Mouldy problems and more with CEC determination!

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Presentation will discuss briefly:

- Mouldy BaCl$_2$ extractions for CEC determination
- NaF titration vs German method for exchangeable acidity determination
Mouldy BaCl$_2$ extractions for CEC determination!

**Problem:**
- BaCl$_2$ extracts were found to be growing mould within 5 days of extraction when stored at ambient temperature.

**Potential Solutions:**
- Extracts that were stored at 4$^\circ$ C were found to have grown mould within 72 hours after reaching room temperature.
- Chloroform was not found to inhibit mould growth.

**Final Solution:**
- Extractions conducted for CEC determination were acidified with 1.45 ml of conc. HNO$_3$ and 1.35 ml of conc. HCl prior to been made up to the 100 ml mark with BaCl$_2$. (Similar to the acid concentration in the standards used on the ICP-MS).
- Acidified extracts were observed to be stable for at least 2 months.
Comparing the German method (GM) with NaF titration for the determination of exchangeable acidity in soils

- There has been some debate about the merits of determining exchangeable acidity using the GM vs NaF titration.

- Exchangeable acidity by the GM can be calculated from the sum of the CEC exchangeable elements of Fe, Mn, Al and H\(^+\) like so:
  \[ E_{\text{acidity}} = \text{Fe} + \text{Mn} + \text{Al} + H^+ \]

- A comparison was made between the exchangeable acidity determined by the addition of Fe, Mn, Al, and Free H\(^+\)(i.e. GM), versus exchangeable acidity determined by titration (SA10) on the 6th FSCC ring test samples.
<table>
<thead>
<tr>
<th>Sample</th>
<th>$E_{\text{acidity}}$ from titration (SA10)</th>
<th>$E_{\text{acidity}}$ from summation (GM)</th>
<th>6$^{\text{th}}$ FSCC ring test mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSCC Sample A</td>
<td>0.50 (\sigma = 0.03) (n = 4)</td>
<td>0.60 (\sigma = 0.03) (n = 4)</td>
<td>0.61</td>
</tr>
<tr>
<td>FSCC Sample B</td>
<td>0.07 (\sigma = 0.02) (n = 3)</td>
<td>0.05 (\sigma = 0.02) (n = 4)</td>
<td>0.11</td>
</tr>
<tr>
<td>FSCC Sample C</td>
<td>-0.12 (\sigma = 0.04) (n = 4)</td>
<td>0.01 (\sigma = 0.02) (n = 4)</td>
<td>0.08</td>
</tr>
<tr>
<td>FSCC Sample D</td>
<td>2.92 (\sigma = 0.15) (n = 4)</td>
<td>2.76 (\sigma = 0.10) (n = 4)</td>
<td>3.56</td>
</tr>
<tr>
<td>FSCC Sample E</td>
<td>4.07 (\sigma = 0.17) (n = 4)</td>
<td>4.05 (\sigma = 0.09) (n = 4)</td>
<td>5.45</td>
</tr>
</tbody>
</table>

Thus, as similar results were obtained, the GM was used in all subsequent analyses.
Thank you for your attention!