
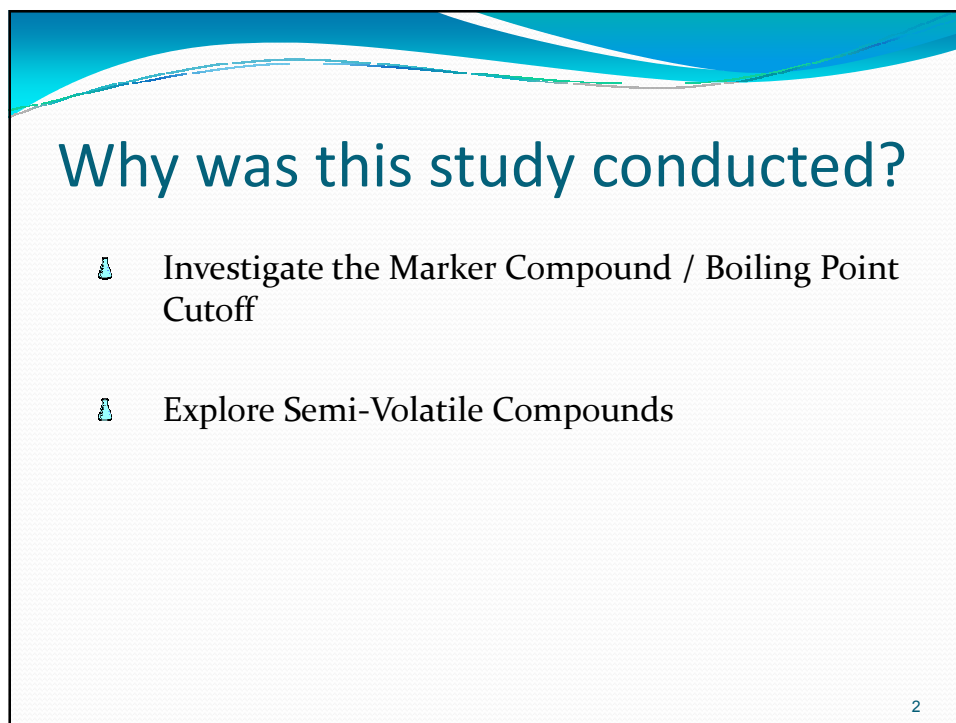


**RELATIVE VOLATILITY OF
PURE COMPOUNDS**
BY VARIOUS METHODS



1



Why was this study conducted?

- Investigate the Marker Compound / Boiling Point Cutoff
- Explore Semi-Volatile Compounds

2

Methods Explored

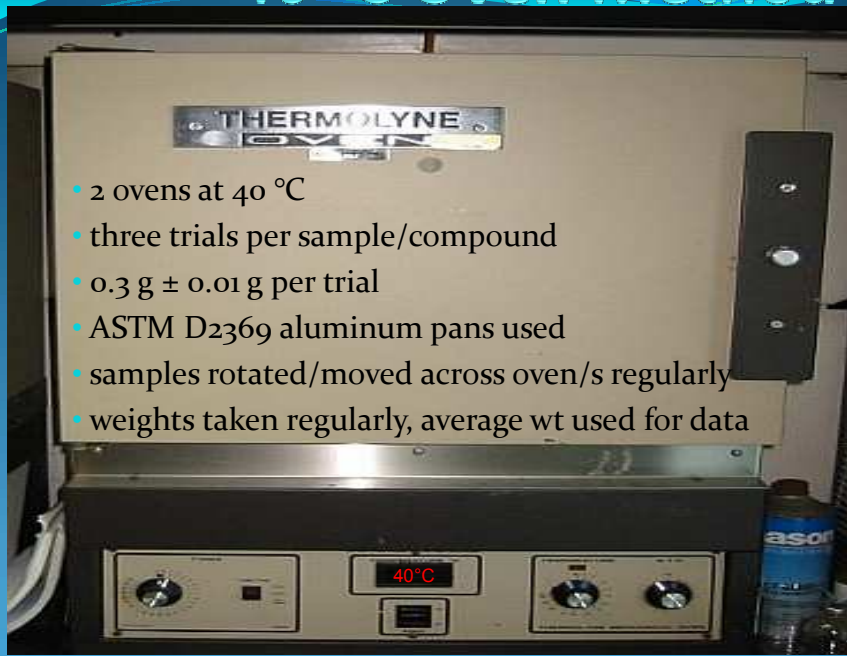
- 🔬 40°C Oven Study
- 🔬 Thermogravimetric Analysis (TGA)
- 🔬 EPA Method 24
- 🔬 Gas Chromatography
 - DB 624 Column
 - PEG-Column
- 🔬 Rooftop Study
- 🔬 BP, VP

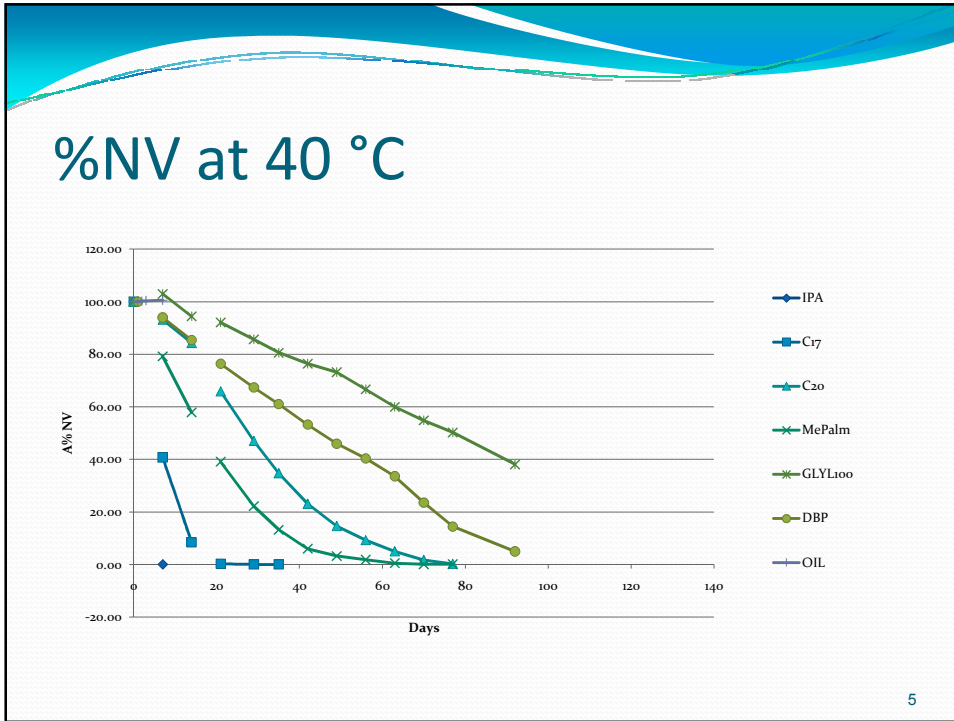


3


40 °C Oven Method

- 2 ovens at 40 °C
- three trials per sample/compound
- 0.3 g \pm 0.01 g per trial
- ASTM D2369 aluminum pans used
- samples rotated/moved across oven/s regularly
- weights taken regularly, average wt used for data



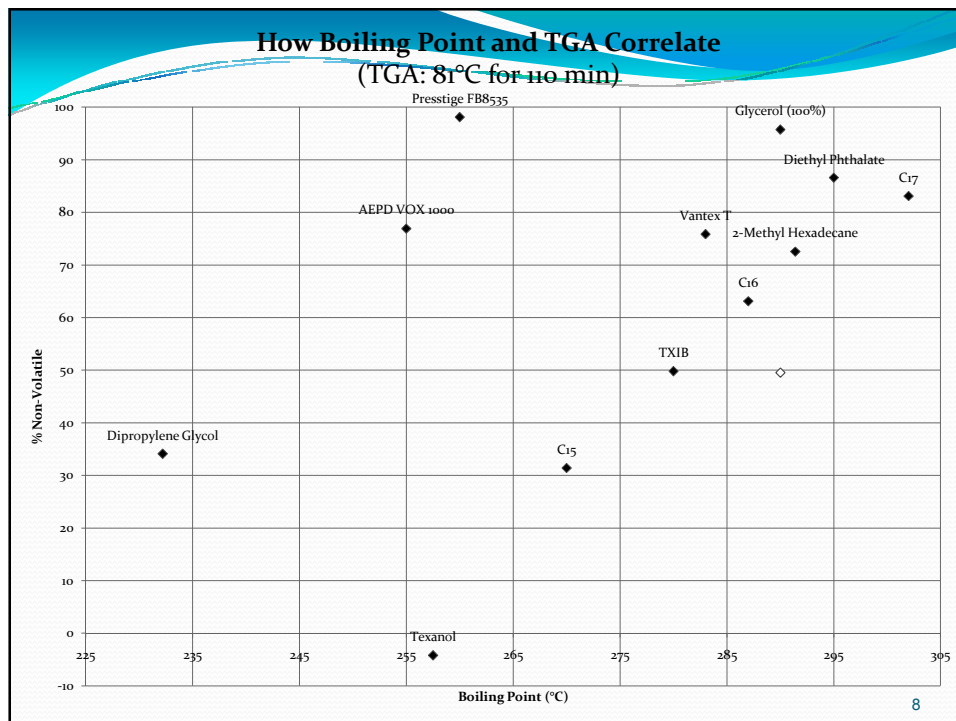
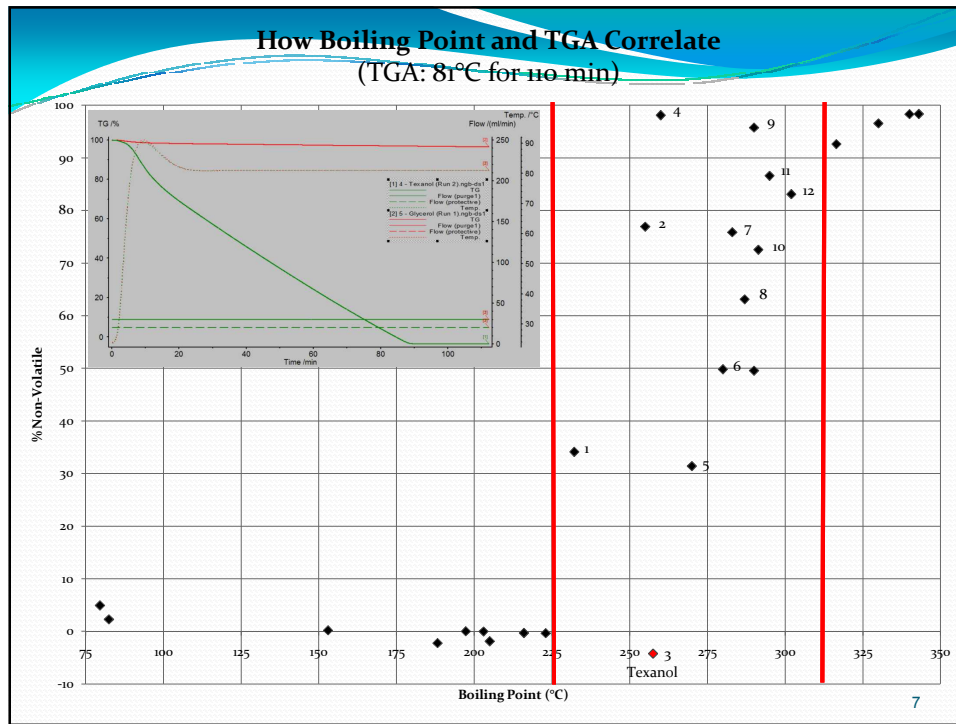


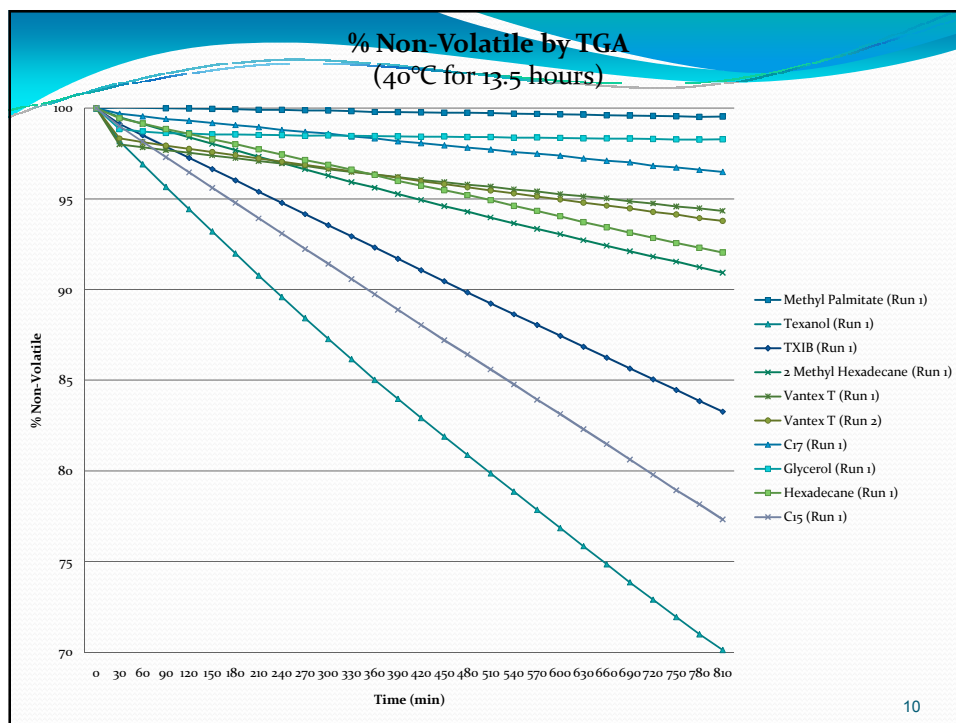
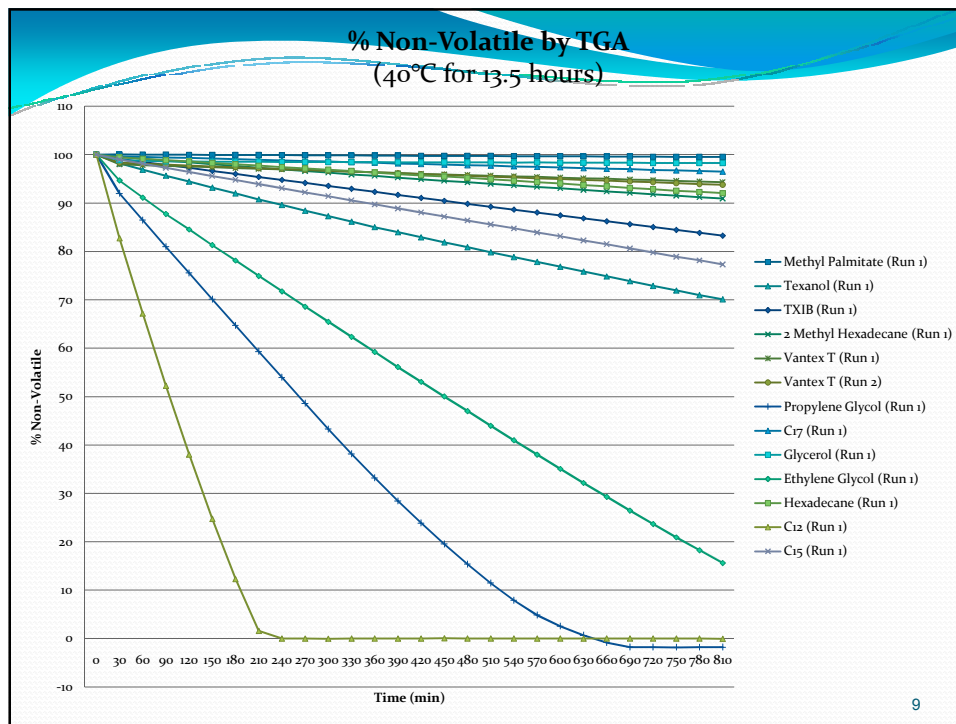
Thermogravimetric Analysis (TGA)

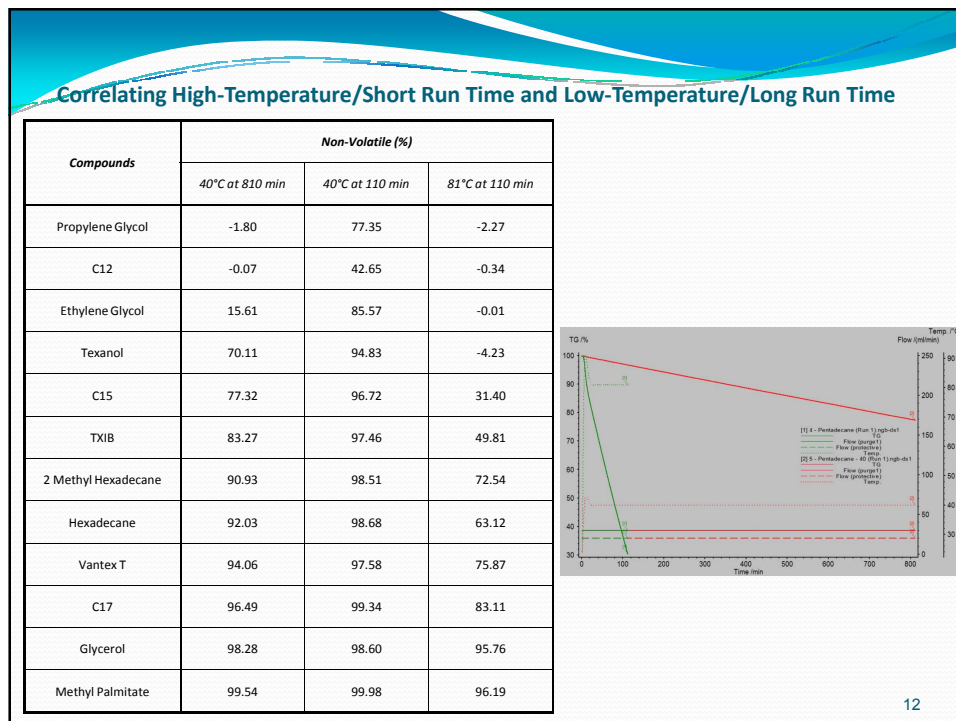
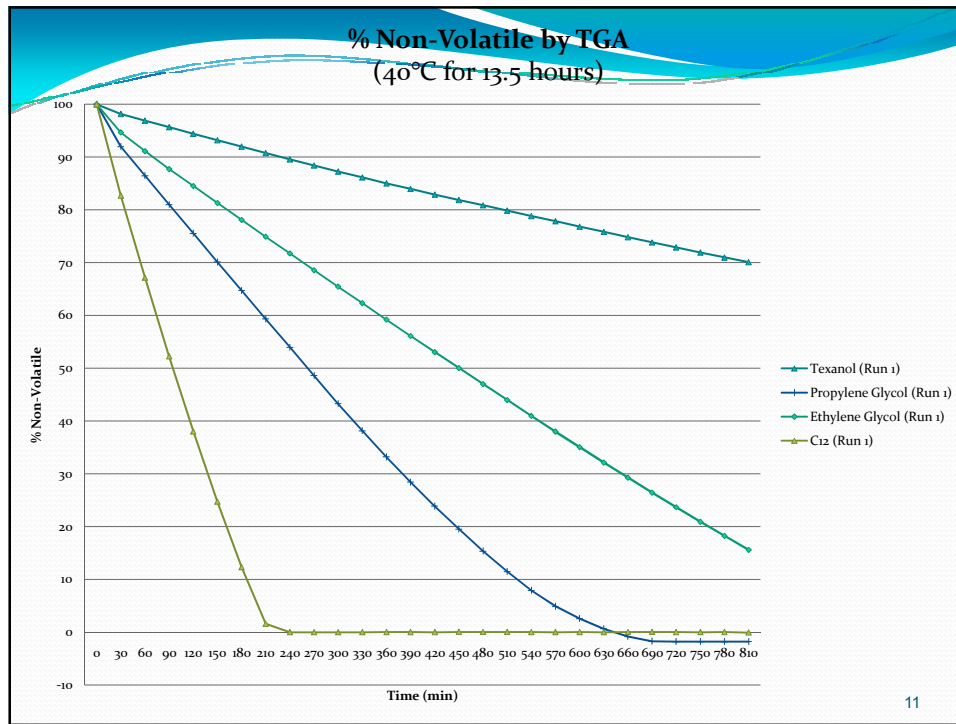


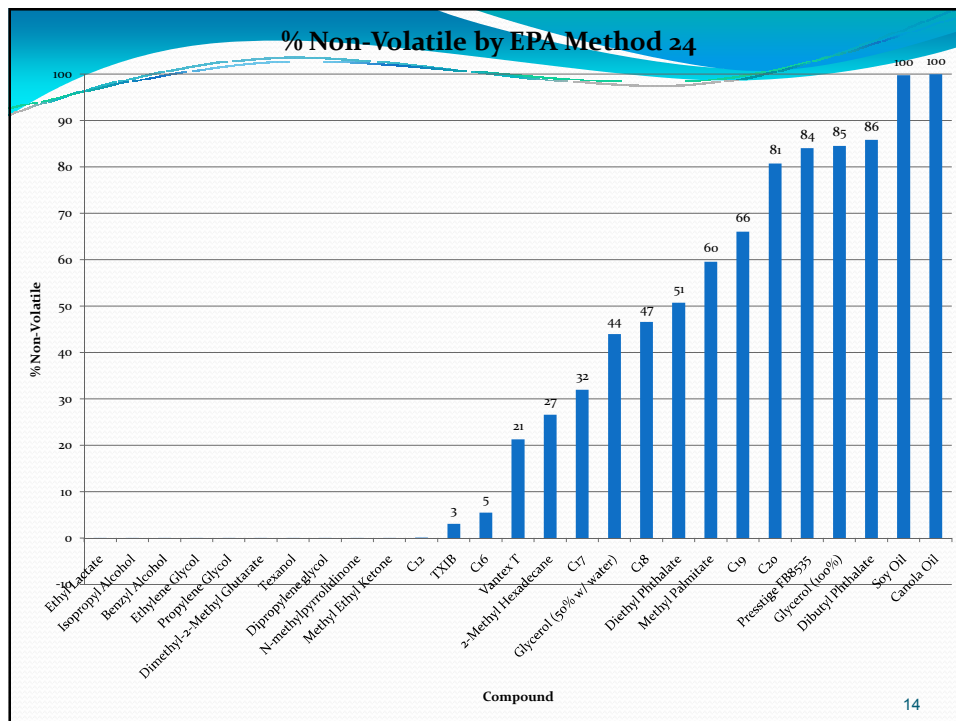
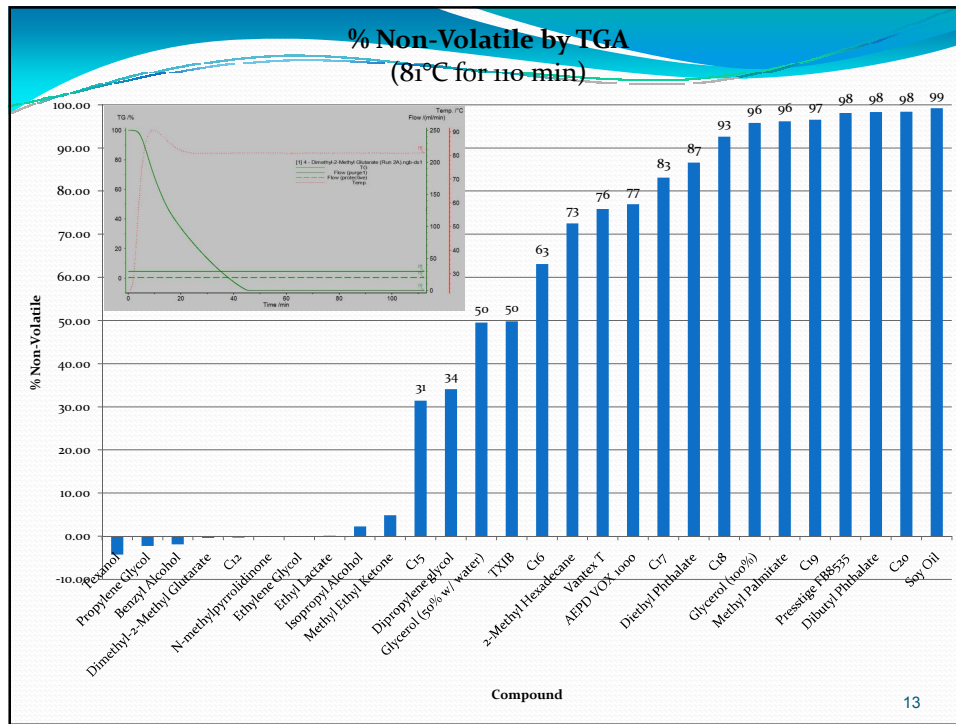
Parameter	Method	
	TGA @ 81°C	TGA @ 40°C
Instrument	Netzsch STA 449 F1	Netzsch STA 449 F1
Specimen Size	10 µL	10 µL
Specimen Holder	Composition	Platinum
	Volume	100 µL
	Dimensions	0.4 in Dia.
Temperature Sensor Location (Sample vs. Furnace)	Sample	Sample
Atmosphere Control System	Gas Type	Nitrogen
	Sample Purge Flow	30 mL/min
	Balance Protection Flow	20 mL/min
	Total Flow	50 mL/min
Baseline Correction	Yes	Yes
Temperature Program	25°C to 81°C @ 25°C/min Isothermal @ 81°C for 110 min	25°C to 40°C @ 10°C/min Isothermal @ 40°C for 13.5 hrs
Auto-sampler Use	No	No
Experiment Termination	110 minutes	810 minutes

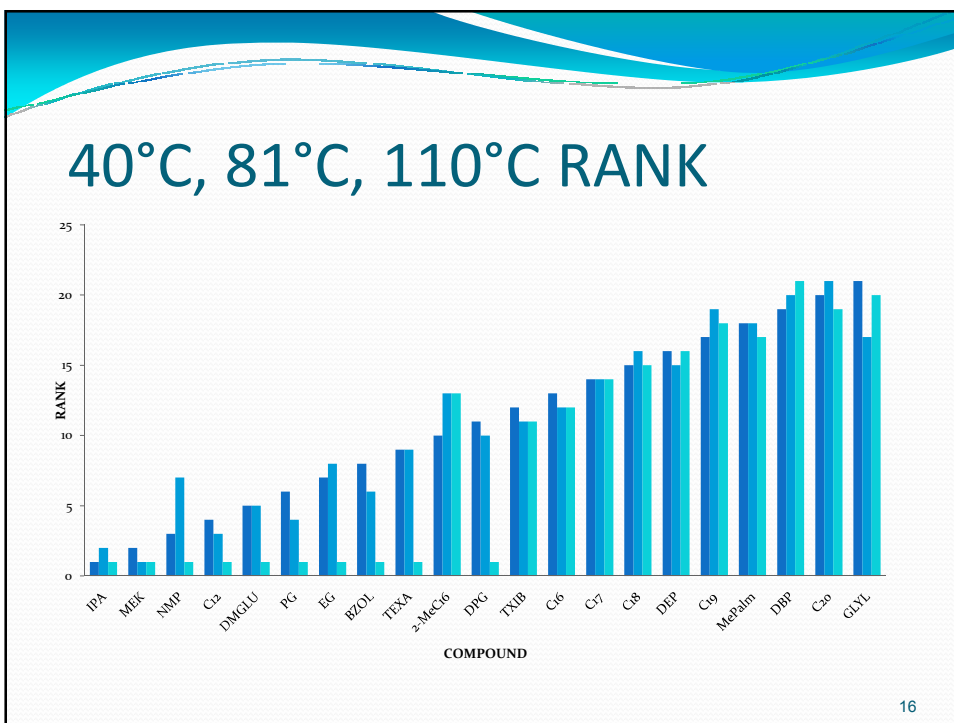
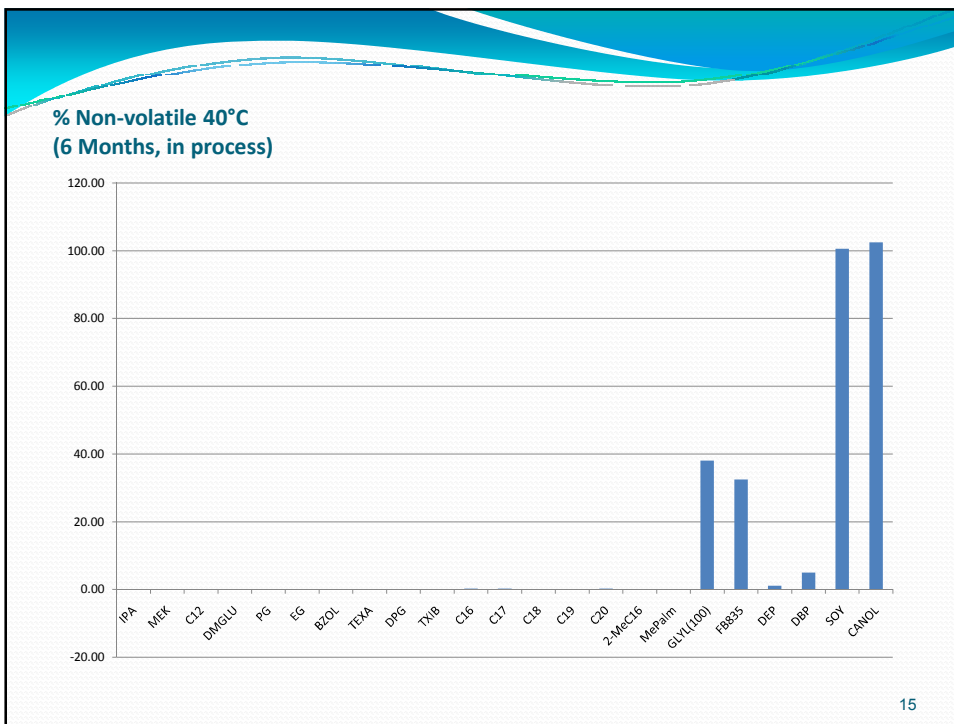
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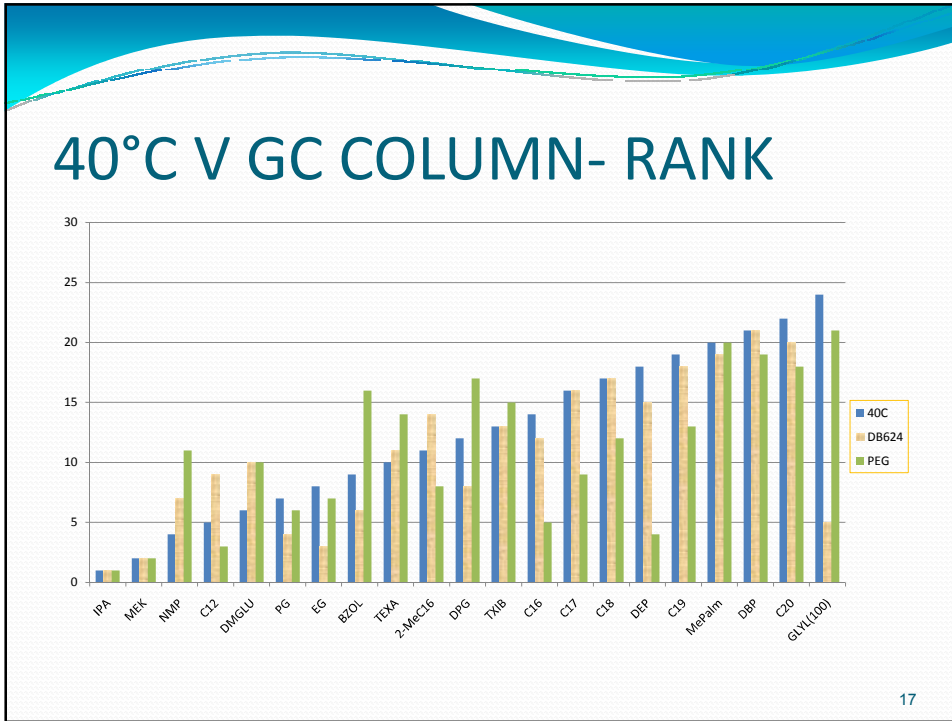












17

DATA

RELATIVE VOLATILITY BY VARIOUS METHODS

VP 20C,25C	mmHg	40C	40C	DAYS TO ZERO	TGA 81C	TGA NV or BY TIME TO ZERO	M24 110C	M24 NV	M313-91 DB624	M313-91	PEG
MEK	1.00E+02	IPA	0.04	MEK	6	IPA	0.00	IPA	IPA	IPA	IPA
IPA	4.40E+01	MEK	0.04	IPA	7	MEK	0.00	MEK	MEK	MEK	MEK
C12	1.30E+00	EtLAC	0.04	EtLAC	15	EtLAC	0.00	EtLAC	EG	EG	C12
NMP	2.40E-01	NMP	0.17	C12	17	PG	0.00	PG	PG	PG	DEP
PG	1.29E-01	C12	0.18	PG	28	EG	0.00	EG	GLYL	GLYL	C16
BZOL	9.40E-02	DMGLU	0.81	DMGLU	35	NMP	0.00	NMP	BZOL	BZOL	PG
EG	5.00E-02	PG	0.89	BZOL	37	BZOL	0.00	BZOL	EtLAC	EtLAC	EG
DMGLU	4.73E-02	EG	0.94	NMP	40	DMGLU	0.00	DMGLU	NMP	NMP	2-MeC16
DPG	1.20E-02	BZOL	0.95	EG	57	C12	0.00	C12	DPG	DPG	C17
TEXA	1.00E-02	TEXA	1.9	TEXA	96	TEXA	0.00	TEXA	C12	C12	
2-MeC16	7.50E-03	2-MeC16	2.0	DPG	34.11	DPG	0.00	DPG	DMGLU	DMGLU	DMGLU
C16	5.00E-03	DPG	4.9	TXIB	49.81	TXIB	3.11	TXIB	TEXA1, 2	TEXA1, 2	NMP
DEP	2.10E-03	TXIB	6.9	C16	63.12	C16	5.48	C16	C16	C16	C18
C17	1.85E-03	C16	12	2-MeC16	72.54	Vantex T	21.28	Vantex T	TXIB	TXIB	C19
TXIB	6.60E-04	Vantex T	12	Vantex T	75.87	2-MeC16	26.59	2-MeC16	2-MeC16	2-MeC16	TEXA1
GLYL (100%)	1.68E-04	C17	22	C17	83.11	C17	31.96	C17	DEP	DEP	TXIB
C20	1.40E-04	C18	22	DEP	86.61	C18	46.58	C18	C17	C17	BZOL
C18	6.05E-05	DEP	34	C18	92.62	DEP	47.40	DEP	C18	C18	TEXA2
MPalm	6.04E-05	C19	37	GLYL (100%)	95.76	MPalm	59.57	MPalm	C19	C19	DPG
C19	3.16E-05	MePalm	40	MPalm	96.19	C19	66.07	C19	MPalm	MPalm	C20
DBP	2.01E-05	DBP	77	C19	96.57	C20	80.73	C20	C20	C20	Presstige
		C20	78	Presstige	98.13	Presstige	84.07	Presstige	DBP	DBP	DBP
		PRESS	100	DBP	98.32	GLYL (100%)	84.54	GLYL (100%)	Presstige	Presstige	MPalm
		GLYL(100)		C20	98.36	DBP	85.80	DBP			GLYL
		Soy oil				Soy Oil	99.74	Soy Oil			
		Canola oil				Canola Oil	100.00	Canola Oil			

18

Policy Implications

- Retention Time Cutoff
 - Include everything up to Methyl Palmitate
- Assign Partial Volatility
 - Compound by Compound
 - Retention Time Ranges
- Stay consistent with Method 24
 - Dry Film Extraction

19

Contacts

- **VOC Test Methodology**
Joan Niertit, Principal Chemist
909-396-2174
jniertit@aqmd.gov

20