel treatment of Alzheimer's disease. Although Herbal Medicinal Products (HMPs) have been perceived by the public as relatively low risk, there has been more recognition of the potential risks associated with this type of product as the use of HMPs increases. Potential harm can occur via inherent toxicity of herbs, as well as from contamination, adulteration, plant misidentification and interactions with other herbal products or pharmaceutical drugs. Regulatory safety assessment for HMPs relies on both the assessment of cases of adverse reactions and the review of published toxicity information. However, the conduct of such an integrated investigation has many challenges in terms of the quantity and quality of information. Adverse reactions are under-reported, product quality may be less than ideal, herbs have a complex composition and there is lack of information on the toxicity of medicinal herbs or their constituents. Nevertheless, opportunities exist to capitalize on newer information to increase the current body of scientific evidence. The integration of ethno-pharmacology and metabolomics can reduce the uncertainty in decision making with respect to herbal medicinal products.

Biography

Umesh K Patil has completed his PhD from Dr H S Gour University, Sagar and Postdoctoral studies from Institute of Biology, Leiden University. Presently, he is serving as General Secretary to Indian Society of Pharmacognosy. His area of specialization is Herbal Drug Technology and Natural Products. He has more than 15 years of experience in teaching and research. He is the recipient of 7 prestigious awards given in the field of HMPs and remained BOYSCAST Fellow of DST. He is a Member of many professional bodies including International Pharmaceutical Federation (FIP), International Society of Ethno-pharmacology (ISE), International Society for Medicinal Plant Research (GA), Germany, International Pharmaceutical Students Federation, International Society of Natural Product Development, APTI, IPA, IPGA, ISTE and IAHP. He has published more than 100 papers in reputed journals and has been serving as an Editorial Board Member of many reputed journals.

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