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|  | **program Information** |
| **NO.** |  |
| **Program Type** | Degree Based …………….....Non degree-Based ……..…. | □□ |
| **Level of Study** | Undergraduate ………..……Master …………………..……...PhD ………………………..…….Post Doc …………………..…..Specialty ………………..…….Subspecialty …………………Fellowship ……………..……..Short term Course ………… | ■■□□□□■ |
| **School** | Pharmacy |
| **Department** | Pharmacognosy |
| **Major/ Name of Program** | Volatile compounds and essential oils: Introduction, isolation methods and different quantitation and qualification analysis  |
| **Keywords (3 Words)** | Essential oils, GC-MS, Volatile compounds |
| **Language Requirement** | Persian or English |
| **Admission Requirement** | PharmD or PhD (pharmacognosy) , MS or PhD in Organic Chemistry, Plant Physiology and Biochemistry , Natural products and the other research fields need to work and analyses of Essential oils, Biological aromatic compounds  Fluency in English or Persian |
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| Contact Person Name : Dr Javad Asili |
| **Description (500 words)** | This program was organized to help promising young researchers from different countries to improve their practical skills and broaden their perspectives in volatile compounds and essential oil isolation and structure determination with respect to some novel aspects like metabolomics in biogenic volatile organic compounds and biomedical studies. Participants are expected to bring the acquired knowledge and skills back to their home countries and take part in researches related to isolation sample preparation, qualitative and quantitative analysis of volatile, aromatic compounds from natural origins and remnant pesticide. The program is intended to be flexible to meet the needs of individuals. The duration is 3 months. Some topics in the suggested program are as follows:1. Plant volatile and aromatic compounds : diversity, structures, chemical structures and some biological activities
2. Basic and some specific approaches to isolation of volatiles , hydrola and aromatic waters: Hydro distillation , steam distillation, SDE, SFE, Solvent extractions, head-space and so on with theory and practice
3. Quantitative and qualitative analysis of essential oils, volatile and aromatic compounds : Physical properties (Optical rotation, Specific gravity, etc.) quantitative analysis by GC-FID, determination of some retention time indices specially Kovat’s Index, GC-MS theory and practice including of introduction of mass spectrometry of aromatic compounds , determination of chemical structure of volatiles by GC and GC-MS
4. Application of metabolomics to studies of biogenic volatile organic compounds
5. GC & GC–MS metabolomics analysis: applicability for biomedical studies

Department of Pharmacognosy of School of Pharmacy (Mashhad University of Medical Sciences, Mashhad, Iran) is among the well-known centers in the Middle East for Biological and Chemical Essential oil and Aromatic compounds Studies. Several PhD students have been trained in the School of Pharmacy up to now. Different high quality papers have been published by researchers of the host department. |
| **Complete Description** |  |
| **Program Detail** | Regular Teaching Events* YJournal Club
* YLectures
* YLab Technique Presentations
* YPractice and Working with different instruments
* YResearch Studies
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