Supercritical CO_2 extraction of nepetalactones from Madjack brand catnip

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Nepetalactones, Oil of Catnip, and Super CO_2

The purpose of this project was to extract a class of compounds called “nepetalactones”, which are the active components in catnip.

This extract contains nepetalactones, and various other components within the matrix, and the extract is collectively called “Oil of Catnip”.

The extraction method chosen to extract the nepetalactones was supercritical carbon dioxide (Super CO_2). The analysis was performed on a gas chromatograph.

Catnip products have a variety of uses, for both cats and humans alike.

Catnip uses: Cats

2/3 of cats enjoy catnip: Catnip has hallucinogenic properties for cats, and research has shown it has no ill effects, and is non-toxic

Catnip uses: Human products

Catnip insect repellent: At least 10x more potent than DEET insect repellent, and non-toxic!

Catnip lotions and cream: Soothes skin, usually scented with lemongrass.

Catnip uses: Catnip tea

Catnip effect on humans: Catnip has a sedative effect on humans, and is available as a “soothing” catnip tea.

Commercially available catnip products

#	Description
1	Flower buds
2	Flowers and stems
3	**Ground catnip**
4	Compressed catnip
5	Catnip mulch
6	**Oil of Catnip**

Commercially available catnip: With respect to our extraction project, we chose to extract oil of catnip (6) from ground catnip (3).

Catnip extraction: Equipment

Extraction equipment: Supercritical fluid technologies, inc. SFT-250 Super CO_2 Benchtop extractor and Julabo chiller

Analysis equipment: Varian Gas Chromatograph 3900 with diethyl glycol succinate column (DEGS) and Flame Ionization Detector (FID)

Catnip extraction: Operating conditions

Supercritical CO_2 extractor

Operating pressure (bar)	Operating temperature (°C)	Flow rate (L/min)
420	40.0	3.0

Gas chromatograph

Column (°C)	Rate (C/min)	Hold time (min)	Elapsed time (min)
42	0	5.00	5.00
150	15	1.00	13.20
180	5	1.00	20.20
215	10	1.00	24.70

Catnip extraction: Operating conditions

Resultant biomass and oil of catnip

Madjack catnip biomass (g)	Madjack catnip biomass after extraction (g)	Change in biomass (g)	Change in biomass (%)	Oil of catnip extract (g)	% Recovery
10.0005	9.5684	0.4321	4.32	**0.0860**	**0.86**

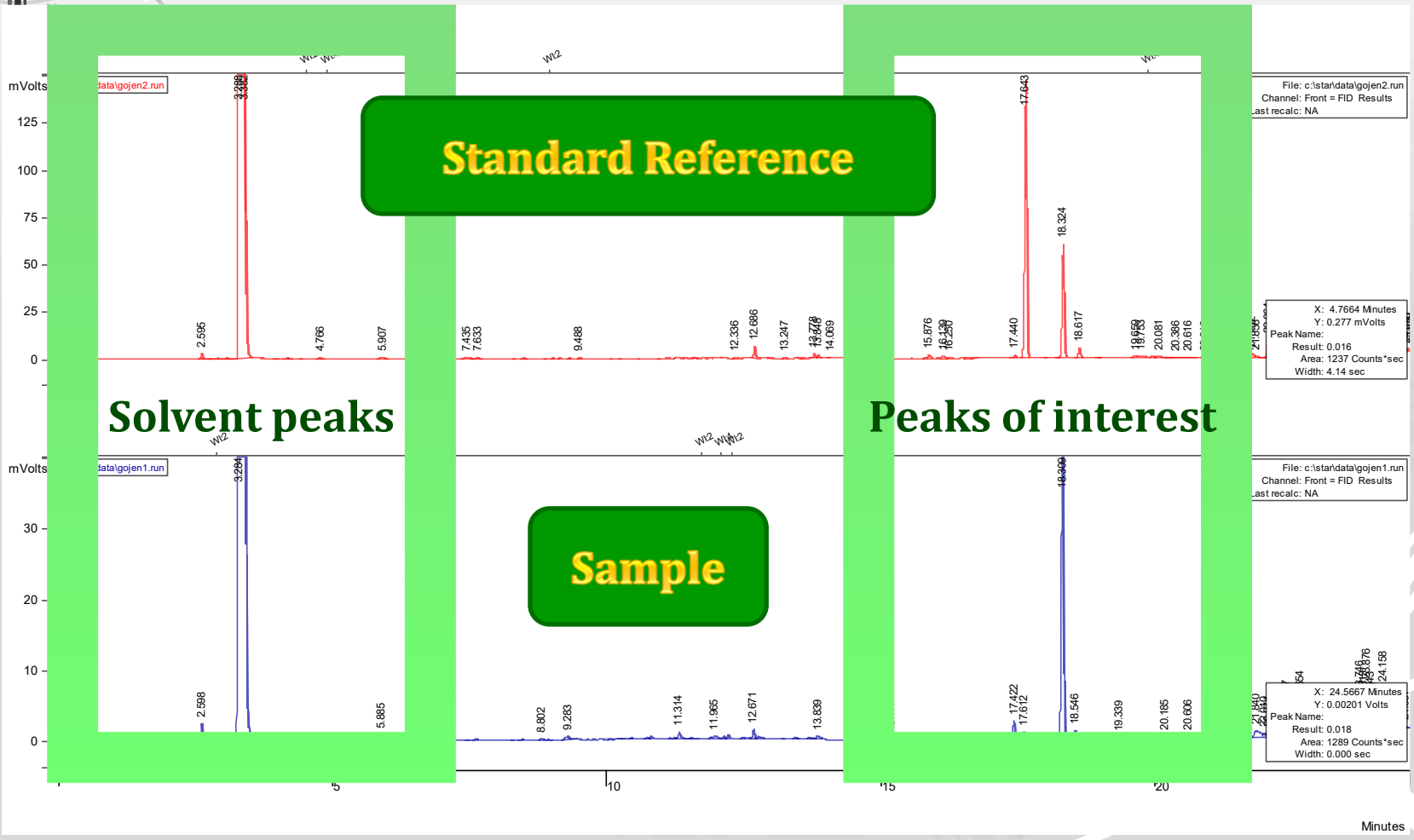
GC Preparation (Standard): 1 drop of Catnip oil standard in 1mL DCM

GC Preparation (Madjack): 1 drop of Catnip oil extract in 1mL DCM

Madjack catnip extract (yellow)

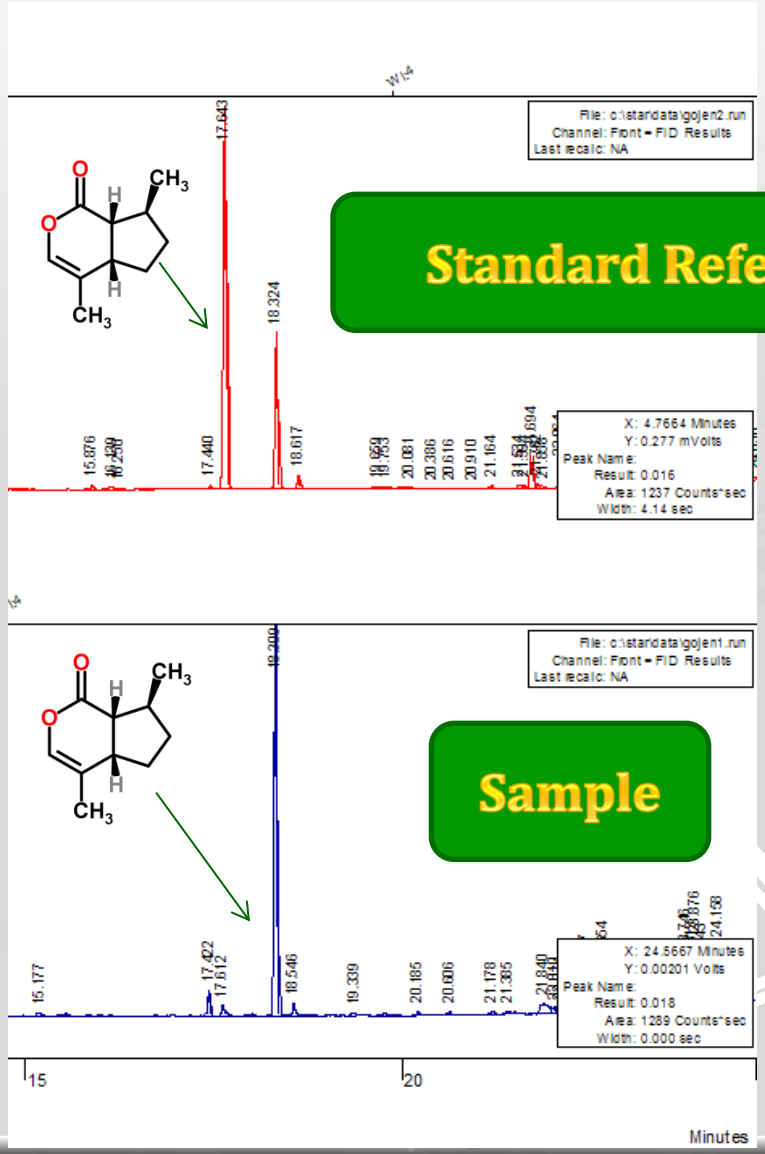
Catnip oil standard (clear)

Catnip extraction: Overall GC chromatograms



Catnip extraction: Extraction results

GC Chromatograms:
The reference standard displayed peaks in a similar region to our sample, and displays a similar peak area, therefore it is likely that oil of catnip was extracted successfully!



Thank you for watching our presentation!

Also thanks to:

Bioniche (Provided catnip oil standard and technical data)

Madjack (Catnip)