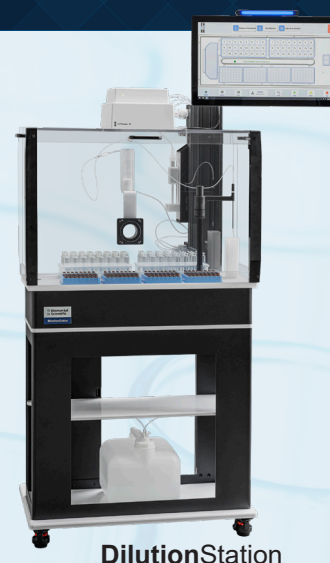


DilutionStation *Extracting and Diluting*

Automating Cannabis Sample
Workflows and Prepping into
HPLC Vials



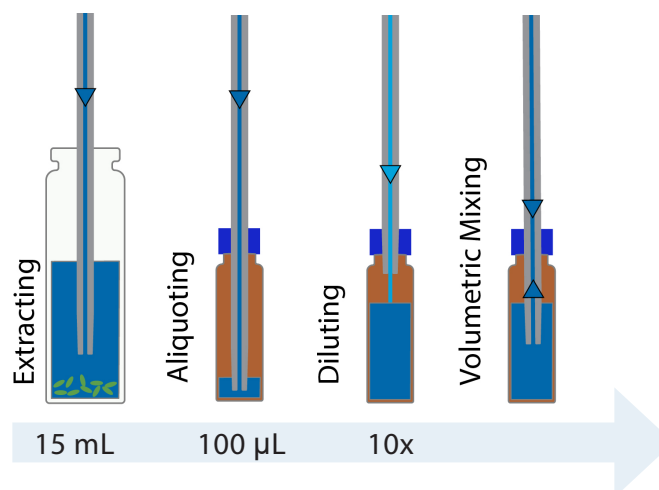
DilutionStation

Author: Davis Reed

Automating Cannabis Extraction and Dilution for HPLC Potency Analysis Using **DilutionStation**

Synopsis

DilutionStation is an automated liquid handling system designed to streamline common sample preparation tasks such as dilution, acidification, internal standard addition, and mixing. This study evaluated its performance through daily single sample Quality Control checks over a 25-day period in automating two tedious manual steps in cannabis flower extract preparation, greatly reducing labor and potential human error. These steps are dispensing solvent to begin extraction and performing a 10x dilution directly into HPLC-compatible vials for LC-based potency testing. In this workflow, **DilutionStation** can prepare over 500 cannabinoid extractions per 24 hours, with the prepared samples being analyzed by HPLC. Dispense volume accuracy and dilution precision of the daily QC were verified gravimetrically and confirmed via HPLC analysis over the 25-day period.

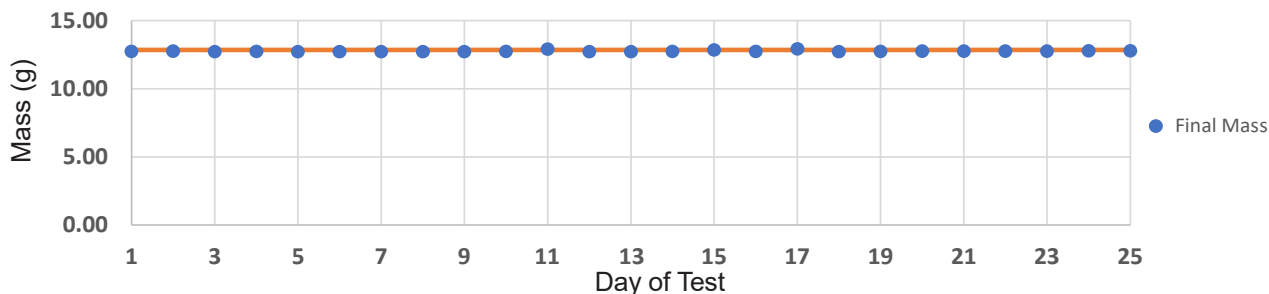


DilutionStation dispenses 15 mL of a 9:1 methanol/chloroform mixture to extract cannabinoids. Manual sonication, vortexing, and centrifugation complete the extraction by separating cannabinoid analytes from the plant material. A 100 µL aliquot of the extract is then diluted 10x to a final volume of 1 mL and volumetrically mixed.



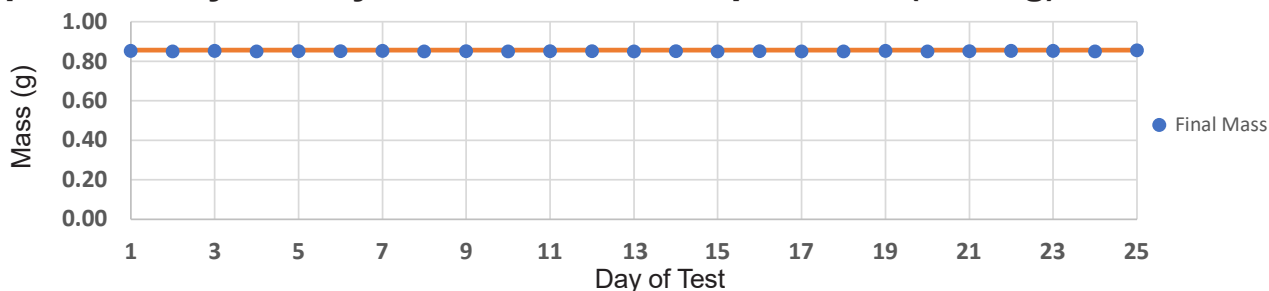
Preparation of Cannabinoid Samples into HPLC Vials

Reproducibility of Automated 15 mL (12.84 g) Solvent Dispense for Daily QC



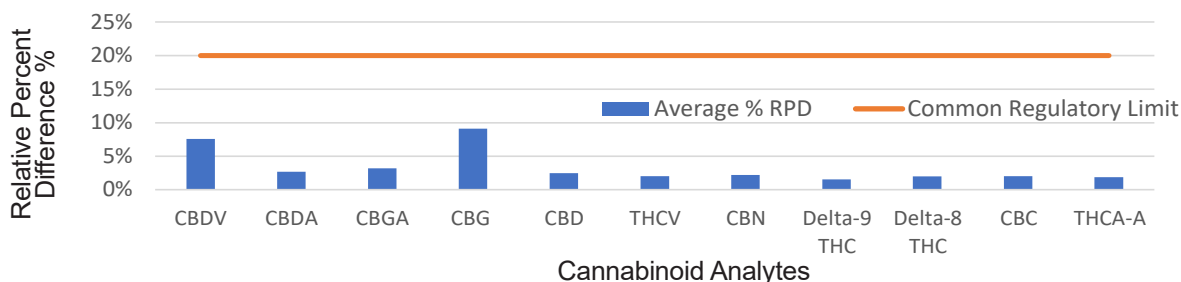
Daily QC of automated extraction solvent dispensing using **DilutionStation** over a 25-day period. Following the weighing of ground cannabis into 20 mL tubes, **DilutionStation** dispensed 15 mL of the extraction solvent mixture (9:1 methanol/chloroform) into each sample. Precision of the 15 mL solvent additions (12.84 g) were evaluated gravimetrically, showing an average recovery of $99.37 \pm 0.44\%$, demonstrating consistent and accurate liquid handling. **DilutionStation** can automatically prepare over 500 samples in 24 hours, or more than 150 samples in an 8-hour shift.

Reproducibility of Daily QC 10x Dilution Step to 1 mL (0.856 g) Final Volume



Daily QC of automated 10x dilution of cannabis extracts using **DilutionStation** over a 25-day period. After manual sonication, vortexing, and centrifugation, **DilutionStation** dispensed 100 μL of extract with 900 μL of 9:1 methanol/chloroform solvent directly into 2 mL HPLC vials. Gravimetric analysis showed an average recovery of $99.39 \pm 0.18\%$ (0.86 g), confirming high reliability for low-volume dilutions.

Comparison of Manual and Automated Preparation of Cannabis Samples



The Relative Percent Difference (RPD) for 11 individual cannabinoid analytes from seven different cannabis samples prepared using automated (**DilutionStation**) and manual methods. All RPD values were below 10%, well under the commonly accepted 20% regulatory threshold, demonstrating compliance with stringent testing requirements. 9 of the 11 analytes were within 5%, with only 2 analytes being reported as between 5 and 10%.



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