



Shiraz University of Medical sciences

“Office of Vice-Chancellor for Global Strategies and International Affairs”

Program Information	
Major (Name of Program)	Quality control of herbal medicine and natural products (instrumental based)
Program Type¹ <small>(For Further information regarding Program types, please refer to the Glossary on page 4)</small>	Degree Based <input type="checkbox"/> Non Degree Based <input checked="" type="checkbox"/> <i>(Please specify in one of the next two rows)</i>
Degree Based Level of study² <small>(For Further information regarding Degree based levels of study please refer to the Glossary on page 4)</small>	Undergraduate <input type="checkbox"/> Master's <input type="checkbox"/> Ph.D.(By Coursework and research <input type="checkbox"/> , By research <input type="checkbox"/>) Specialty <input type="checkbox"/> Subspecialty <input type="checkbox"/>
Non-Degree Based Level of study² <small>(For Further information regarding non degree based levels of study, please refer to the Glossary on page 4)</small>	Fellowship <input type="checkbox"/> Post-Doctorate <input type="checkbox"/> Short-Term Training Program <input checked="" type="checkbox"/> (Duration 6 Months) Medical Elective (Clinical Rotation/Internships) <input type="checkbox"/> Summer Program <input type="checkbox"/> Other <input type="checkbox"/> (please specify)
School/ Research Center	School of Pharmacy and Medicinal Plants Processing Research Centre
Department	Pharmacognosy
Brief Description of the Major/study Program (300 to 1000 characters)	Each student will have a practical project on quality control of herbal medicine/ natural product. During this Short-Term Training Program he/she will attend the necessary classes on theoretical bases of the experimental procedure as well as the instrumental techniques. Meanwhile the students will learn about determining Pharmacopeial values for herbal medicine as well as working with GC/MS; HPTLC; HPLC; IR and atomic absorption. The student is required to finish the project and give a report as a manuscript with final data. This project does not include troubleshooting or repair of the instruments.
Related Website/Webpage (If Any)	
Related Keywords (Minimum 3 Keywords)	quality control; herbal medicine; natural products; instrumental; workshop; project based



<p>Capacity (Number of International Students for Each Educational Year)</p>	<p>4</p>
<p>Complete Description of the Major/study Program</p>	<p>The chemical constituents of herbal products may vary depending on harvest seasons, plant origins, drying processes and other factors. Thus, it is necessary to determine phytochemical constituents of herbal products in order to ensure reliability and repeatability of their pharmacological and clinical effect. Several chromatographic techniques, such as high-performance liquid chromatography (HPLC), gas chromatography (GC), high pressure thin layer chromatography (HPTLC) can be applied to quantify the major components of the herbal products. They also can be used to prepare a chemical profile, such as a chromatographic fingerprint, for an herbal product which can be compared with the profile of a standard reference. They also, can be used to detects different adulterations and any unwanted ingredients.</p> <p>Thin layer chromatography (TLC), High pressure thin layer chromatography (HPTLC)</p> <p>TLC and HPTLC are usually the common methods of choice for herbal analysis before establishing other instrumental chromatographic methods such as GC and HPLC. Several herbal pharmacopeias have provided TLC finger prints of herbal medicines. TLC is rather simple and can be employed for multiple sample analysis. For each chromatography lane, more than 40 compounds can be separated simultaneously in one time. It is possible to obtain useful qualitative and quantitative information from the developed HPTLC plate.</p> <p>Gas chromatography (GC) and volatile components in herbal medicines</p> <p>It is well-known that many pharmacologically active components of herbal medicines are volatile chemical compounds. Thus, analysis of volatile compounds by gas chromatography is very important in the analysis of herbal products. GC analysis of volatile oils gives a reasonable “fingerprint” which can be used to authenticate essential oils. The composition and relative concentration of the organic compounds in the volatile oil are characteristic of the particular plant and the presence of impurities in the volatile oil can be readily detected. Secondly, the extraction of the plants volatile oil is relatively straight forward and their components can be easily identified using GC–MS. The advantage of GC clearly is its high sensitivity of detection for almost all the volatile chemical compounds. This is especially true for the usual GC-FID detection and GC–MS.</p>



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	<p>High-performance liquid chromatography</p> <p>HPLC is a popular method for the analysis of herbal products because it is easy to learn and use and is not limited by the volatility or stability of the sample compound. In general, HPLC can be used to analyze almost all the compounds in the herbs. It is necessary to notice that the optimal separation condition for the HPLC involves many factors, such as the different compositions of the mobile phases, their pH adjustment, pump pressures, etc. Thus, a good experimental design for the optimal separation is necessary. The advantages of HPLC is its versatility for the analysis of the chemical compounds in herbal medicines.</p> <p>Atomic absorption is used to determine heavy metal contaminations of herbal products.</p> <p>During this Short-Term Training Program, each student will have a practical project on quality control of herbal medicine/ natural product. Meanwhile he/she will attend the necessary classes on theoretical bases of the experimental procedure as well as the instrumental techniques. The students will learn about determining Pharmacopeial values for herbal medicine as well as working with GC/MS; HPTLC; HPLC; IR and atomic absorption. The student is required to finish the project and give a report as a manuscript with final data.</p> <p>This project does not include troubleshooting or repairing the instruments.</p>
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Program Information

Admission Round for this Educational Year	September/ February
Language Requirements³	<p>SUMS' minimal requirements for English language proficiency for undergraduate admission is: IELTS: minimum band score of 5.5, TOEFL (or its equivalent in TOEFL) iBT (minimum 69) or TOEFL PBT (minimum 525). The following individuals are exempted from providing a certificate of English proficiency:</p> <ul style="list-style-type: none"> ● Applicants who are natives of English speaking countries ● Applicants whose language of instruction in their previous degrees has been English.
Required Previous Certificates & Other Admission Requirements⁴	<p>The applicants have to hold one of the following degrees:</p> <p>The Pharmacy doctorate (Pharm. D)</p> <p>Master of Philosophy in chemistry</p> <p>Master of Philosophy in photochemistry</p> <p>Bachelor's degree of Chemistry</p>



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	The applicants should provide us with their last academic degree(s) along with the complete transcript(s) of records.
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Contact Info (Program Coordinator)	
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