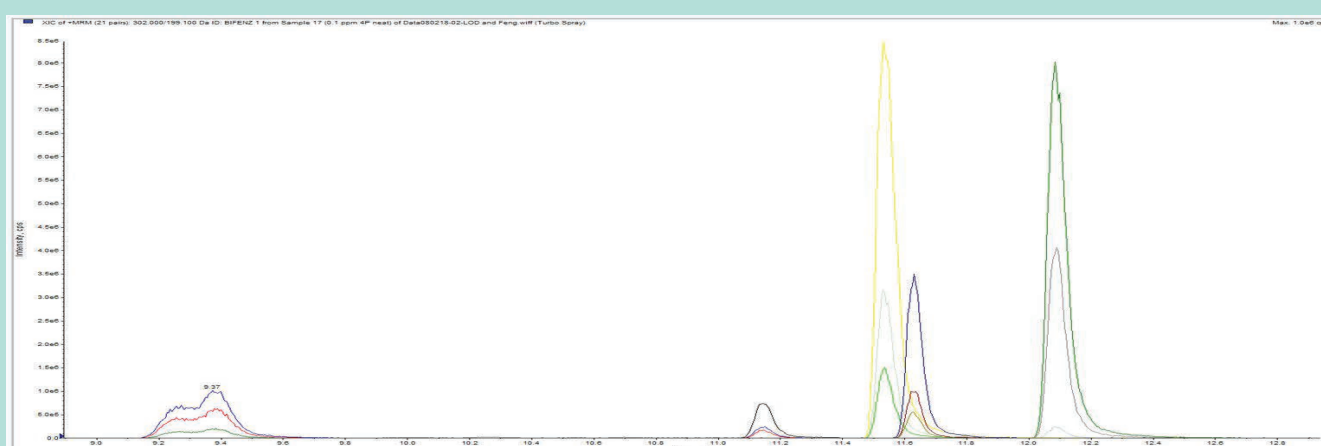


Introduction

- Based on CA's regulation, several challenging pesticides were tested. These pesticides are known to have low signals in mass spectrometry, or to have interferences with components in cannabis oil.
- Different sample preparation techniques were tested, such as dilute and shoot, liquid-liquid extraction (LLE) and QuEChERS. Acceptable detection limits for those compounds were achieved in cannabis oil using QuEChERS.

Instruments and Materials

- Instruments:** Pesticides were separated by Gazelle C18 UHPLC column (Orochem Technologies Inc) and detected by ExionLC-triple Quad 4500 MS (SCIEX) operated in ESI+ mode.
- Materials:** OroQuests-Hemp QuEChERS tubes for hemp (Orochem Technologies Inc) were used for all extractions. Five pesticides (bifenazate, pyrethrin I and II, spiromesifen, bifenthrin) and formic acid were purchased from Sigma-Aldrich. Mass spec grade acetonitrile, water and ACS grade heptane were purchased from Pharmco-Aaper.



Analyte	RT (min.)
Bifenazate	9.72
Pyrethrin II	11.27
Spiromesifen	11.61
Pyrethrin I	11.70
D9THC	12.02
Bifenthrin	12.20

Figure 1: LC-MS Chromatogram of Pesticide Extract From 10 mg/mL THC Oil

HPLC-MS/MS Conditions:

Column: Gazelle C18 UHPLC column 2.1 x 50 mm, 1.7 μ m, and guard column 2.1 x 10 mm.
Mobile Phase: Gradient 90/10 5 mM NH₄AC with 0.1% FA/methanol to 100% methanol in 10 min, hold 3 min.

Experiments and Results

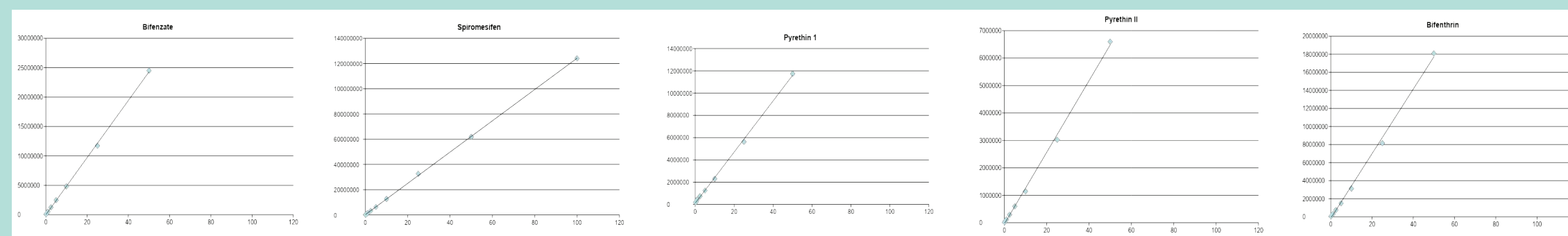
1-Experiments of QuEChERS procedures with/without acid

- Prepare 10 mg/mL of THC or CBD oil sample in acetonitrile (w/o 0.1% formic acid)
- Add 1 mL sample to QuEChERS tube
- Vortex 3 minutes, centrifuge 2500 rpm for 5 minutes
- Transfer about 0.15 mL to HPLC vial for LC-MS analysis

2-Better recovery achieved with acids during extraction

	Bifenazate	Spiromesifen	Pyrethrin I	Pyrethrin II	Bifenthrin
QuEChERS: Non-acidified	61.2%	48.9%	75.5%	61.0%	57.5%
QuEChERS: Acidified	85.4%	102.9%	91.0%	87.5%	90.0%

3-Linearity range of pesticides in different cannabis oils



Matrix	Pesticide linearity range (ppb)				
	Bifenazate	Spiromesifen	Pyrethrin I	Pyrethrin II	Bifenthrin
10 mg/mL THC distillate	2.5-100	2.5-100	2.5-100	0.5-100	0.25-100
10 mg/mL CBD distillate	0.5-100	0.5-100	1-100	1-100	2.5-100

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