Screening *Cannabis* for Meaningful Mycotoxins and their metabolites using high-resolution mass spectrometry

Karl Oetjen[1], Matthew Johnson[2], Stephen Goldman[2], Sean Orlowicz[3], Matthew Noestheden[1]

[1]SCIEX, USA [2]Kaycha Labs, USA [3]Phenomenex, USA

What are mycotoxins ?

Several hundred different mycotoxins have been identified, but the most commonly observed mycotoxins that present a concern to human health and livestock include ***aflatoxins, ochratoxin A,*** patulin, fumonisins, zearalenone and nivalenol/deoxynivalenol. Mycotoxins appear in the food chain as a result of mould infection of crops both before and after harvest. Exposure to mycotoxins can happen either directly by eating infected food or indirectly from animals that are fed contaminated feed, in particular from milk.

World Health Organization

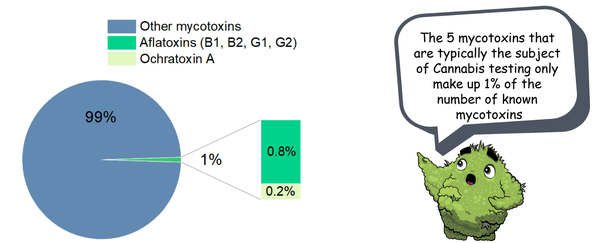


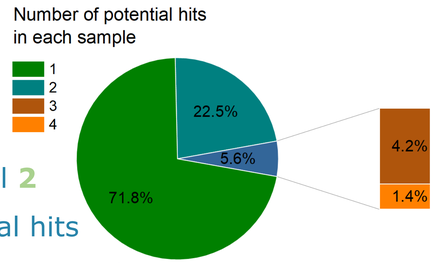
Figure 1. The number of known mycotoxins vs. the 5 mycotoxins that are commonly the focus of Cannabis testing.

How do we test for mycotoxins ?

	Pros	Cons
ELISA	• Cost • Speed	• Background interferences • Sensitivity
Immunoaffinity column chromatography with fluorometry	• Sensitive	• Extra capital expense • Cost of consumables
LC-MS/MS	• More Sensitive • Wider range of compounds	• Upfront cost

100 *Cannabis* samples that failed microbial testing requirements screened for the presence **uncommonly tested for mycotoxins and their metabolites**

Initial suspect screening results



21 level 2 potential hits were discovered

Figure 2. The total number of potential identifications in each sample.

Comparing the suspect screening results to reference standards

Table 1. Current results after purchasing available standards.

Component name	Potential hits	Average MS[1] error (ppm)	Average MS/MS Library Score (Fit)	Confidence	Next Steps
15-hydroxyculmorone	9	-0.8	85	Level 2	Find a standard
Agistatin D	1	-2.1	70	Level 2	Reacquire for better MS/MS spectra
Cycloheximide	9	-0.3	79	Level 3	Reacquire for better MS/MS spectra
Deepoxy-deoxynivalenol	4	-0.7	96	Level 3	Reacquire for better MS/MS spectra
Macrosporin	2	0.1	70	Level 2	Find a standard
Mycophenolic acid	1	0.1	99	Level 1	Orthogonal method
Orsellinic acid	42	-0.4	92	Level 1	Orthogonal method

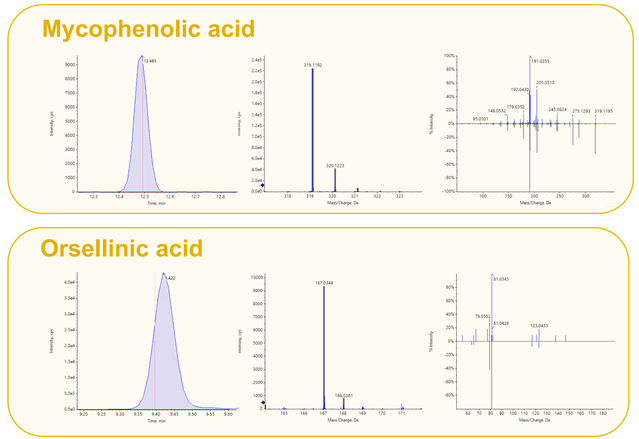


Figure 3. Example MS/MS spectrums of level 1 compounds identified.

Methods

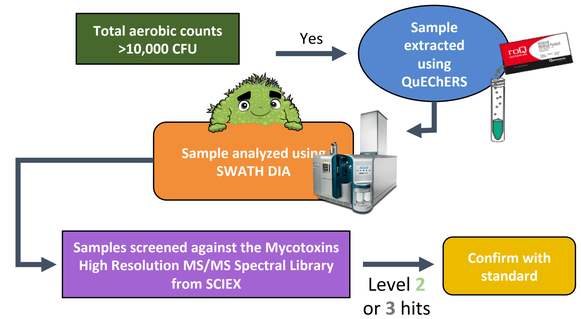


Figure 4. Suspect screening workflow used to analyze samples.

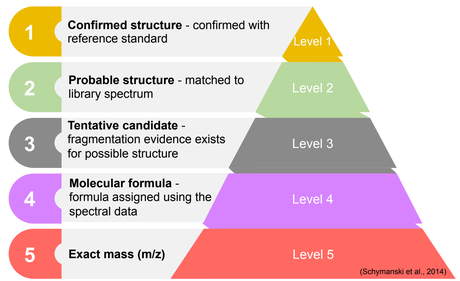


Figure 5. Identification confidence levels in high resolution mass spectrometric analysis.

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