SYSTEMATIC SAMPLING and ANALYSIS of TWENTY-ONE ACRYLATE ESTERS

by

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Sampling for ACRYLATES

Problems ...

- **SAMPLE LOSS from Media**
  - **decomposition of acrylates on media**
- **Low % RECOVERY**
  - **hard to extract from media**
- **Skewed Chromatography**
  - **non-ideal peak shapes**

Sampling for ACRYLATES

Problem ...

to be efficient, IH & LAB would like to sample many acrylates using a single media and method BUT…

	OSHA	NIOSH
ethyl acrylate……	7, 92	1450
butyl acrylate……	PV2011	n/a
methyl acrylate…….	7, 92	1459
methyl methacrylate….	94	2537
ethylhexyl acrylate…..	PV2026	n/a
other acrylates……..	n/a	n/a

Non-Polar Acrylates

R_1 = H

acrylates

R_2

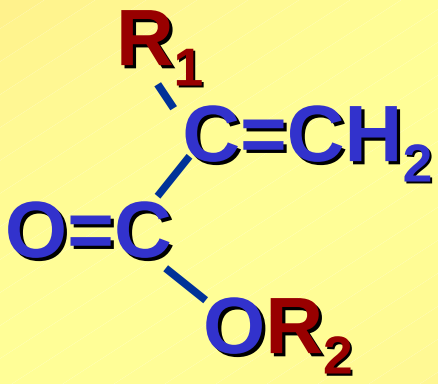
ethyl-

methyl-

n-butyl-

iso-butyl-

2-ethylhexyl-



R_1 =CH_3

methacrylates

R_2

allyl-

ethyl-

methyl-

n-butyl-

iso-butyl-

2-ethylhexyl-

Polar Acrylates

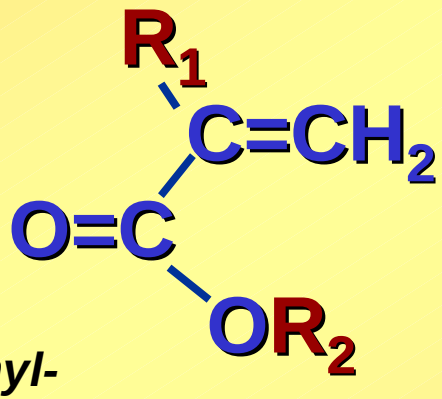
R_1 = H

acrylates

R_2

hydroxyethyl-

hydroxypropyl-



R_1 =CH_3

methacrylates

R_2

glycidyl-

hydroxyethyl-

hydroxypropyl-

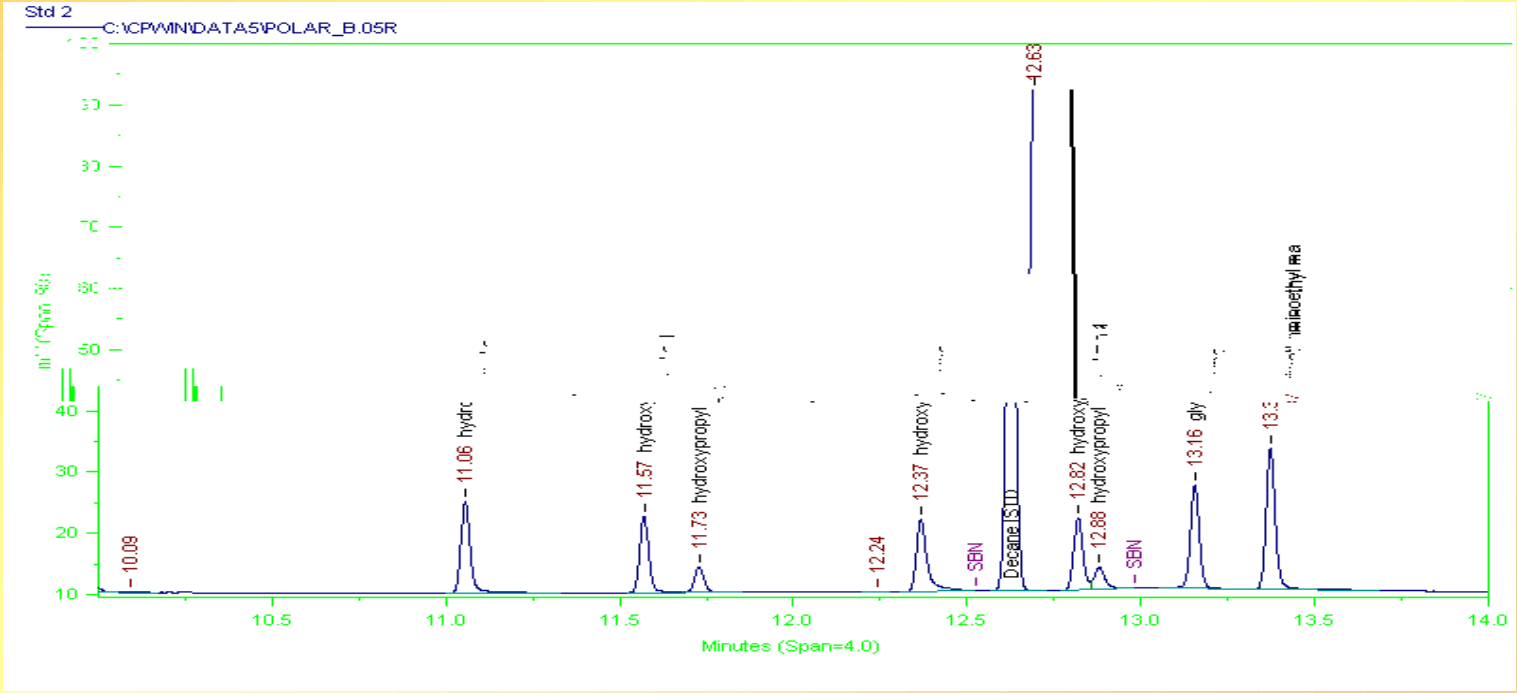
2-(dimethyamino)ethyl-

Sampling Media

- **Charcoal Sampler**
  - Room Temp & Cold Storage
- **XAD-2**
  - Room Temp & Cold Storage

GC Analysis of Polar Acrylates

- **Extract Sample with 2.0 mL 97% CS_2 w/ 3% v/v Dimethyl Formamide**
  - **1µL Injection in Gas Chromatography Column - Restek RT-1 (Methyl Silicone 1.5µm film) 30 x 0.32mm**
  - **Split 10:1 Init Temp = 50°, 3 min hold, 15°C per minute to 250°C**



GC Analysis - Non-Polar Acrylates

- **Extract Sample with 2.0 mL 97% CS_2 w/ 3% v/v Dimethyl Formamide**
  - **1µL Injection Gas Chromatography Column- Restek RT-1 (Methyl Silicone 1.5µm film) 30 x 0.32mm**
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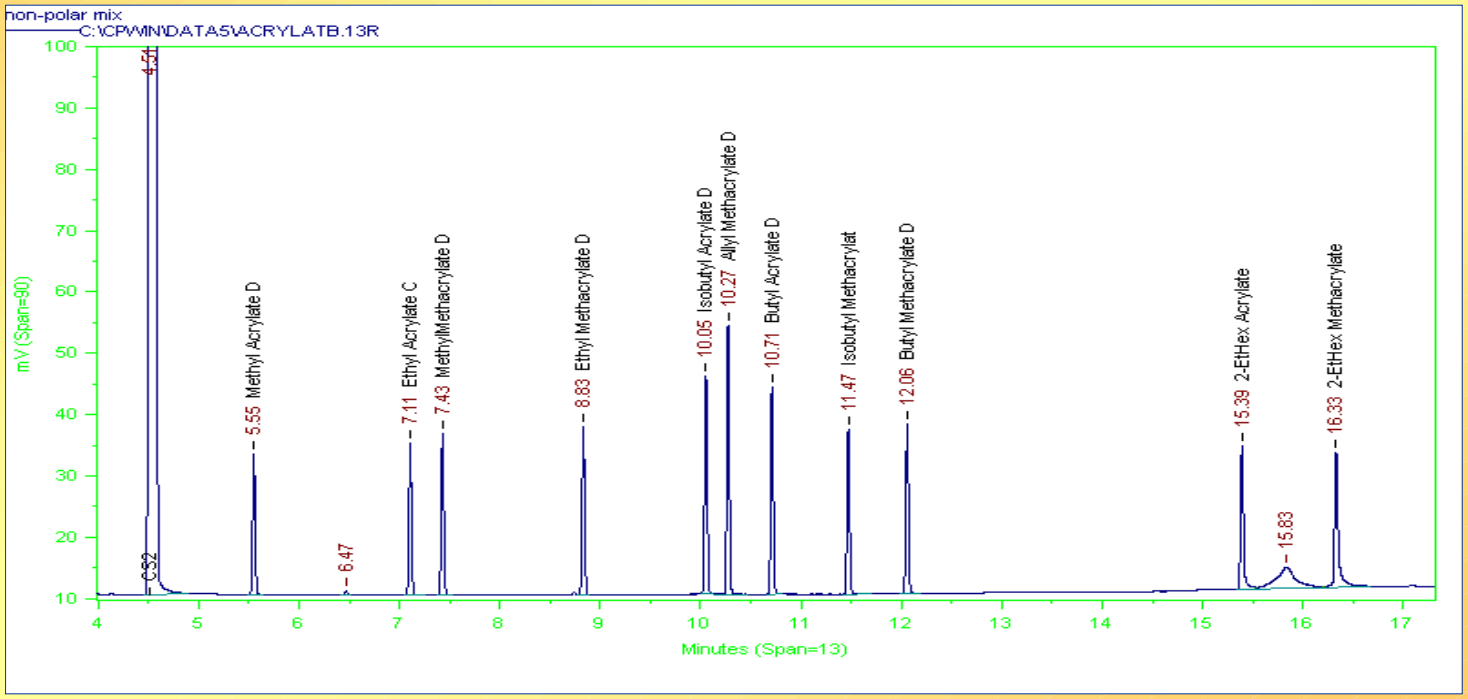
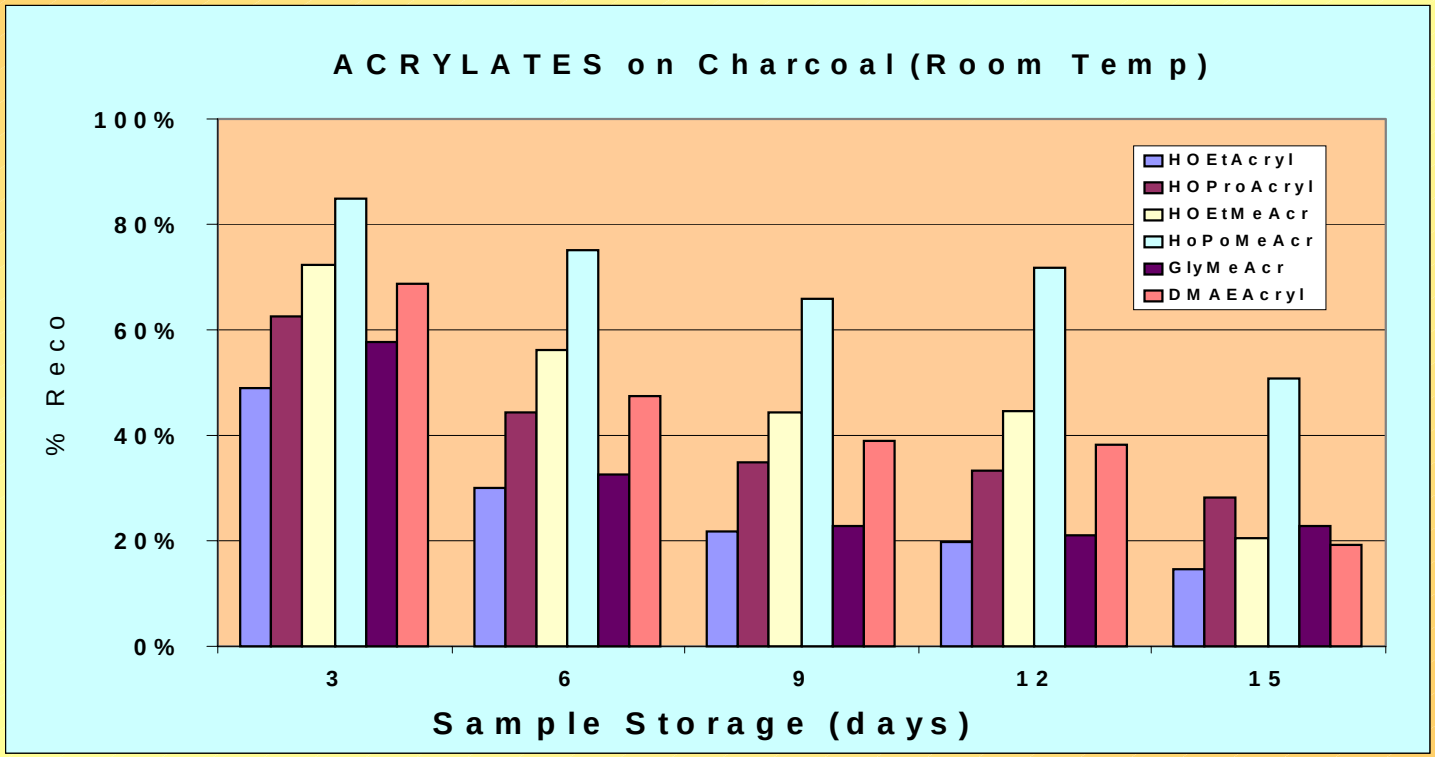
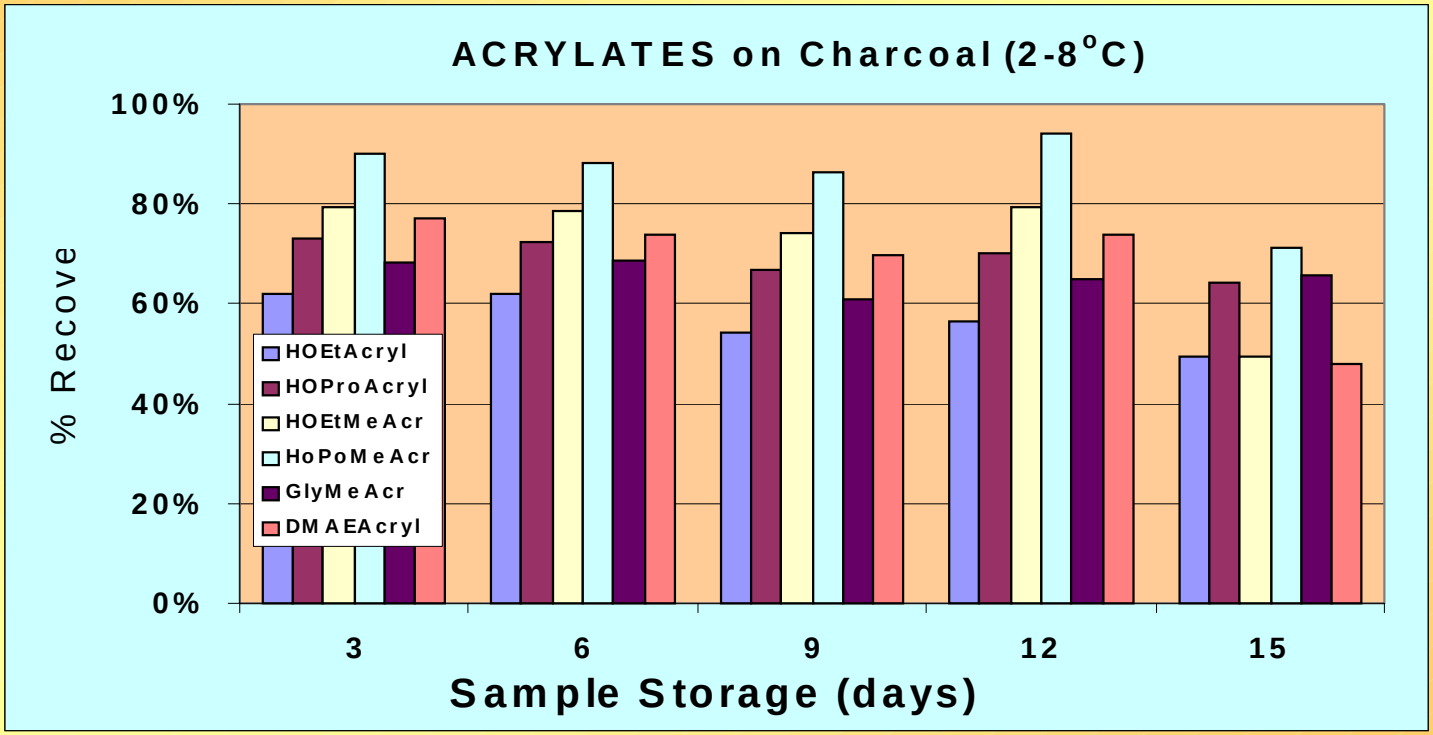


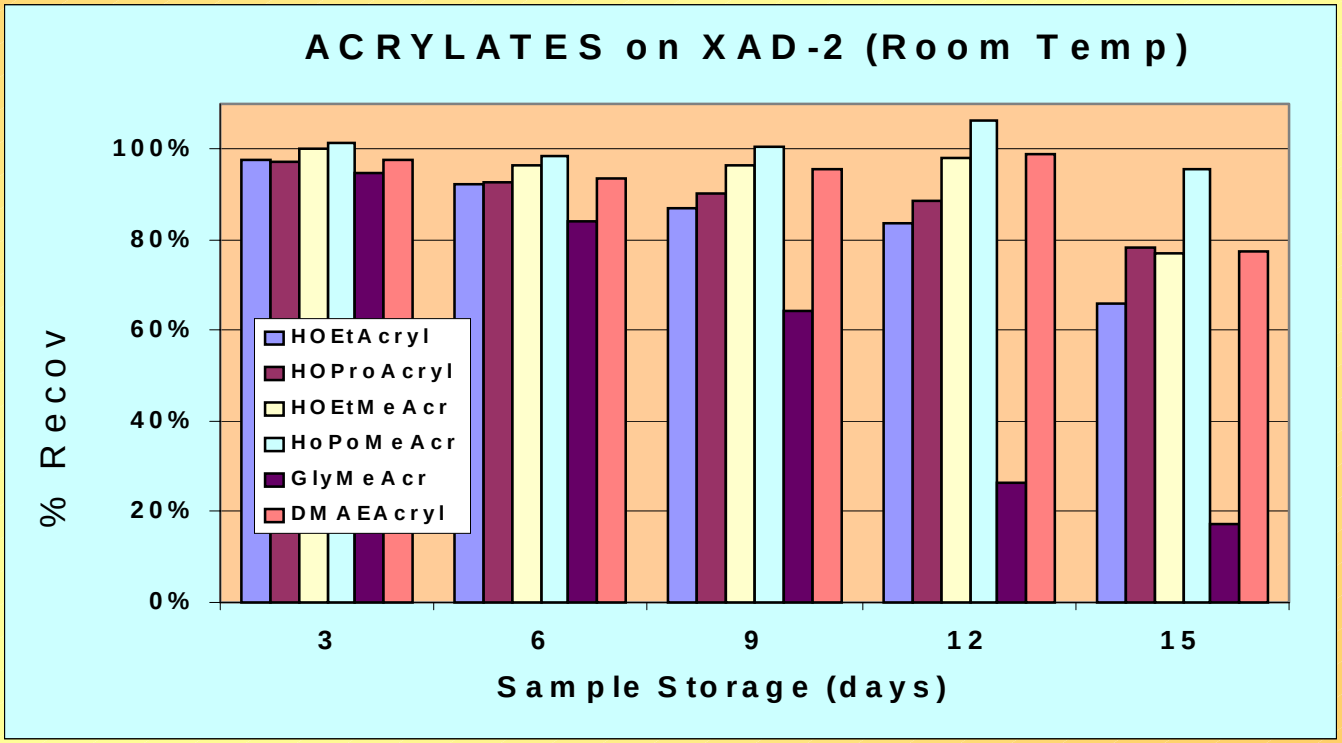
Stability of Polar Acrylates on Charcoal Sampler (RT)



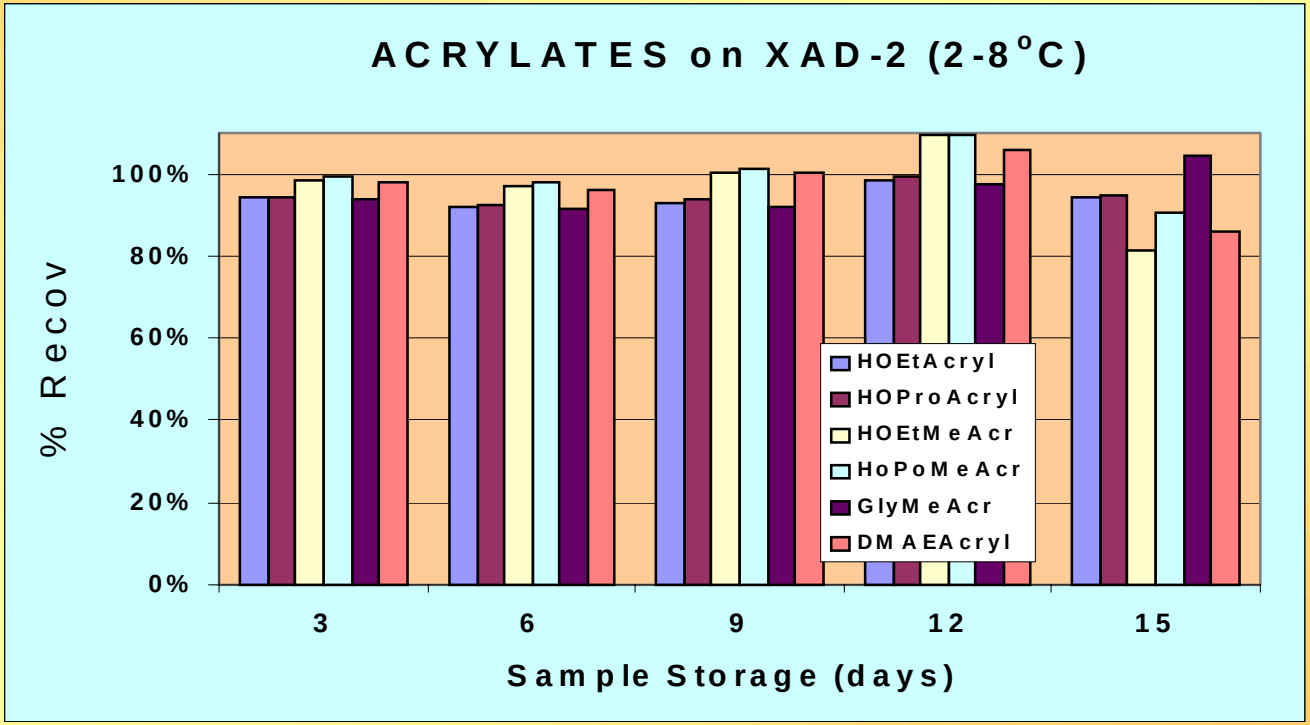
Stability of Polar Acrylates on Charcoal Sampler (cold)



Stability of Polar Acrylates on XAD-2 Sampler (RT)



Stability of Polar Acrylates on XAD-2 (cold)



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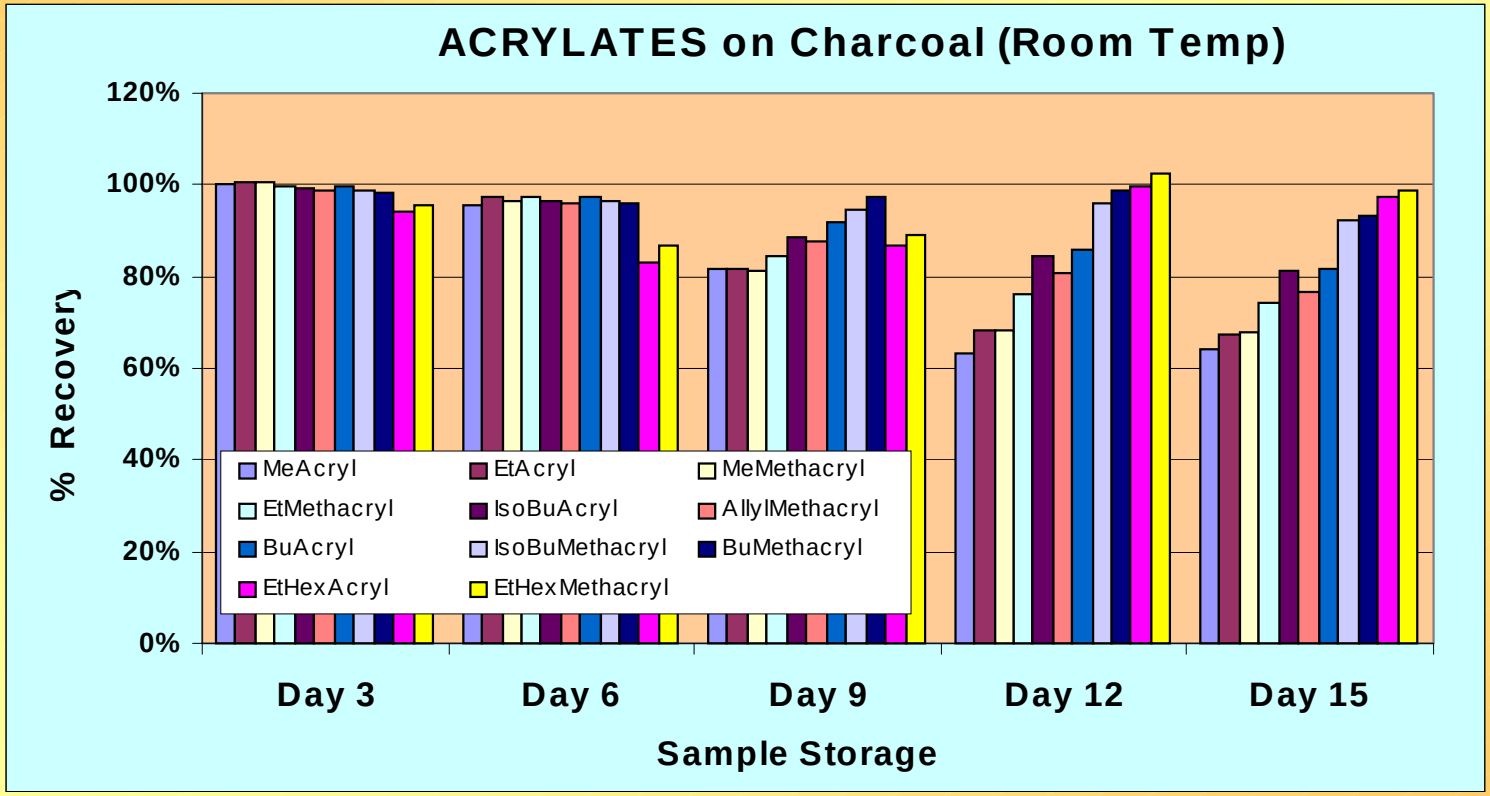
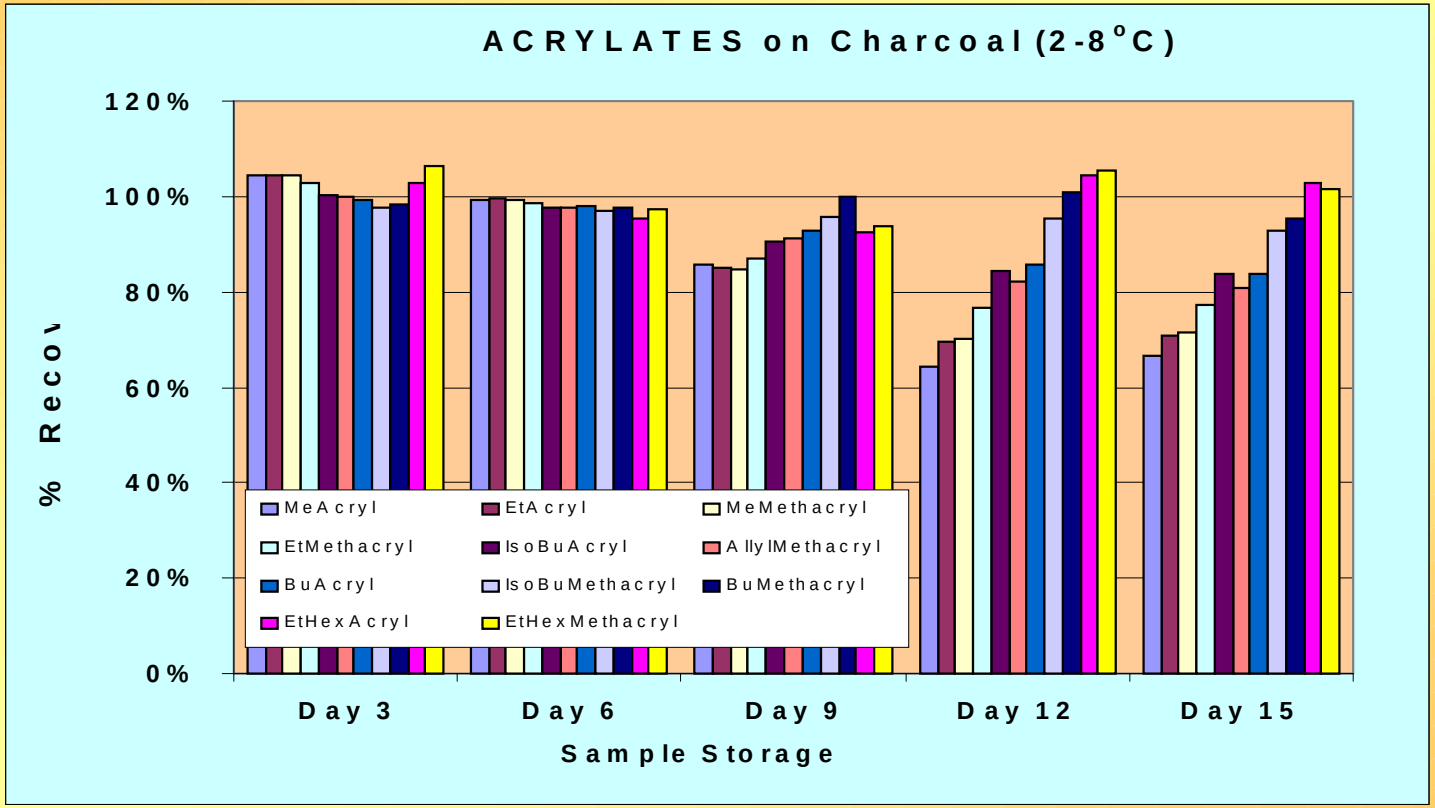
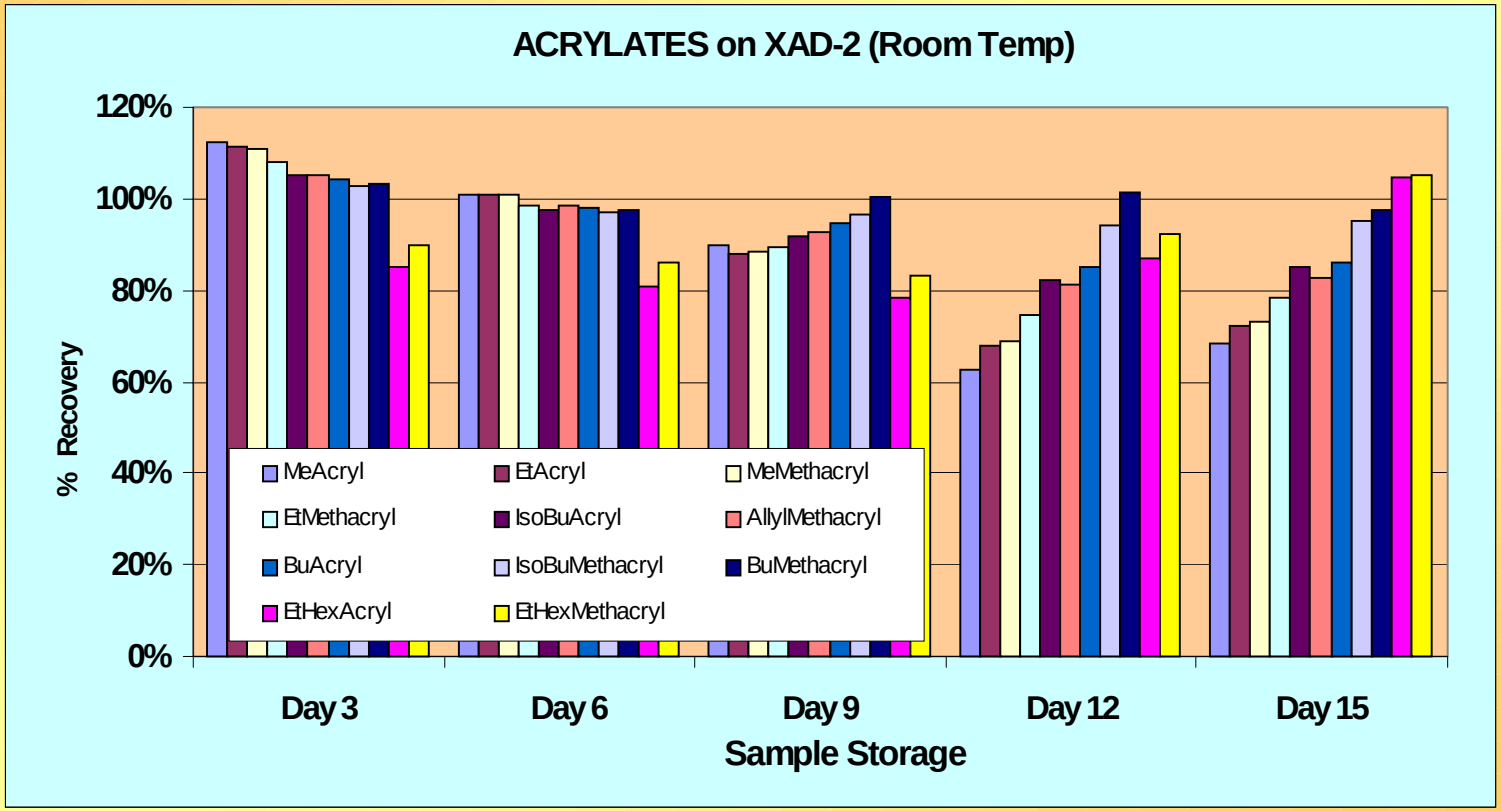


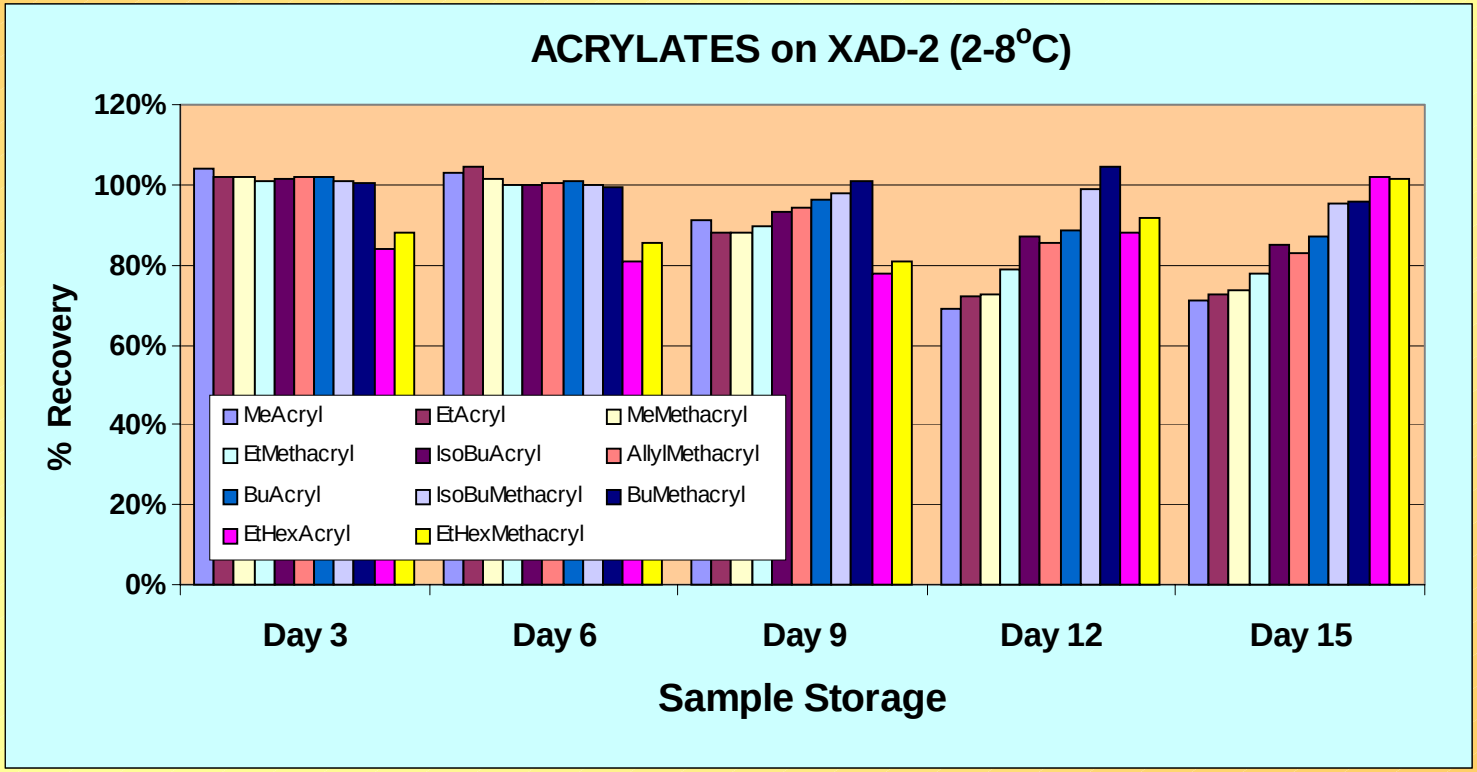
Stability of Non-Polar Acrylates on Charcoal Sampler (cold)



Stability of Non-Polar Acrylates on XAD-2 Sampler (RT)



Stability of Non-Polar Acrylates on XAD-2 Sampler (cold)



CONCLUSIONS

SAMPLING & HOLDING

17 Acrylates can be collected on the same Sampling Media

- Charcoal or XAD-2

XAD-2 is Preferred for Sample Stability

- 16/17 Acrylates stable on XAD-2 for 1 week
- all Acrylates stable on cold XAD-2 for 9 days
- 11/11 Non-Polar Acrylates stable on Charcoal for 1 week

EXTRACTION and ANALYSIS

17 Acrylates can be extracted with 97% CS_2 + 3% DMF

11 Non-Polar Acryltaes canb be resolved in a single GC Scan

6 Polar Acryltaes can be resolved in single GC Scan