Green Chemicals deserve sustainable purification

Perfect pitch and boost the European Bio-economy event,
November 7, 2018, Brussels

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SoliQz B.V. is a Rotterdam, NL based SME providing services and equipment for purification of (bio-based) chemicals by bringing together:

- the proven Hydraulic Wash Column (HWC) technology from TNO,
- the state-of-art crystallisers and plant design/building experience from Armstrong-Chemtec.

Present status:
- Founded in November 2013, 5 FTE’s in 2018
- Armstrong-Chemtec (US/UK engineering company) as main shareholder
- Fully scalable technology with two industrial scale plants delivered;
- Partner in H2020 FIRST2RUN BBI-JU project
- Rapidly growing funnel of opportunities
- Pilot plant operational at PlantOne in Rotterdam (customer testing)
- Projected sales of 6-9 MM€’s (0,4 MM in 2018; 1,2 MM target in 2019)
HWC combines Solid-Liquid separation with highly efficient counter-current washing

*Simplified process flow diagram of a suspension melt crystallization – Hydraulic Wash Column process*

15 cm Hydraulic Wash Column operating with para-xylene
Melt crystallisation in combination with Hydraulic Wash Column: low cost process for high purity

<table>
<thead>
<tr>
<th>Compound</th>
<th>[Impurity] Mother Liquor</th>
<th>[Impurity] Product</th>
<th>Melting T (°C)</th>
<th>Viscosity (mPa.s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Para-xylene</td>
<td>10.8 wt%</td>
<td>0.07 wt%</td>
<td>13</td>
<td>0.7</td>
</tr>
<tr>
<td>Acrylic acid</td>
<td>4.8 wt%</td>
<td>0.04 wt%</td>
<td>13</td>
<td>1.25</td>
</tr>
<tr>
<td>Para-dichlorobenzene</td>
<td>5.98 wt%</td>
<td>0.025 wt%</td>
<td>53</td>
<td>1.0</td>
</tr>
<tr>
<td>Maleic Anhydride</td>
<td>4.03 wt%</td>
<td>0.03 wt%</td>
<td>53</td>
<td>2.4</td>
</tr>
<tr>
<td>Naphthalene</td>
<td>10.0 wt%</td>
<td>0.02 wt%</td>
<td>80</td>
<td>0.94</td>
</tr>
<tr>
<td>Ice/MgSO₄</td>
<td>27.7 g/l</td>
<td>0.032 g/l</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

- Over **20 years** experience with HWC at pilot and industrial scale: successful tests for **more than 50 chemicals**
- HWC product typically contains **100-1000 lower concentration of impurities** than the mother liquor in which the crystals were grown
- Proven in **broad T-** (-50 to +100°C) and **η-range** (0.35 to 50 mPa.s)
### Scale up and scale down of HWC

<table>
<thead>
<tr>
<th>Code</th>
<th>Diameter (cm)</th>
<th># filter tubes</th>
<th>Typical production capacity (kg/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWC-2</td>
<td>2</td>
<td>0</td>
<td>1-10</td>
</tr>
<tr>
<td>HWC-8</td>
<td>8 New</td>
<td>1</td>
<td>5-175</td>
</tr>
<tr>
<td>HWC-15</td>
<td>15</td>
<td>6</td>
<td>50-650</td>
</tr>
<tr>
<td>HWC-30</td>
<td>30 (in industry)</td>
<td>16</td>
<td>200-2500</td>
</tr>
<tr>
<td>HWC-55</td>
<td>55 (in industry)</td>
<td>50</td>
<td>1000-9000</td>
</tr>
<tr>
<td>HWC-110</td>
<td>110</td>
<td>200</td>
<td>4000-36000</td>
</tr>
</tbody>
</table>

**Scale-up principle**
Increase diameter and keep filtration area around tubes constant

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Pitch SoliQz @ Cross-border matchmaking and networking event
Brussels (Belgium), November 7, 2018
Candiates for purification by (melt) crystallization and HWC-technology

The potential to be purified by (melt) crystallization and HWC technology has been proven/identified for more than 450 chemicals, including e.g.:

**Bio-Based Chemicals**
- Itaconic Acid  
- Succinic Acid  
- Cinnamic Acid  
- Levullinic Acid  
- DDDDA  
- Adipic Acid  
- Lactide  
- Glyoxylic Acid  
- Sebacic Acid  
- Lactic Acid  
- FDCA  
- Butanediol  
- Azelaic Acid  
- HMF  
- Fumaric Acid  
- Malic Acid  
- ................

**Bulk and fine Chemicals**
- Caprolactam  
- Phosphoric Acid  
- Maleic Anhydride  
- N-Vinyl Pyrrolidone  
- Maleic Anhydride  
- Phthalic Anhydride  
- Naphthalene  
- Benzoic Acid  
- Di-aminohexane  
- Methacrylic Acid  
- Acrylic Acid  
- Phenol  
- MDI  
- PDCB  
- PNCB  
- ONCB  
- TDI  
- NaOH·1 H₂O  
- ................

Your product not on the above lists? Ask for a free desk evaluation
Producers of specialty and bio-based chemicals get high purity (upto 99,9%) products in a continuous, single step process and with:

**Reduced OPEX:**
- Energy savings of 20% up to 90% versus distillation
- No use of solvents
- No wash liquid consumption.

**Reduced CAPEX:**
- Truly continuous process with throughput up to 36 MT crystals per m2/hr.

**Operational benefits:**
- Reliable operations, lower maintenance: NO rotating/moving parts.
- Stable operation due to intrinsic self-correction of the process.