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Ayurvedic Pharmaceutical Sciences-Challenges Ahead

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Ayurvedic Pharmaceutical Sciences (APS) is an upcoming discipline. Ayurvedic pharmacy (AP) has always been looked upon as traditional subject having limited value in modern era of pharmaceutical sciences. Ayurveda, the Traditional Indian Medicine (TIM), has recently, become popular among patients largely due to its benign nature. Other factors, which have contributed to globalization of Ayurveda, include reorganization by World Health Organization and onset of research and development for discovering efficacious and cost-effective drugs.

Dravyaguna Vignana (Medicinal Plant Pharmacology) and *Bhashejya Kalpana Vignana* (Ayurvedic Pharmaceutics) are two major subjects of Ayurvedic curriculum. A typical graduate Ayurvedic course (BAMS) is of 5½ year duration, including five-years of intensive study and six-month internship. BAMS is followed by three-year of masters study (MD) and two-year of doctorate (Ph.D). This is conventional mode of education in Ayurvedic system of medicine and provides persons trained in clinical practice. Majority of the graduates settle in peripheral areas of cities or rural belt for clinical practice.

With revised interest in Ayurveda, there is strict need for producing trained manpower for Ayurvedic drug industry. Initially, there was requirement of trained Ayurvedic Pharmacists (upvaid) in the Ayurvedic drug manufacturing units. These people are trained at diploma level in Ayurveda. Recently, AYUSH, the statutory body dealing with Ayurvedic education and pharmaceuticals, has made appointment of Ayurvedic graduate and person trained in chemistry compulsory for Ayurvedic drug manufacturing units.

Although Ayurvedic Pharmacy is not a new issue, but keeping in mind the recent developments, we need to produce quality manpower for producing efficacious formulations. The institutes imparting Ayurvedic studies need to give a scientific look to the all time important subject of Ayurvedic Pharmacy. Several institutes in India are providing studies in Ayurvedic Pharmaceutical Sciences at diploma, bachelor and even master's level.

Ayurvedic pharmaceutics has fundamental a principle as far as designing of formulations is concerned. Pharmacopoeial preparations like *swarasa* (expressed juice), *kalka* (mass), *him* (cold infusion) and *phanta* (hot infusion), *kwatha* (decoction) and *churana* (powder) are backbone of Ayurvedic formulations. The basic five pharmacopoeial preparations form basis for other pharmacopoeial preparations; *asva* and *artishta* (medicated wines), *panak* (syrup), *taila* (medicated oils) and *avleha* (confection).

Expressed juice, mass, infusion and decoction are obsolete in modern pharmaceutical sciences. These have been largely replaced by extracts. Expressed juice, mass, infusion and decoction usually become useless after 48 hours. Even powders are in not great demand, largely due to short shelf-life. The basic five pharmacopoeial preparations, formulated according to Ayurvedic principles are mostly efficacious. However, to keep pace with demand; the manufactures usually adopt short processes for manufacturing, which is largely responsible for altered action of finished product or loss of efficacy.

Recently, AYUSH has made GMP certification necessary for Ayurvedic drug manufacturing units. Majority of the Ayurvedic pharmacies are not equipped with latest manufacturing machines and lack trained manpower. Another

factor which has hindered the growth of Ayurvedic pharmacy was lack of standard pharmacopeia until series introduced by AYUSH. The official documents like Ayurvedic Pharmacopeia (AP) and Ayurvedic Formulary of India (AFI) are not part of five and half year curriculum of graduate Ayurvedic studies. Both the official documents should be made part of graduate Ayurvedic studies in order to make students familiar with basic concepts of Ayurvedic pharmacy.

Ayurvedic clinical practice (ACP) and Ayurvedic drug manufacturing (ADM) are two distinct disciplines. Ayurvedic clinical practice has little scope in urban or even rural belt as patients want to eradicate disease at the earliest. Even if we look at the modern science, pre-clinical pharmacology is the prerequisite for rational drug development. Ayurvedic drugs have always been disqualified by modern medicine largely due to lack of clinical efficacy. Further lack of standard education in Ayurvedic institutions, apathy of students for learning Ayurveda and antidotal approach of the modern pharmaceutical drug industry are responsible for downfall of Ayurvedic sciences in recent times. Further, improper handling of funding for R&D has put question mark on future of Ayurvedic drug industry.

First step in harvesting quality manpower for Ayurvedic drug industry is to improve quality of education in Ayurveda. Visit to Ayurvedic industry should be made compulsory for students pursuing graduate Ayurvedic course. Colleges having in-house pharmacy should be well equipped in order to make students conversant about scope of Ayurvedic drug manufacturing. Libraries should be equipped with quality publications including indexed journals, as they cover majority of the quality publications related to medicinal plants or herbal drugs.

Medicinal plants have given several potent drugs to the modern pharmaceutical industry. Modern medicine should be thankful to Ethno botany and tribal medicine for providing drugs like taxol and vincristine. The plants consisting of these active constituents have been used in one or other form for treating cancer. Modern pharmaceutical sciences have antidotal approach toward Ayurvedic pharmacy but other side of the story is that the ancient knowledge has been used as 'lead' for discovering therapeutically useful drugs (example of reserpine, the first antihypertensive drug, may be cited here). This is supplemented by the fact that 80 % of the Novel Chemical Entities (NCE) has been derived from natural sources.

Imparting a graduate or postgraduate course in Ayurvedic pharmacy is not that difficult, but all important question is harvesting trained manpower. Ayurvedic Pharmaceutical Science is basically interdisciplinary subject and we need to enhance quality of education in Ayurvedic institutes. Establishment of Medicinal Plant Board (NMPB) and Ayurvedic Universities in some parts of India are welcome steps. For a well-trained Ayurvedic pharmacist, elementary knowledge of traditional medicine, ethnobotany, pharmacy, phytochemistry, biochemistry, microbiology and pharmacology is essential.

Publication of standard text books and up gradation of already available is strictly required for upliftment of standards in Ayurvedic pharmaceutical sciences. Today we do not have single publication available addressing interdisciplinary nature of Ayurvedic Pharmaceutical Sciences. Publication of standard monographs on medicinal plants like that of *Hypericum perforatum*, *Ginkgo biloba* and *Silybum marianum* can play a pivotal role in boosting knowledge of students perusing graduate or postgraduate Ayurvedic Pharmaceutical Science. Further, introduction of an indexed publication related to Ayurvedic Pharmaceutical Science is must for a trained professional for keeping pace with modern trends in Ayurvedic drug industry.