Selective Solid Phase Extraction for purification of Fluorous Radiotracer issued from an Aromatic Nucleophilic Substitution using Molecularly Imprinted Polymers

A mixture of Ethyl 4-hydroxybenzoate (99 µg), Ethyl 4-dimethylaminobenzoate (928 µg), Ethyl 4-fluorobenzoate (10 µg) and Ethyl 4-trimethylammoniumbenzoate iodide (102 µg) in 80-20 Water-Acetonitrile (5 mL) is prepared as the loading solution.

**Solid phase extraction (SPE) protocol**
The SPE procedure used a AFFINIMIP® SPE 18F Aromatic Nucleophilic Substitution Cartridge. The details of each step are as follows:

- Condition the SPE Cartridge with 5mL of Acetonitrile (ACN)
- Load 5mL of the loading solution (L)
- Wash the cartridge with 5mL of 80-20 Water-ACN
- Dry the cartridge. Force the water down into the cartridge and out the bottom or apply vacuum 30 seconds
- Elute Ethyl 4-fluorobenzoate with 3mL of ACN (E1)
- An extra elution of 1 mL until dryness (E2)

The flow has to be as slow as possible so as to favour the interactions between the phase and the different compounds.

**Analysis**
HPLC was performed on a ThermoFinnigan Spectra System with an Hypersil Gold column 50mm x 2.1mm, 1.9 µm (Thermo). The separation was carried out using a gradient (see Table 1) at a flow rate of 0.2mL/min.

**Table 1. Gradient used for the analysis.**

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>% Water</th>
<th>% ACN</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>32</td>
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<td>30</td>
</tr>
<tr>
<td>33</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>43</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

The detection system was a ThermoFinnigan Spectra System Model UV6000LP set to 235nm. The injection volume was 10µL.

**Results**
Recovery of more than 95 % of the fluorous radiotracer was obtained without any contamination of the other compounds.

**Figure 1.** Chromatograms obtained before (red) and after (E1 : blue, E2 : green) AFFINIMIP® SPE 18F Aromatic Nucleophilic Substitution Clean-up

**Conclusion**
The use of an AFFINIMIP® SPE 18F Aromatic Nucleophilic Substitution cartridge is a simple, fast, and selective tool for the purification of reaction mixture issued from radiofluoration.