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Thank you for submitting

# ARC Engage Final Report

Our team may reach out to you with follow-up requests for clarification regarding your submission.

**Review your submission responses below:**

Researcher First Name: Paulo

Researcher Last Name: Sgarbi

Department: Chemistry

Other Department:

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Project Title: Effects of compaction and flower type in the smoking behavkiour of cannabis pre-rolls

Start semester: 1/6/2025

End Semester: 4/30/2025

Introduction - Please introduce yourself and include pertinent background information as it relates to your project's research area. My name is Dr. Paulo Sgarbi, from the Department of Chemistry. I hold a B.Sc. in Chemical Engineering and a master and a doctorate in Organic Chemistry, with specialization in synthesis and medicinal chemistry. I had 10 years of industry experience (pharmaceutical) prior to joining Langara College as faculty in 2006. Prior to this project, I carried out research on the effects of ozonation on Cannabis flowers, along two Langara students. In this prior study my team studied whether ozone - used for disinfection of the buds - could (a) affect the potency (THC/THCA content) of the biomass and (b) eliminate harmful yeasts and bacteria.

Please discuss your educational background and your work experience as it relates to this project. If possible, include a quote that helps define your interest in the project. I have a BSc in Chemical Engineering (UNICAMP, SP, Brazil), a masters degree in organic chemistry with emphasis in organic synthesis (USP, SP, Brazil), PhD in organic synthesis (U. of A., AB, Canada) and a post-doctorate in medicinal chemistry (Université de Montréal, QC, Canada). Part of my academic training and industrial experience in medicinal chemistry involves what is often referred to "structure activity relationship" or "structure property relationship": the methodical change of some features of the object of study (the "structure") and probing how this change affects its activity or properties. In this project, the team attempted to relate pre-roll specifications (the "structure") with its smoking behaviour (the "property"). This work was a natural extension of my initial involvement with Cannabis research through the ozonation project.

Please summarize your project in plain language that others not in your field could understand. Consumer experience involves the interaction and engagement of consumers with a specific product, and it influences decision-making processes and outcomes (satisfaction, perceived benefits, and even brand loyalty). Customers response often include sensory aspects, and uniformity is a big party of the sensory experience! Our partner, PureSun Farms, wanted to find a correlation between the

joint's structure and its "smokability" as a means to quickly identify defective or inconsistent batches of pre-roll before they left the factory floor. We collect the data using a "smoking machine" that smoked the joints for us...

Identify the project goals and objectives. Explain how the results may be used to solve a problem or inform further research in the field. Goal: correlate Cannabis pre-roll parameters such as particle size, flower characteristics (sticky vs. dusty) and compaction (loose vs. compact) with smoking characteristics of the pre-roll: back-pressure (easy vs. difficulty to "suck" prior to inhaling by breathing), the amount of Cannabinoids produced per breath, the behaviour of the joint during the combustion time (uniform vs. uneven burning, and the masses of intact joint and the ashes after smoking. Objective: Establish a relationship between the above properties and the quality of the pre-roll, so that a consistent product is obtained.

Briefly explain the steps taken (methods used) to conduct the research, and describe the key findings. I am not sure. At this time I do not know whether this project continues to be of interest to the community partner (SPF). Attention: the final reportts were produced as excel files, which are not accepted by this system. Please see Dr. Nathan Jones for the final data reports.

Who was involved in this project (eg. faculty, students, community partners)? How did their involvement contribute to the project's success? Were there any challenges to overcome? The following personal was involved in this project: Dr. Paulo Sgarbi (Dept of Chemistry, Langara College); Dr. Markus Roggen (Consultant: Complex Biotech AG, Zurich; and Controlled Chemistry, UBC); Kelina Schinkarik, Benjamin Judkowicz and Raahim Adil (students, Langara College); PureSun Farms or "PSF" (community partner, the interested party on this research. PSF provided the pre-rolls for testing). In this project, I assigned and supervised the work of the students and worked on the data collection end; Dr Roggen has many years of experience on gthe Cannabis research field, and designed the pre-rolls profiles and transferred his previous experience with the smoking machine to the team; our students took turns weighing samples and filter pads, using the smoking machine to smoke the pre-rolls, and monitored the back pressure to ensure the filter pads were changed at the correct time. There were a few challenges: (a) the PC that controlled the smoking machine remained lock for a while, and we required on-site physical support form SPF's IT to gain access; (b) the smoking machine was poorly calibrated and quite dirty inside with Cannabis oils, requiring a

thorough set-up before the work started; (c) the samples from SPF were not available right away and two rehydrated set of pre-rolls were never sent to us, adding to delays and an incomplete data-set; and (d) the filter pads were consumed quite rapidly due to the number of replicates. The first refill came quickly, but subsequent refills took very long time, causing more delays and a bit of frustration. For example, the last refill set arrived only on June 9th, and remain unused.

Please share any personal stories that made this research experience memorable/valuable.
Some of the students had their first up-close experience with Cannabis joints, and so there was a lot of excitement about lighting the joint and observing it being consumed, while registering events like canoeing, having to re-lit the joint, and being exposed to a bit of the smells associated with the volatile terpenes (experiments were carried out in the fume hood, but the weighing was done on the bench top). Students had the opportunity to operate a piece of equipment (the smoke simulator), which not many people had seen, let alone used it.

What are the next steps for this project and for you as a researcher?
Method: The pre-rolls were weighed and labeled; experiments were carried in 5 replicates. Pre-rolls were hold using an adaptor attached to the smoking machine, with a numbered glass microfiber filter pad sandwiched between the adapter and the machine. The joint is lit and subjected to a smoking cycle. The back pressure was monitored in real time; When the smoking machine's "sucking" action became difficult (i.e., high back pressure), the filter pad was changed. Once the pre-roll had ben consumed, ashes, roach and pads were all weighed. The key findings have been summarized in the report produced by our colleague and consultant Dr. Markus Roggen, and involves the statistical analysis of the data collected. Differences between the several pre-roll construction were easily detected. One particular set produced reasonably consistent smoking data. I refer the reader to this report for further information.

*Please upload any images that will help to showcase your project.*

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