Green Chemistry Project Inception Workshop

Ali Abo Sena
ENCPC Director

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The industrial sector in Egypt contributes to about 35% of the Egyptian GDP and employs approximately 25% of the workforce.

60% of total Egyptian export (excluding petroleum products).

Chemical industry represents about 20% of the Egyptian industrial sector.

The chemical industries include subsectors such as Plastics, Rubber, Paper, Detergents, Paints, Chemicals, and Fertilizers.
Chemical Industry in Egypt II

- Exports of Chemical Industries sector reached 3 Billion US$ in 2015 (Source: Chemical Industry Chamber 2016)

![Bar chart showing exports of Chemical Industries sector](chart.png)

<table>
<thead>
<tr>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>ورق والكرتون</td>
<td>420</td>
<td>480</td>
</tr>
<tr>
<td>البلاستيك والقطان</td>
<td>1268</td>
<td>1626</td>
</tr>
<tr>
<td>المنتجات الصناعية</td>
<td>167</td>
<td>184</td>
</tr>
<tr>
<td>البويات والأحبار</td>
<td>79</td>
<td>110</td>
</tr>
<tr>
<td>الكيميائيات المتنوعة</td>
<td>1039</td>
<td>1809</td>
</tr>
</tbody>
</table>
Chemical Industry in Egypt

The top 10 importing countries for the period (Jan - December) 2012:

- France: 19%
- Turkey: 21%
- China: 6%
- Spain: 10%
- USA: 9%
- Italy: 8%
- Belgium: 7%
- Libya: 7%
- Brazil: 7%
- Brit: 6%
<table>
<thead>
<tr>
<th>Sector</th>
<th>Project/Process</th>
<th>Green Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petrochemical</td>
<td>Producing of Bio-PVC</td>
<td>Bio-PVC production from Molasses</td>
</tr>
<tr>
<td>Petrochemical</td>
<td>Production of Medium Chain Chlorinated Paraffin (MCCP)</td>
<td>Cooling and catalization stages after converting the green MCCP is to be obtained from Medium chain paraffin</td>
</tr>
<tr>
<td>Petrochemical</td>
<td>Production of styrene (=benzene ring with CH=CH2 tail) - <strong>Traditional route:</strong> Two-step method starting with benzene, which is carcinogenic) and ethylene to form ethylbenzene, followed by dehydrogenation to obtain styrene</td>
<td>Start with toluene (benzene ring with CH3 tail).</td>
</tr>
<tr>
<td>Chemical</td>
<td>Produce new materials from waste acid of pickling process</td>
<td>Green chemical process</td>
</tr>
<tr>
<td>Chemical</td>
<td>Shift to safer solvent in paints production &amp; bio-based solvent</td>
<td>Bio-based paints</td>
</tr>
<tr>
<td>Chemical Industry-Plastic Industry</td>
<td>Bio-degradable plastic &amp; bio-cleaner for plastic extruder machine to reduce consumption of material</td>
<td>Bio-plastic technology</td>
</tr>
<tr>
<td>Chemical application-Furniture Industry</td>
<td>Formaldehyde-free wood composites and bio-adhesive</td>
<td>Green composite technology</td>
</tr>
<tr>
<td>Chemical application-Ceramic Industry</td>
<td>Fumed silica from rice straw as additive to reduce the combustion temperature in drying furnace of ceramics</td>
<td>Combustion Technology</td>
</tr>
<tr>
<td>Metal &amp; Construction Building Industry</td>
<td>Steel slag in greening of road construction and in concrete</td>
<td>Green Construction Technology</td>
</tr>
</tbody>
</table>
Green Chemistry Initiatives in Egypt

- Programmes for Innovative Chemical Management in Industry (ENCPC and UNIDO)
- Eco-innovation Programme in Chemical Industry (with UNEP)
- UNESCO Programme on Green Chemistry for Young Researchers with the Egyptian Academy of Scientific Research (ASR)
- Academic Programme at Cairo University, Mansoura University and at the Suez University on Green Chemistry
Expectations

- Technology solutions for Green Chemistry in different industries
- Tailored-made Green Chemistry awareness raising activities including university-level curriculums development on Green Chemistry
- Concrete economically feasible case studies for replication and scale-up
Egypt National Cleaner Production Center

27 A Abdel Khaliq Tharwat St., Down Town Cairo, Egypt
Telfax: +2 02  23925984 - 23916154
E-mail: abosena@yahoo.com
www.encpc.org