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## Pharmacognosy loosing its charm among students in India

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### ABSTRACT

Pharmacognosy is one of the most important sciences, which introduces many new molecules in the medical world after the involvement of scientist from various domains. The subject matter of this branch is ever increasing and one has to be on her toes to do excellent in this rapidly flourishing branch. It has been observed that students in India are not opting for this branch when they make their mind to do post graduation in pharmacy. Presently perhaps the least takers are there for Pharmacognosy specialization. An attempt has been made to ponder on this situation and some feasible steps have been suggested to revive interest of students in this branch. If students are enrolled in this subject and they do quality and relevant research then it will be a significant contribution towards society.

**Keywords:** M. Pharm., Pharmacognosy, Pharmacy, URI, Medicinal chemistry.

### 1. INTRODUCTION

Pharmacognosy is a branch of pharmaceutical sciences and deals with medicinal potential of natural sources. The American Society of Pharmacognosy defines pharmacognosy as "the study of the physical, chemical, biochemical and biological properties of drugs, drug substances or potential drugs or drug substances of natural origin as well as the search for new drugs from natural sources"([www.pharmacognosy.com/about.htm](http://www.pharmacognosy.com/about.htm)). This branch is credited for supplying highest number of lead molecules to address various human diseases. Several classical examples of blockbuster natural molecules like taxol, vincristine, quinine, cocaine, morphine etc. are testimony of this fact. Scientists have yet to replicate these jumbo molecules in artificial set ups. It is impossible to even imagine drug discovery and development without natural sources (terrestrial or aquatic).

In India after graduation in pharmaceutical sciences (B. Pharm.) one can do post graduate program (M. Pharm.) in pharmacognosy. Few universities also offer post graduate course in Herbal Drug Technology. Presently students coming out of their under graduate institutes have least penchant for pharmacognosy. Still most of the colleges in author's province are yet to open their account in present academic year, but the seats of other branches like pharmaceuticals, pharmaceutical chemistry and pharmacology are the preferred ones among student community. One of the most cardinal reasons for this apathy towards this science is least job options in pharmaceutical industries, for most of them are engaged in allopathic medicines, and those who are churning out natural products, are also least interested in research based operations. Further, after finishing this course most of the students find it difficult to work in other department of industries like formulation and development/novel drug delivery system or sophisticated instrument centre or synthetic chemistry laboratory. Problem is that students become so centered that they themselves find it difficult to excel in the area where specific talent pool is available so industries do not prefer them most of the time.

Most of the universities still forcing students to follow decades-old syllabus (it can be seen from the websites of respective universities). These syllabi are rich in instrumentation portion, making students sound in theoretical aspects, but lead students to pass out from their schools without being exposed to such instruments as NMR, Mass, HPLC and other facilities which are indispensable in drug development and discovery from synthetic route or natural route.

The pharmacognosy syllabi are comprised of rudimentary things, plant tissue culture and allied chapters, detailed study of morphological and microscopical features of crude and powdered drugs, isolation and estimation of secondary metabolites and varied chromatographic techniques. Other important topics might be added.

Pharmacognosy students are generally poor in handling instruments owing to their course content or their research topics. On the other hand their pharmaceutical chemistry and pharmaceuticals counterparts get experience of handling various instruments like FTIR, UV-VIS spectrophotometer, dissolution apparatus besides other instruments. This is so because pharmacognosy scholars in their academic life might not have laid their hands on such common apparatus. In India, in most of the cases, pharmacognosy students start their research from Soxhlet apparatus and finish in pharmacology laboratory (in many universities in India research topics still oscillate between pharmacological and phytochemical screening of medicinal plants with least emphasis on phytochemistry). This fact can be gauged and corroborated by going through the publications in internationally acclaimed publishing houses. Titles of research articles published in few country journals and titles in impact factors journals will debunk the present state of affairs in India. Very few scholars engage themselves in isolation of prospective molecule and then testing that molecule for the activity, its parent extract found active for. In rarest of rare case attention is paid towards chemical modification and structure activity relationship. Though these students have potential to do breakthrough research but probably lack of sophisticated instruments or other facilities or scarcity of jobs are deterring them. Unless a pharmacognosist is sound in chemistry of natural products, isolation schemes (not very simple ones as isolation of piperine, caffeine, hesperidine, starch or pectin; these are enumerated in syllabi either at UG or PG level), biochemical pathways and structure elucidation; how does he stand a chance to get a job in an environment where things revolve around these specialties?

It is high time to amend the name of this branch or to append some right words with it and subsequently teach this branch with a heavy mix of chemistry (like most of the US schools offering courses in pharmacognosy). Pharmacognosy was one of the three mainstays (i.e., pharmacology, medicinal chemistry, and pharmacognosy) of most pharmacy schools in US for many years. Gradually, pharmacognosy merged with medicinal chemistry, the science of synthetic drugs, until most colleges of pharmacy had eliminated pharmacognosy from their curriculum (Miller L. G et al). An extensive report had been published by Elaine DM on students' interest and related courses offered by US universities in last decade (Elaine D. M et al).

Many colleges and schools of pharmacy in US terminated their pharmacognosy programs in the latter part of the 20th century

only to find that the explosive use of herbal medicine and dietary supplements after implementation of the 1994 DSHEA left pharmacy students with little background and understanding of natural product chemistry (Kenneth S et al).

In most of the US schools this subject is being taught now under the subject medicinal chemistry and pharmacognosy. The Department of Medicinal Chemistry and Pharmacognosy, university of Illinois at Chicago Health Science Center is one of the best examples. As the website of the university reads "The Medicinal Chemistry program includes research in traditional synthetic medicinal chemistry but also incorporates cancer biology and neuroscience research. Pharmacognosy is the study of the chemistry, biochemistry, biology, taxonomy, and ethnobiology of natural products from plant, marine and other life origins. The overarching aim of research programs in the two complementary areas is translational drug discovery. The scopes of both fields are sufficiently broad to give students with many different science backgrounds a rewarding and challenging program of study. Areas of active interest include natural products chemistry, organic synthesis of medicinal agents, computational chemistry, structural biology, cell and molecular biology, drug metabolism, bioanalytical and molecular toxicology, and animal models" ([www.pharmacy.ohio-state.edu](http://www.pharmacy.ohio-state.edu)). Similarly The University of Rhode Island (URI) is another reputed university offering similar course. The URI has numerous clinical and medicinal chemistry researchers who work with natural products. In 2008 the College of Pharmacy reinvested for a promising future in chemical aspects of pharmacognosy work at URI with the hire of energetic new faculty who seek to advance natural products research in exciting directions ([www.uri.edu/pharmacy](http://www.uri.edu/pharmacy)). Back home, in most of the institutes, research are carried out independently without involving other department.

## 2. CONCLUSION

It is high time when department personnel should exchange their expertise which will ultimately lead to churning out all-round pharmacognosists who will be able to show their strut in almost all the phases involved in drug discovery from natural sources and also in area like instrument handling. Integral inter- and intra-institutional collaborations must be ensured as top most priority. Subjects like ethnobotany, nutraceuticals research, natural product synthesis, metabolic engineering and marine and microbial organism research should be extensively covered along with equal and rather more emphasis on practical exposure. It is now clear that strong steps must be taken to increase and revive interest in this crucial branch of pharmaceutical sciences. By using such a holistic approach, the pharmacognosy lessons probably would be more exciting and useful for students. Further it should be feasible, looking at today's unimaginable pace of life and uncertainties of job markets and wavering economy, to teach entrepreneurial skills to enrolled students.

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