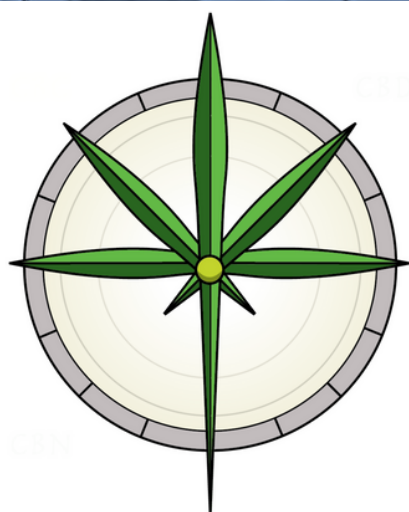# Institute of Cannabis Research
COLORADO STATE UNIVERSITY PUEBLO

8th Annual CANNABIS RESEARCH CONFERENCE
AUGUST 7-9, 2024
FORT COLLINS, COLORADO
COLORADO STATE UNIVERSITY

HOSTED BY

Institute of Cannabis Research
COLORADO STATE UNIVERSITY PUEBLO

Oregon State University
Global Hemp Innovation Center

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The 8th Annual Cannabis Research Conference (CRC) will be held on August 7-9, 2024, at Colorado State University-Fort Collins.

The Cannabis Research Conference (CRC) is an annual scientific meeting focused on advancing cannabis science, encompassing both hemp and marijuana. We unite leading researchers, innovators, and industry stakeholders, embracing all dimensions of diversity. We are committed to fostering an equitable and inclusive community for all those interested in cannabis research, irrespective of age, race, ethnicity, religion, gender, location, physical ability, or sexual orientation.

This is a multi-disciplinary, three-day conference that explores the latest in cannabis science and innovation for applications in medicines, foods, materials, and textiles that can improve people's lives and society.
(Con't .Next page)

The 8th Annual Cannabis Research Conference (CRC, from page 1)

The CRC has become a cornerstone in the cannabis research calendar, allowing attendees to explore recent advances and future possibilities in cannabis science. The conference program is expected to include a variety of presentations, workshops, and panel discussions, covering topics from medical applications of cannabis to the impact of cannabis legislation.

The CRC promises to be a dynamic and informative event, reflecting the rapid evolution and growing importance of cannabis research.
This conference allows you to connect with the brightest innovators addressing unique and timely topics and will feature:

- More than 100 Live Presentations
- Exhibit Hall
- Poster Hall
- Student Poster Content and More

There is no better time or place to connect with cannabis experts actively conducting new research and business ventures in:

- **Biology, Chemistry, Physiology, and Agronomy of Cannabis**
- **Business and Economic Development**
- **Cannabis Education**
- **Hemp Cultivation, Processes, and Uses**
- **Medical and Clinical Research**
- **Public Policy and Regulation**

[Conference Website](#)

Journal of Cannabis Research

Journal of Cannabis Research

Leading the way in open access publishing in biology, health and medicine

Since 1999, BMC has been committed to making high quality research available to anyone who wants to access it.

BMC

Aims and Scope

The Journal of Cannabis Research is an international, fully open access, peer-reviewed journal that welcomes submissions covering all topics pertaining to cannabis. Our goal is to provide an outlet for experts across disciplines and foster innovation and collaboration, driving public discourse around this timely issue and furthering this exciting area of research.

Why publish with us?

Achieve high impact with a broad audience and publish in the leading open access cannabis research journal

- Impact Factor of 3.7, CiteScore™ of 3.5 and mean 6.5k downloads/article
- Truly multidisciplinary covering all aspects of cannabis and led by an esteemed Editorial Board
- Broadly indexed and highly discoverable, including PubMed Central, Scopus, Web of Science and more...

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Truly multidisciplinary

Our journal welcomes all aspects of cannabis research, divided into the following sections:
- Agriculture and plant biology
- Commerce, business, and environment
- Endocannabinoid system
- Cannabis and cannabinoids biochemistry and genetics
- Cannabis and cannabinoids preclinical pharmacology
- Cannabis and cannabinoids clinical pharmacology
- Epidemiology and public health
- Cannabis-related disorders
- Medical cannabis
- History, regulation, and public policy

Recent Article:

The Two Sides of Hemp

Section Editor for Agriculture and Plant Biology, Dr Nirit Bernstein, is pleased to launch a collection titled, "The Two Sides of Hemp: Medical and Industrial". We cover hemp plant science; chemistry and cultivation; ethnobotany and regulations; medical and industrial uses of hemp and hemp products (such as cannabidiol); and differences between hemp and psychoactive cannabis.

Outcomes of ICR funded research: Exploring Intoxication During Acute Alcohol and Cannabis Co-Administration: A Focus on Cannabinoid Content and Effects of Order of Consumption

Alcohol and cannabis co-use is increasingly common in the United States, and legal cannabis markets have made new formulations of highly potent cannabis concentrate products more available to consumers than ever. Thus, individuals in Colorado are likely using cannabis products with high levels of delta-9-tetrahydrocannabinol (THC), and at least some users are likely combining it with alcohol. Currently, there is a dearth of research on the acute effects of highly potent THC products, including cannabis concentrates, which may contain up to 90-95% THC. The limited existing laboratory data on this topic suggests that alcohol and cannabis co-use (compared to alcohol alone) may be associated with reduced blood alcohol content (BAC), delayed time to peak BAC, longer duration of intoxication, and increased subjective intoxication. There is also little research examining whether order or timing of consumption matters, though some work suggests that using alcohol before cannabis may be associated with greater risk compared to using cannabis before alcohol. Biological sex is another variable that has not been fully examined, but likely influences the effects of co-administered alcohol and cannabis.

The present ICR-funded study, Exploring Intoxication During Acute Alcohol and Cannabis Co-Administration: A Focus on Cannabinoid Content and Order Effects, utilized a mobile lab design (compliant with federal cannabis research regulations) to explore the immediate effects of self-administered cannabis concentrates alongside a standard dose of alcohol. After using the first year to refine and develop the protocol, we collected data following our published study protocol (Karoly et al., 2022, Plos One). We now present preliminary data from N=43 (51.2% female) individuals who participated in this research. Approximately half (n=22; 50% female) of these participants consumed alcohol before self-administering their preferred cannabis concentrate, and the other half (n=21; 52.4% female) used their cannabis concentrate prior to drinking the standard dose of alcohol. Recruited participants included heavy drinking community members (MAge = 32.19 years; SD = 11.12; range = 21-60 years) who also regularly use cannabis. The sample reported scores on the Alcohol Use Disorder Identification Test (AUDIT) suggestive of harmful alcohol use (MAUDIT = 11.43; SD = 5.65) as well as low-moderate cannabis dependence scores on the Marijuana Dependence Scale (MMDS= 3.34; SD = 2.66).

Participants first completed some survey measures online, and then the mobile lab visited participant residences on the day of their scheduled lab appointment. They were randomly assigned to either consume a standardized dose of alcohol designed to bring their blood alcohol concentration (BAC) to approximately .08 g/dL and then to enter their residence and use a cannabis concentrate product of their choice (this group was called the "alcohol before cannabis [AC]" group), or to first use their chosen cannabis concentrate product inside their residence and then consume the standardized alcohol dose in our mobile lab (the "cannabis before alcohol [CA]" group). Following alcohol and cannabis use, participants remained in our mobile lab for at least 4 hours. They completed a breathalyzer and several measures of alcohol and cannabis intoxication every 30 minutes for the duration of the session.

In this preliminary analysis, a significantly greater peak heart rate was reached by individuals in the AC condition (MHR = 111.00; SD = 18.42) compared to individuals in the CA condition (MHR = 97.52; SD = 13.68). We also explored whether there were any differences between the order (AC vs CA) and sex (Male vs Female) in the peak levels reached for BAC, alcohol craving, as well as stimulating and sedative effects of alcohol, while controlling for age and percent THC in the cannabis concentrate product. No other significant main effects or interactions emerged from these models. It should be noted that 4 individuals who began participating in the protocol experienced an adverse reaction, and their participation was immediately stopped and therefore data from these participants is not included in the present analyses. Adverse events included nausea and vomiting (two participants), fainting after the blood draw (one participant), and paranoia following cannabis/alcohol use (one participant). Each of these adverse reactions resulted in immediate termination of the study, and follow-up with each participant confirmed their well-being the following day.

Outcomes of the funded research from 2022: Exploring Intoxication During Acute Alcohol and Cannabis Co-Administration: A Focus on Cannabinoid Content and Order Effects (2022)(Con't.)

   Additionally, a "mini-pilot study" was conducted on a subset of N=15 participants from the current sample. These individuals participated in an optional portion of the session to measure their brain activity using electroencephalography (EEG) before (sober), 1 hour after (intoxicated), and 4 hours after consuming alcohol and cannabis (recovery from intoxication). Participants included in this "mini-pilot" completed behavioral tasks on the computer while their brain activity was recorded in the sober, intoxicated, and recovery states. In these 15 participants, we observed significant behavioral impairments on the cognitive task as well as corresponding changes in brain activity at the intoxicated timepoint compared to the sober timepoint and recovery of performance and brain activity at 4-hours post-use timepoint.

   Overall, results indicate that using alcohol before cannabis is associated with higher peak heart rate compared to using cannabis before alcohol. On average, the AC group exceeded 100bpm (a commonly accepted cutoff for tachycardia), while the mean HR for those in the CA group did not exceed this cutoff. This finding, if replicated, could offer a practical and straightforward harm reduction option for individuals who co-use alcohol and cannabis (i.e., avoid using alcohol before cannabis during co-use sessions to reduce the impact of co-use on heart rate elevations). Additionally, given the low severity of adverse events experienced by the 4 participants who did have an adverse reaction to the protocol, this work indicates the relative safety of co-administering alcohol and cannabis concentrates within a research setting. Results from the mini-pilot suggest that alcohol and cannabis co-use impacts task performance and brain activity in the hour after use, but that these measures return to near-baseline levels within 4 hours. Data collection is ongoing, and analyses will be repeated with the full sample upon completion of data collection to confirm and extend the present findings.

Please follow us on Facebook and LinkedIn for ICR and Cannabis Related News

Upcoming Webinars

CANNABIS RESEARCH SERIES

Ryan McLaughlin, PhD

TITLE: **From Seed to Synapse: Modeling the Long-Term Impacts of Developmental Cannabis Exposure**

DATE: **March 14 1:00PM MST** **REGISTER HERE:**

Dr. Ryan McLaughlin is an Associate Professor in the Department of Integrative Physiology and Neuroscience at Washington State University (WSU). The overarching goal of Dr. McLaughlin's research program is to determine how endogenous and exogenous cannabinoids affect the brain and behavior. His research has shown that the endocannabinoid system is a vital component of the neuroendocrine and behavioral response to stress, and that pharmacological targeting of this system can be a promising therapeutic strategy for treating stress-related dysfunction. Dr. McLaughlin is a recipient of the Healthy Minds Canada Prize in Children's Mental Health and his research team is currently funded by federal grants from the National Institute on Drug Abuse (NIDA) and the National Institute of Mental Health (NIMH). He has over 45 peer-reviewed publications in nationally recognized scientific journals, including Biological Psychiatry, Proceedings of the National Academy of Sciences, Journal of Neuroscience, Neuropsychopharmacology, and Pain, and has authored several book chapters detailing the role of the endocannabinoid system in the regulation of stress and emotional behavior. His research has been covered in various news media outlets, including Forbes, Scientific American, The Scientist, The Seattle Times, and The Washington Post.

CANNABIS PLANT SCIENCE & CULTIVATION SERIES

Zamir K. Punja, PhD

TITLE: **Total yeast and mold in cannabis: How and why?**

DATE: **March 20, 11:00AM MST** **REGISTER HERE:**

Zamir completed his MSc and PhD degrees in plant pathology from the University of California, Davis. He joined Campbell Soup Company and was Manager of plant biotechnology until 1989, when he left to join Simon Fraser University. Zamir's research investigates the causes and management of plant diseases on vegetable and horticultural crops, and include the applications of plant biotechnology for disease management. His group is currently developing methods for identifying and managing new and emerging diseases of cannabis. He is a Fellow of the Canadian Phytopathological Society and a recipient of the Award for Outstanding Research

Upcoming Webinars

CANNABIS RESEARCH SERIES

TITLE: **How the CB1 cannabinoid receptor communicates within the cell via associated proteins.**

DATE: **April 11, 2024, 1:00PM MT REGISTER HERE:**

Dr. Allyn C. Howlett is a Professor of Physiology and Pharmacology at Wake Forest University School of Medicine, Assistant Dean of WFU Graduate School Biomedical Programs, and Director of the Office of Postdoctoral Education. Dr. Howlett is an expert on CB1 cannabinoid receptor signal transduction. Her research on the cellular signaling by cannabinoid, aminoalkylindole and aryl pyrazole ligands as cannabinoid receptor regulators has been continuously funded by grants from the National Institute on Drug Abuse. She is active in the International Cannabinoid Research Society (president, 2009-2010)) and the American Society of Pharmacology and Experimental Therapeutics (Molecular Pharmacology Division Chair, 2019-2020). She has reviewed for numerous NIH study sections and journals, and is currently an Associate Editor of Cannabis and Cannabinoid Research

Allyn C. Howlett, PhD

CANNABIS PLANT SCIENCE & CULTIVATION SERIES

TITLE: **How to Use Light in Cannabis Cultivation**

DATE: **April 17, 2024 11:00AM MT REGISTER HERE:**

Youbin Zheng PhD, MPhil, MAg, BAg. Associate Professor/Environmental Horticulture Chair Dr. Zheng is the Environmental Horticulture Chair of the University of Guelph and Vineland Research and Innovation Centre. The objectives of his research program are to develop technologies for producing plant materials in a sustainable and environmentally friendly manner; to develop and use horticultural technologies for improving the environment and to help build a sustainable society.

Dr. Youbin Zheng

A Deeper Look At Hemp
Photos by Dr. Eun-Soo Kim

Transmission electron microscopy images of cotyledon cells of Cannabis seed show the degeneration process of protein bodies during germination.
Abbreviations: ob, oil body; pb, protein body.

- (A) A protein body containing high electron-dense globoid and heterogeneous matrix and numerous oil bodies are packed in a storage cell.
- (B) A heterogeneous matrix of protein body is digested first, and it looks like a prominent enclave.
- (C) The hydrolytic enzymes (arrows) contribute to the degeneration of protein bodies and oil bodies during germination.
- (D) Following germination, protein bodies lose their shapes and electron densities in the cells.

Image courtesy of Dr. Eun-Soo Kim (ICR).   Kim et al.(2023), AoB PLANTS, 15(6): 1-11