TWO-DAY COURSE

Chemical Analysis of Cannabis and Cannabis-Derived Products

Instructor

Jack Henion, Professor Emeritus, Cornell University

Course Description

This course will review and apply practical concepts important to successful chemical analysis of cannabis plant materials, products and other samples relevant and pertaining to cannabis. The diversity of chemicals associated with cannabis require a variety of analytical technologies and techniques for reliable chemical analysis. Each step from sample preparation to the appropriate analytical tool or technique is important for a successful analytical determination. A systematic sequence of lectures will be presented beginning with an overview of the diverse and important chemicals common to cannabis cultivars. The course will open with a focus on the importance of sample preparation and the various strategies employed for samples which range from plant materials to oils, edibles, drinks, etc. This topic will be followed by the concepts of chromatography including capillary gas chromatography (GC) and high-performance liquid chromatography (HPLC) coupled with various detectors. Importantly, mass spectrometer (MS) detectors will be discussed in considerable detail for a full understanding and appreciation for the merits of GC/MS and LC/MS including tandem mass spectrometry (GC/MS/MS and LC/MS/MS). These latter techniques are the current 'gold standard' for combined sensitivity and selectivity for chemical analysis of complex mixtures. The student will gain an understanding and appreciation of the analytical techniques associated with modern chemical analysis of cannabis and cannabis-related samples from this course.

COURSE OBJECTIVES

Through participation in this course, students will be able to describe:

- Strategies for sample preparation optimized for GC/MS and LC/MS analyses
- How to develop and implement GC and HPLC methods that are amenable and optimal for mass spectrometric detection
- How to perform on-line GC/MS, LC/MS and LC/MS/MS experiments for solving real-world problems
- How to develop bioanalytical methods for the quantitative determination of cannabinoids, pesticides and mycotoxins in cannabis-derived samples
- How to prepare and generate calibration curves and use stable isotope internal standards for optimal quantitative analyses
- Strategies for optimal quantitation employing LC/MS and LC/MS/MS techniques
- The latest developments in the analysis of cannabis-related samples including heavy metal measurements using ICP/MS techniques.
- New developments in the preparation and analysis of cannabis products beyond plant samples.

Titles for the eight (8) Lectures or Modules in this course

M O D U LE 1

Cannabis Sample Preparation Techniques

M O D U L E 2

LC, GC and MS Techniques

M O D U L E 3

Potency Determination

M O D U L E 4

Pesticide Analyses

M O D U L E 5

Terpene Analyses

M O D U L E 6

Flavonoid, Mold and Mycotoxin Determination

M O D U L E 7

Residual Solvents Determination

M O D U L E 8

Heavy Metals Determination