

## The evolution of pharmacognosy in Iran, challenges, and developments

Dear Sir,

Pharmacognosy is delineated as an area of pharmacy involved with the medicinal plants, natural pharmaceutical products, extraction and purification of natural drugs, and rational application of traditional medicines.<sup>[1]</sup> Pharmacognosy, as a modern science, began in 20<sup>th</sup> century in Iran through teaching modern science and research classes for undergraduate pharmacy students and nowadays, is one of the main departments of pharmacy in 13 pharmacy schools, including Tehran, Shahid Beheshti, Shiraz, Mashhad, Tabriz, Isfahan, Ahwaz, Kerman, Sari, Kermanshah, Zanjan, Hamedan, and Islamic Azad all around the country. The first group of residents to be trained as pharmacognosist entered a postgraduate program in decade 1990-1999. The residency program in pharmacognosy was founded in Tehran University of Medical Sciences, Faculty of Pharmacy.<sup>[2]</sup> Research programs in pharmacognosy include studies in some areas of phytochemistry (including isolation and structural elucidation of natural compounds from diverse phytochemicals), biological, and pharmacological investigations on medicinal plants and extracts, plant cell cultures, and finally, standardization of traditional herbal medicines. The Iranian Society of Pharmacognosy was established in 1991. This organization mission is to promote the development of pharmacognostical research and education through presentation of research achievements and publication of meritorious research, and to modify the professional responsibilities of a pharmacognosist in related pharmaceutical companies.<sup>[3]</sup>

Beside the above-mentioned progresses, employment is still a challenge for a recently graduate pharmacognosist. It seems that many of the graduate pharmacognosist would like to spend post-doctoral fellowship periods in well-known universities to improve their skills and experiences but after that, they have no choice for employing except at academic positions in faculties or research centers. Although the number of pharmacy schools and medicinal plants research centers has been growing, phytopharmaceutical companies have not shown interest in the absorption of pharmacognosist in their

expertise. Solving this problem needs more activities of the Society of Pharmacognosy to present the abilities of the graduates especially in quantification and qualification of herbal drugs. The related societies would bring together industrial pharmacognosist and other allied professionals to discuss about the latest developments and trends in herbal drugs researches. Conferences might provide an effective forum for standardization of herbal drugs and their formulations, which is a deep challenge in this area.

The increase in the number of students pursuing higher studies in pharmacognosy is an Iranian trend, despite the old-fashioned educational methods and high number of students in each class. This may attribute to the interest of green pharmacy and sustainable use of natural products. It seems that current research and educational strategies need prompt renewing regarding incredible identification of natural products as a source of chemical diversity for new drugs.<sup>[4]</sup> Other strategies on the basis of ethnobotany, ethnopharmacology, and ethnomedicine are commonly used in prospecting of research on novel biological activity and chemical structures, found in recent Ph.D. thesis. Another reason of consideration to pharmacognosy research may find in attractive geographical condition of Iran, a land of 1.64 million km<sup>2</sup>, which lies in the northern part of the temperate zone. Arid and semi-arid regions, Mediterranean climate, humid and semi-humid regions, support about 8,200 conservative estimated species of plants, almost 1,900 of which are endemic. There are 12.4 million hectares of woodland, and some 8,900 hectares of *Avicennia* mangroves along the Persian Gulf coast.<sup>[1,2]</sup>

Advanced pharmacognosy represents a highly interdisciplinary science, of which molecular pharmacognosy has developed at the borderline between pharmacognosy and molecular biology. Molecular pharmacognosy involves in some important problems, such as distinguishing herbal and animal drug populations by molecular marker assay, conserving the wild plant resources using technology of molecular biology, and obtaining higher quality resources for active natural products through genetic engineering.<sup>[5]</sup> By modernizing and renewing the thesis and research topics, graduate pharmacognosists will have strategic positions to connect biological and chemical professionals. The outstanding level of research and advances, achieved in this area very recently, would appear a sign of satisfaction to the future of pharmacognosy in Iran undoubtedly.

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