Implementation of scalable sample preparation workflow solutions in a clinical laboratory

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Learning objectives

» Build from Julia’s discussion on fundamentals

» Workflow solutions to support strategies towards implementation
  » Processing options
    • Manual
    • Automation
    • Homogenizers – sample cleanup for solid phase samples
  » Extraction options
    • Cartridges
    • Plates
  » Evaporation
    • Cartridges
    • Plates

» What now?
» Conclusions

What if chromatographic separations had <1000 theoretical plates?

No leprechauns riding on unicorns
Sample prep can
  • Add some resolution elements to an assay
  • Protect your LC
  • Protect your MS/MS
  • Improve data quality
Good chromatography decision making is still required

Acknowledgement to Brian
New this year: Biotage BeadRuptor 24

Aps in development: extraction of drugs of abuse from hair, bone, tissue

Positive Pressure+ Manifolds

Vs.

RapidTrace+ Automated SPE Workstation
New this year: Extrahera
Translation = extraction

» Simple robust & ready to run
» Compact 8 or 4 channel instrument
» Quick processing
» Dual format
» Easy software interface

EVOLUTE EXPRESS
method development plates

They do exist!
Presented at MSACL
Load, Wash, Elute

ISOLUTE SLE+

SPE looks like this:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash</td>
<td>Wash</td>
<td>Wash</td>
</tr>
<tr>
<td>Load</td>
<td>Wash</td>
<td>Elute</td>
</tr>
</tbody>
</table>

SLE looks like this:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elute</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Also available in 96 well plates
No condition
No equilibration
No wash steps
Generic method development plan

ISOLUTE SLE+ Supported Liquid Extraction Plates. Method Selection

- ACIDIC DRUG
  - Buffer 1: Acetic acid 0.5 M, pH 4.0
  - Extraction Solvent 1: MeOH, 30%
- NEUTRAL DRUG
  - Buffer 2: Acetic acid 0.5 M, pH 4.0
  - Extraction Solvent 2: MeOH, 30%
- BASIC DRUG
  - Buffer 3: Acetic acid 0.5 M, pH 4.0
  - Extraction Solvent 3: MeOH, 30%
- OTHERS
  - Buffer 4: Acetic acid 0.5 M, pH 4.0
  - Extraction Solvent 4: MeOH, 30%

TurboVap-LV Evaporation Workstation

Patented vortex evaporation technology

Evaporation 96 well plate options

SPE Dry
- Designed for high-throughput laboratories, the Biotage® SPE Dry 96 Well Edition provides efficient solvent evaporation in a microplate format.

TurboVap® 96
- TurboVap® 96 Concentrator is a microprocessor-controlled evaporation system for simultaneous, automated concentration of multiple samples.
Implementing methods
I bought the technology, what do I do now?

Colleague versus customers
Applications support provided
25 published references with collaborators in 2014
Clinical applications include
• Drugs of abuse testing
• Alcohol abuse biomarkers
• Biogenic amine / Catecholamine metabolites
• Biomonitoring for exposure assessment
• Water soluble vitamins

Final thoughts
» Considerations for implementing should consider many variables including cost and throughput
  » Cartridges vs plate

» Automation should always be considered

» If you have a problem, please reach out
  » Sorbent selection
  » Issues with recovery
  » Method scalability

A grateful acknowledgement to the Biotage family
And thanks for everything Karl!
Thank You For Your Attention!

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