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Faster GC Analysis of Medical Cannabis Terpenes with Same 624Sil MS Selectivity

March 25th, 2014 by Jack Cochran

The chromatograms below show what happens when you translate a GC method (previously used for medical cannabis terpenes here and here) from a 30m x 0.25mm x 1.40µm Rxi-624Sil MS GC column to a 30m x 0.25mm x 1.00µm Rxi-1301Sil MS column. Both of these columns have arylene-modified cyanopropylphenyl dimethyl polysiloxane-type stationary phases. As should be expected, the separation is approximately the same, but faster, due to the thinner film on the 1301Sil MS.

Another thing that the thinner film gives users is the ability to elute less volatile compounds without long isothermal hold times. The example here is for Phytol, an acyclic diterpene alcohol that may be a therapeutically-active compound in cannabis. Phytol wasn't in the terpene mix I analyzed on the 624Sil MS, and in fact, I added several "new" terpenes to my qualitative medical cannabis terpenes standard for the 1301Sil MS work, including Sabinene, alpha-Phellandrene, Ocimene, p-Cymene, alpha-Humulene, alpha-Bisabolol, and Phytol. I've labelled some of those additional terpenes with small letters in the first 1301Sil MS chromatogram and the analyte list, and I show the later eluting additions by name in the second 1301Sil MS chromatogram.

I am continuing this work along several lines, including running on even thinner-film cyanopropylphenyl dimethyl-type columns. Why do that? Because we can pick up efficiency, i.e. more separation power through narrower peaks. Chromatographic efficiency is EXTREMELY important in this type of analysis because there are many, many terpenes in medical cannabis and *high efficiency GC is the only way to go* to achieve the best separations and avoid coelutions that will lead to inaccuracies in terpene quantification for medical marijuana.

I'd like to acknowledge Andrew Goldsmith of SRI Instruments for providing some of the terpene standards, and Don Rhoads of Restek for making the beta-version Rxi-1301Sil MS GC column.

Please, check out our Medical Marijuana web page.

Analyte	Name
1	alpha-Pinene
2	Camphene
3	Myrcene
4	beta-Pinene
5	delta-3-Carene
6	alpha-Terpinene
7	Limonene
8	1,8-Cineole
9	gamma-Terpinene
10	Terpinolene
11	Linalool
12	Fenchone
13	1-Isopulegol
14	dl-Menthol
15	1-Borneol
16	alpha-Terpineol
17	Dihydrocarveol
18	Citronellol
19	Geraniol
20	2-Piperidone
21	Citral 1
22	Pulegone
23	Citral 2
24	Citral 3
25	Citral 4
26	beta-Caryophyllene
27	Nerolidol 1
28	Nerolidol 2
29	Caryophyllene oxide

a Sabinene

b alpha-Phellandrene

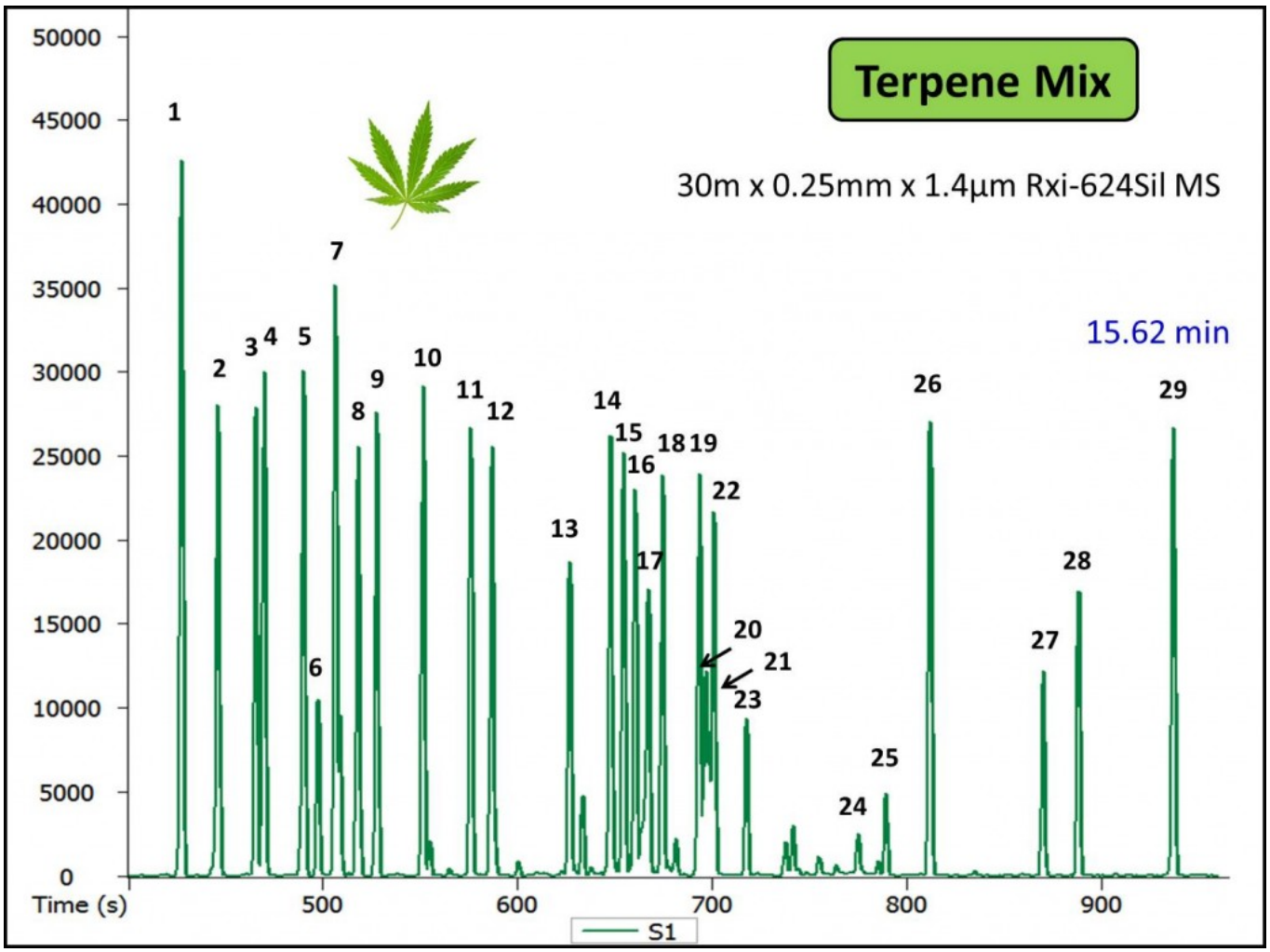
c Ocimene 1

d p-Cymene

e Ocimene 2

Terpene Mix New

f alpha-Humulene


Terpene Mix
30m x 0.25mm x 1.4µm Rxi-624Sil MS
15.62 min
50000
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Time (s)
500
600
700
800
900
S1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
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20
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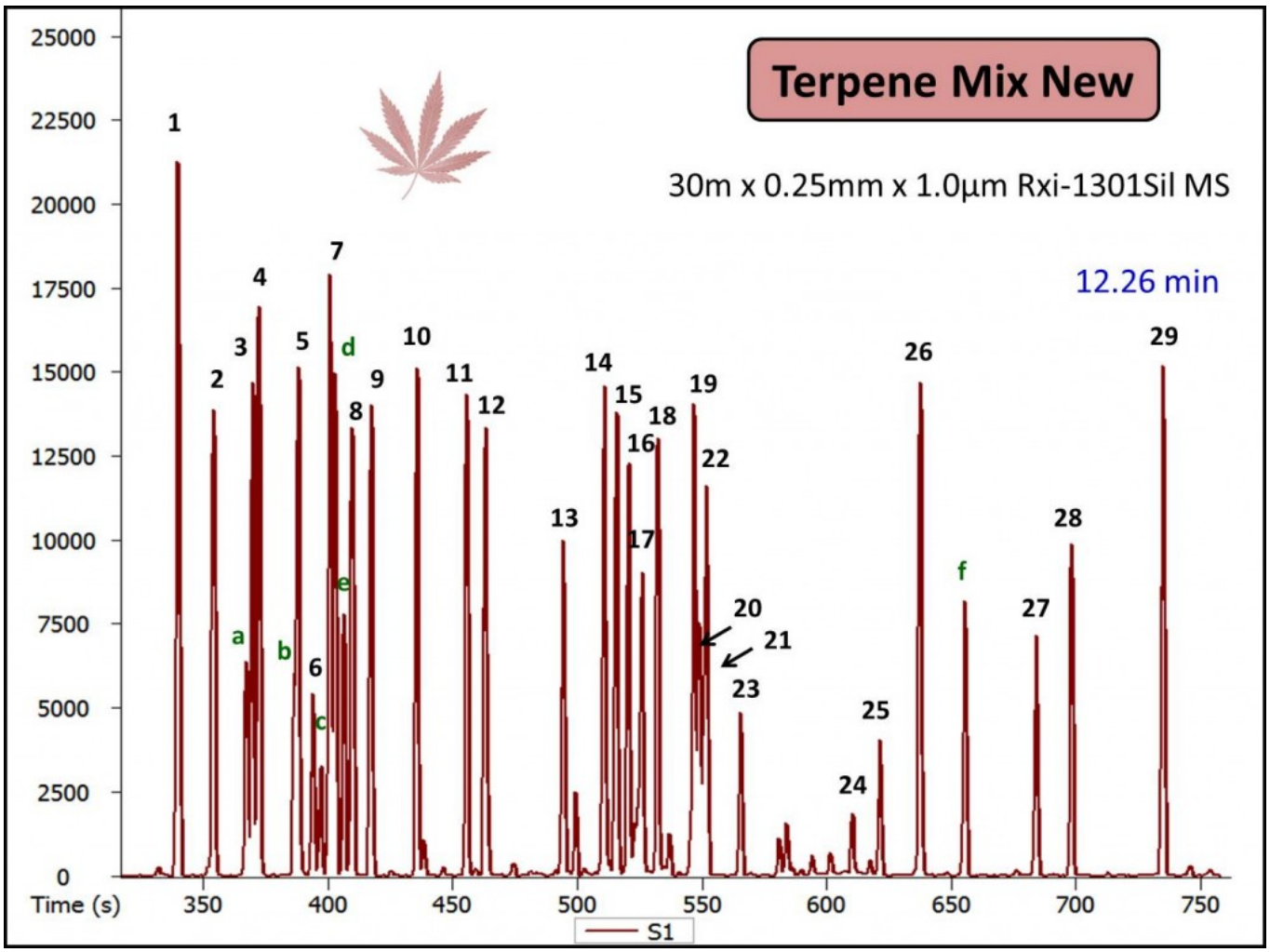
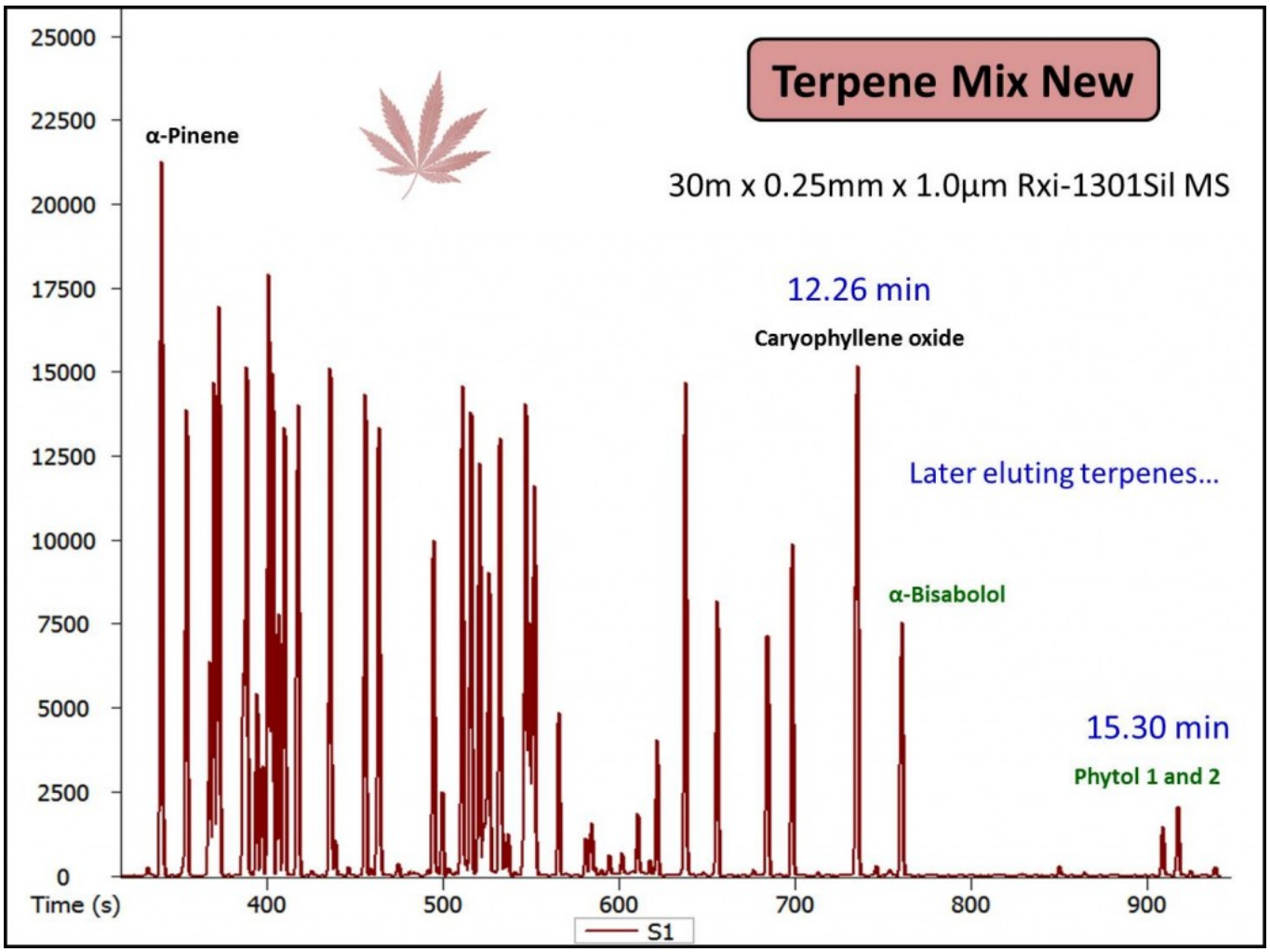
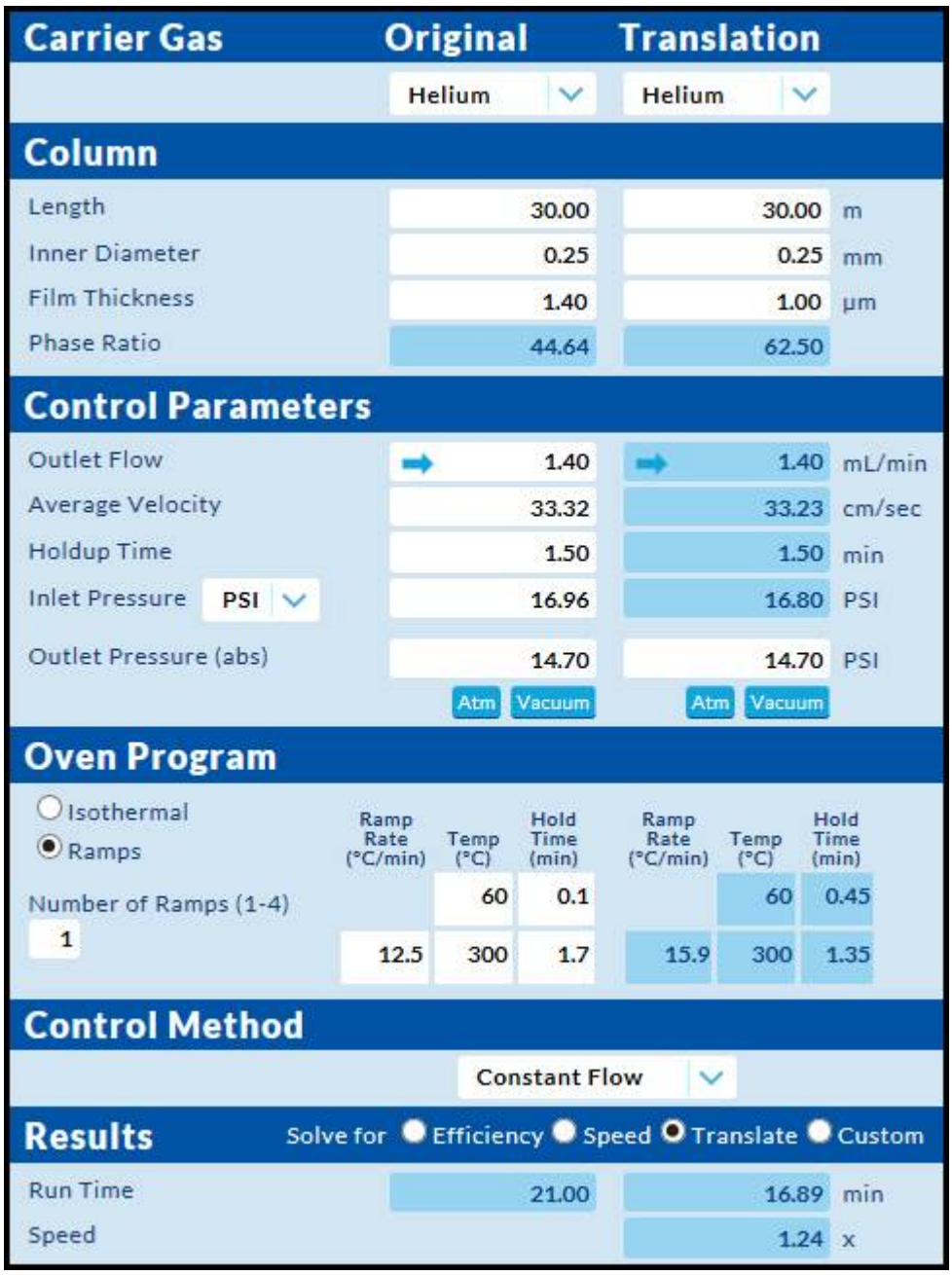
24
25
26
27
28
29


Terpene Mix New
30m x 0.25mm x 1.0µm Rxi-1301Sil MS
12.26 min
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
Time (s)
350
400
450
500
550
600
650
700
750
S1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
a
b
c
d
e
f


Terpene Mix New
30m x 0.25mm x 1.0µm Rxi-1301Sil MS
α-Pinene
12.26 min
Caryophyllene oxide
Later eluting terpenes...
α-Bisabolol
15.30 min
Phytol 1 and 2
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
Time (s)
400
500
600
700
800
900
S1



This entry was posted on Tuesday, March 25th, 2014 at 2:38 pm and is filed under Cannabis, Faster Analyses, Method Translator and Flow Calculator, New GC Columns, Optimizing Applications. You can follow any responses to this entry through the RSS 2.0 feed. You can leave a response, or trackback from your own site.

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1. *Restek's EZGC Online Suite that includes the Method Translator and Flow Calculator, and a Chromatogram Modeler, wins a TASIA Award – Chris Nelson, One of the Suite Builders « ChromaBLOGraphy: Restek's Chromatography Blog* says:
   January 26, 2015 at 7:58 pm

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