

Cultivating Safety: Toxicology 101 of Botanicals and Natural Products

This course offers a deep dive into the world of botanicals, bridging the gap between their traditional uses and modern applications in supplements, medicines, and cosmetics. Participants will explore routes of botanical exposure, interactions with drugs, dose-response nuances, acute and chronic toxicity, and a range of potential health endpoints. With hands-on graphing exercises, cutting-edge toxicity assessment tools, and interactive case studies—including challenges like product adulteration and new botanical discoveries—the course provides a comprehensive look into the complexities of botanical safety, making it essential for researchers, practitioners, and thrill seekers.

Lectures: 1 hour and 15 minutes

Welcome and Introduction

Kick off the course with a comprehensive introduction to the significance and evolving relevance of botanical safety. Dive deep into the world where tradition meets modern science.

Exposure to Botanicals: Tradition vs. Modernity

Trace the journey of botanicals from their ancient, traditional uses to their current roles in our modern world. Understand how these natural products have transformed from cultural remedies to ingredients in supplements, medicines, and cosmetics.

Routes of Exposure and ADME

Discover the various ways humans are exposed to botanicals, from skin applications to oral consumption, and understand the science of Absorption, Distribution, Metabolism, and Excretion (ADME) in relation to botanicals.

Botanical-Drug Interactions

Learn about the complexities of botanical-drug interactions. Dive deep into the common enzymes, such as CYP3A4, and how they can be affected by botanicals.

Dose Response and Its Nuances

Navigate the intricate world of dose-response, understanding key terms like LD50, NOAEL, and LOAEL.

Acute and Chronic Toxicity

Differentiate between immediate and long-term effects of chemicals. Discover how the same botanical can have varying impacts based on exposure duration.

Overview of Common Endpoints

Delve into the varied endpoints that can be affected by botanicals such as genotoxicity, carcinogenicity, hepatotoxicity, neurotoxicity, cardiotoxicity, DART, and renal impacts.

Tools for Assaying Toxicity

Get acquainted with the most common tools used in the scientific community to assay toxicity, including a variety of rodent studies and genotoxicity assays.

Break: 15 minutes

Interactive Case Studies and Scenarios: 1 hour and 15 minutes

Students will work through case studies with support from the lecturers, emphasizing the material taught in the course.

Logistics

60 minutes for lectures (with illustrative examples highlighted)

15 minutes for breaks

60 minutes for case studies – we prepare 3, students get to work on 2

15 minutes share 3 key learnings in each group

Case studies

1. Green tea
2. Berberine
3. Multiple botanicals
4. Adverse reports and mistaken identifications – eucalyptus
5. Mexican Hawthorne and yellow oleander