Maleic and kojic acid in starch applying UV/VIS detection after ion-exclusion chromatography

Maleic acid findings in Asian food caused the recall of a lot of starch-containing food products in Asia. Long-term consumption of maleic acid can cause kidney problems. The cyclic kojic acid, on the other hand, is approved as an additive in food and cosmetics to preserve or to bleach, respectively. In this work, both acids are determined in a single analysis.

Results

<table>
<thead>
<tr>
<th>Organic acid</th>
<th>Concentration</th>
<th>RSD [%] n = 7</th>
<th>Recovery [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maleic acid</td>
<td>0.859 mg/g</td>
<td>0.7</td>
<td>-</td>
</tr>
<tr>
<td>Kojic acid</td>
<td>n.d.</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kojic acid (3.0 mg/L spiked)</td>
<td>2.95 mg/L</td>
<td>-</td>
<td>98</td>
</tr>
</tbody>
</table>
Sample
Starch

Sample preparation
Extraction of 0.1 g of sample in 50 mL of ultrapure water. An aliquot is diluted 1 : 1 with 50% acetonitrile, centrifuged, filtered (0.2 µm) and injected over an RP cartridge.

Columns
Metrosep Organic Acids - 250/7.8 6.1005.200
Metrosep RP 2 Guard/3.5 6.1011.120

Solutions
Eluent 0.125 mmol/L sulfuric acid
15% acetonitrile

Analysis
UV/VIS detection

Instrumentation
930 Compact IC Flex Oven/Deg 2.930.2160
944 Professional UV/VIS Detector Vario 2.944.0010
863 Compact IC Autosampler 2.863.0010

Parameters
Flow rate 0.5 mL/min
Injection volume 20 µL
P_{max} 7 MPa
Recording time 29 min
Column temperature 35 °C
Wave length 216 nm
Bandwidth 5 nm
Measuring duration 300 ms