

**Workshop: Analytical challenges with
environmental testing of polymers and
other difficult chemistries**

Hosted by ITAP Team
Tuesday, November 5,
2019

Why Polymers? Why Now?

- Increased interest from microplastic scope creep.
- Anticipated regulatory review – ECHA “Polymers Requiring Registration”
 - ECETOC Polymer Safety Task Force:
 - Phase 1. Polymer assessment framework - completed
 - Phase 2. Methodology – target December 2019
 - Phase 3. Case studies
- But polymers are **COMPLEX**

Challenges with Polymers and Ecotox Testing

- Lack of publicly available data!
- Uncertainty about MoA – physical effects and modelling dose-response?
- Uncertainty about toxicological bioavailability?
- What are the relevant toxicological descriptors?
- Are these UVCBs – and how to test mixtures?
- Test methods – do they need update/amendments?
- Mitigating factors – humic acid, solids, in the tests – guidance?
- **Need analytical methods to verify exposures!**
- Need to develop computational models when the above is resolved?
- **Need consensus and guidelines for these issues**

How to detect and quantify polymers?

They are not our
"usual suspects"

How to analyze
these
"compounds"?



Older methods

Colorimetric wet
chemistry methods
(Dubois, 1956
&
Kanzaki, 1959)

Early P&G work

Cap-GPC-MS
semi-quantitative +
quantitative
w/high selectivity

Current state

CapGPC-QTOF
(characterization)
FI-HRQTOF-MS
(quantitation)



*Acknowledgements:
P&G analytical team (P&G)
2019*

Workshop Agenda

- 11:30 am – Introduction and rules of engagement
- 11:45 am – 12:45 pm – World Café style – 1 question per table with 15 min per table
- 12:45 – 1pm – Debrief and wrap up

Workshop Format

- World Café format
- 4 tables – 4 methods
- 12 min/table
- Table host will act as notekeeper and timekeeper
- Cycle through the tables 1 through 4
- Highlights and notes and findings shared during wrap-up

What Tool Do I Use:

Mass Spectrometry



Atom-based -Total Organic Carbon,
Atomic Spectroscopy



Other Methods: Wet chemistry,
Selective Ion Electrode, FTIR?

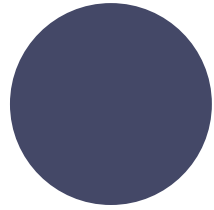
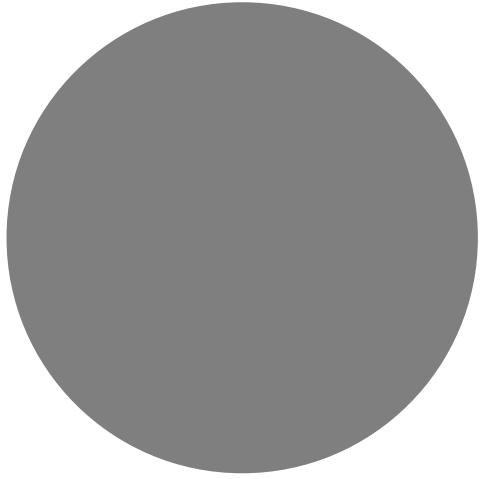
What about Extraction?



What Tool Do I Use?

Considerations:

- What question is being asked? Characterization, detection or quantitation?
- How can I apply this tool?
- What factors are important in tool selection?
- Who needs the data?
- How will the data be used?
- What environmental safety studies (fate, effects, field, etc)
- What is the matrix/type of study?
- How low do we need to go?
- How specific does the method need to be?
- Is this instrumentation available?



GOOD LUCK!



Parking Lot

Workshop Qs

- Signal suppression
- Variability between runs, samples, methods
- What about tandem MS?