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Differentiating *cannabis* products within the brands of the legalized adult use markets

Within the framework of Bill C-45, Canada is positioned to become the global leader in the legal *cannabis* economy and global exporter. The enactment of this Canadian Cannabis Act provides legal access to marijuana and to control and regulate its production, distribution and sale. The primary objective of Health Canada's regulatory policy bears stringencies with respect to public health and safety and strict requirements for quality assurance, record keeping and mandatory testing by 3rd party laboratories for product contamination. This opens an opportunity for advancing analytical development for *cannabis* metabolite profiling of active natural products and bleeds through to the accurate quantitative reporting of pesticides, mycotoxins and heavy metalloids that serve regulatory audit to clear products for sale. A complete LC-MS/MS workflow is described to quantitate 14 cannabinoids and screen for over 40 terpenoids to fingerprint various top *cannabis* dried flower brands from the large enterprise-producers in a method that is delivered in under 15 mins of analytical run time using a dual ESI and APCI ionization strategy. A wide linear dynamic range of 0.03 to 90% measurement (104 orders LDR) of cannabinoid per LC-MS injection can be reported to provide a more accurate view for product labeling and dosing recommendations. Terpene expression and metabolite measurement in plant cultivars are becoming less challenging with newly identified terpene synthases and availability of new mono-terpenes and sesquiterpene standards. It is of high interest for results of these metabolite profiling experiments to be correlated with plant cultivation parameters to achieve quality control and strengthen the consumer's experience with a brand of *cannabis* and differentiate products for retail. Furthermore, pesticide residue analysis in cannabis flower and oil formulations has been developed to meet the reporting requirements of Health Canada's banned pest control ingredients list. With UHPLC linked tandem mass analysis covering all of the 96 banned pesticides except for 11 compounds best suited by GC separation, it is possible to achieve a validated *cannabis* product certificate of analysis for issuance to *cannabis* licensed producers in rapid turn-around. Analytical method details include LC separation using the Raptor Restek Column, Raptor Biphenyl and newly available mixtures of pesticide standards to meet the Canadian Pest Management Agency's list of required pesticide maximum residual levels (down to 10 ppb in most cases). The addition of mycotoxins and other organo-contaminants can also be inserted into our methods with the use of optimized Scheduled MRM mass spec scanning techniques. The assembly of all the potency and ingredients data collection possible can provide information to consumers and track benefits to the *cannabis* producers stride to bring powerful brands to the global *cannabis* market.

Biography

Brigitte Simons is a business development executive in support of leading-edge laboratory services and data management tools for the development of safe cannabis. Bridging expertise within analytical science, pharma drug development and environmental testing – Brigitte have a professional track record for laboratory testing instrumentation, software and sample contract design for the Canadian federal agencies, such as Canadian Food Inspection, Health Canada, Agriculture Canada and Environment Canada. She spent over 6 years working in the Drug Toxicology and Analysis Division at Health Canada in a mass spectrometry facility testing. She completed two post-doctoral fellowships at the Clinical Sciences Hospital of the National Heart, Blood & Lung Institute within the famous NIH campus in Maryland, USA. Continuing on in lab specialties, Brigitte then joined SCIEX, a global instrumentation vendor for hardware and software for mass spectrometry. With over 15 years experience with operating mass spectrometers, Brigitte managed Canadian federal and provincial government sales for full laboratory services, covering clinical, forensics to product health and environmental safety. Prior to working abroad, Brigitte received her Ph.D. in Chemical Biology at the University of Ottawa in a joint chemistry program with drug pharmacology at Health Canada.

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