From olive oil residues to electricity via the PEM fuel cell

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7th Framework Programme

“Research for SMEs”

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<thead>
<tr>
<th>Name</th>
<th>Beneficiary type</th>
<th>Country</th>
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<tbody>
<tr>
<td>Powercell Sweden AB</td>
<td>SME</td>
<td>Sweden</td>
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<td>Helbio</td>
<td>SME</td>
<td>Greece</td>
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<td>Leitat</td>
<td>RTD performer</td>
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<td>FAECA</td>
<td>End-user</td>
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<td>Ingenostrum</td>
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<td>Marches Biogas LTD</td>
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<td>United Kingdom</td>
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Aim of this project

"To provide a modular, reliable, cost-effective and efficient combined heat & power (CHP) system suitable for a distributed on-site power generation from agricultural wastes (specifically from olive oil mill waste)"
From olive oil mill waste to electricity via a PEM fuel cell

\[ H_2 \rightarrow 2H^+ + 2\ e^- \]

\[ \frac{1}{2} O_2 + 2H^+ + 2\ e^- \rightarrow H_2O \]

Hydrogen

Reforming

Biogas

Anaerobic digestion

Mill waste

Air \((O_2)\)

Electricity

Water + heat

Digester

Reformer + PEM Fuel Cell

From olive oil mill waste to electricity via a PEM fuel cell.
H₂ + ½ O₂ → H₂O

hydrogen + oxygen → water
Digester gas and contaminants

Depending on the material that are digested, the composition will vary (methane, carbon dioxide, sulfur compounds etc.)

Also surroundings influence on presence of contaminants.

Discussion within the consortium and with Powercell about what contaminants to focus upon.
Effect of NH₃ on cell voltage

- Instant effect on cell voltage
- Increase in cell resistance, but only part of the problem
- Catalysts and other parts of electrodes also affected
Thanks for your attention!

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