

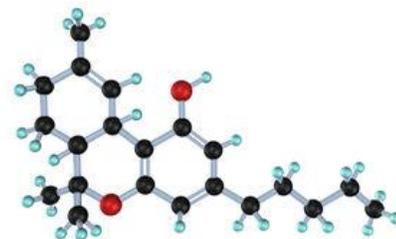


### November 2016:

Milford, MA - ProVerde Laboratories ([www.proverdelabs.com](http://www.proverdelabs.com)) has participated in the fall 2016 version of the Emerald Test® for analyzing key contaminants and target analytes within cannabis regulatory testing protocols. ProVerde took part in four individual proficiency programs to analyze cannabinoid, pesticide, microbial, and residual solvent concentrations in cannabis matrices to prove reliability of ProVerde advanced analytical techniques measuring important, and potentially toxic compounds found on the plant or in plant extracts. “The best science in the business,” has earned ProVerde four Emerald Test® badges for competency and accuracy in measuring cannabinoid potency levels, microbial contamination, pesticide concentrations, and residual solvent levels.

Data analysis was carried out by the American Oil Chemists’ Society (AOCS). After calculating average scores, mean deviations and a few other parameters, AOCS assigns each lab an absolute Z score ( $|Z|$ ) for each component measured. An absolute Z score below  $\pm 2.0$  shows that the lab is statistically producing quality data and accurately measuring the target components.

Five main cannabinoids were analyzed and quantified to fulfill the Emerald potency test including THC, THCA, CBD, CBDA and CBN from a sample spiked with an unknown concentration. The cannabinoid test samples were prepared in a range between 0.01-1.0 mg/mL. ProVerde found the unknown sample to contain approximately 0.08-0.12 mg/mL of cannabinoids with  $|Z|$  scores between 0.111 and 0.485 for each cannabinoid measured. These cannabinoids were measured on ProVerde’s ultra-performance convergence chromatography instrument which is two generations more advanced than traditional high-performance liquid chromatography providing superior accuracy.



Many laboratories across the country and throughout the world have varying degrees of difficulty measuring pesticide contamination on cannabis. ProVerde has shown that previous methods of analyzing pesticides in the agricultural industry for items including corn, hops, other vegetables, and leafy greens do not translate to accurately measuring those same pesticide contaminants on cannabis.

ProVerde used an ultra-performance liquid chromatography method along with new and creative processing techniques to analyze and quantify Abamectin, Bifenezate, Etoxazole, Imazalil, Imidacloprid, Myclobutanil, Spiromesifen, and Spirotretsamat. ProVerde |Z| scores for analyzing each pesticide ranged from 0.073 to 0.753 showing that ProVerde has one of the most accurate methods for detecting and quantifying harmful pesticides residing in or on cannabis.

Emerald Scientific worked closely with NSI labs out of Raleigh, North Carolina to prepare lyophilized cannabis flower samples inoculated with various microbial compounds. ProVerde used a combination of techniques to analyze, quantify, and confirm the amount of microbial species present in the cannabis sample. An automated most probable number (MPN) enumeration platform and enzyme-linked fluorescence assay (ELFA) from BioMerieux was used to analyze for aerobic bacteria, coliform bacteria, Enterobacteriaceae, total yeast/mold, and salmonella. ProVerde received |Z| scores between 0.041 and 1.917 for different microbial species. This platform was tested against traditional 3M rapid petri-film culture media with concordant results showing that ProVerde enumerates the amount of microbial species found on cannabis reliably across multiple analysis platforms.

ProVerde uses gas chromatography solutions such as GC-FID and GC-MS to accurately measure residual solvent contamination primarily in cannabis concentrates. As cannabis extracts and concentrates become more popular, laboratories need to be able to tell if there is residual extraction solvent remaining in the sample. Extractors have been using solvents like ethanol, butane, acetone, hexanes, or isopropanol (propan-2-ol) to remove cannabinoids from the plant and get them into a concentrated form. If these concentrated extracts are not purged for enough time in a vacuum oven, there may be significant amounts of these toxic compounds residing within the extract. The Emerald residual solvent test contained seven key solvents and known carcinogens including n-butane, iso-butane, benzene, toluene, heptane, hexane, and xylenes. ProVerde showed high accuracy with |Z| scores across these solvents ranging from 0.084 to 1.467.

Contact ProVerde Laboratories with questions and inquiries about analytical testing services, extraction, and consulting services.

