Solvay proposal for a Quality Index applied to internal ecoprofiles

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Score LCA Seminar
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Context

- Need to qualify the ecoprofiles of chemical products “cradle to gate”
  - Level of confidence of the results based on LCI data quality
  - Classify the ecoprofiles done (Very Good, Good, Fair, Poor, Very Poor)

- Statistical studies (ex: Monte-Carlo) limited to flow characterisations
  - Time consuming
  - Pedigree notation reveals to be very different for each practionner
  - Difficulty to communicate so high uncertainties

- Development of an internal tool to assess the data quality of an LCI
  - Not time consuming
  - Shared with every practitioner and reliable
  - Easy to communicate
  - Take into account not only the quality of the LCI data but also the "confidence" that can be put in the various datasets

\[ \text{LCI DATA QUALITY} \times \text{LCA METHOD QUALITY} = \text{LCA RESULTS QUALITY} \]
Principle of qualification

Reliability  Completeness  Temporal Correlation  Geographical Correlation  Technological Correlation

Qualification of flows

FLOWS INPUT

PROCESS N - 1

PROCESS studied

PROCESS N

Chemical

PRODUCT

PROCESS N + 1

FLOWS OUTPUT

Qualification of Processes

Completeness  Aggregation Level  Mass Balance  Allocation Pertinence  Confidence in Upstream Process

Adaptation of Pedigree matrix to chemicals
LCI Data Quality Criteria

- Criteria and sub-criteria for Flows:

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Completeness</th>
<th>Temporal Correlation</th>
<th>Geographical Correlation</th>
<th>Technological Correlation</th>
</tr>
</thead>
</table>
| • Data Cross-Checking  
  • Data acquisition method  
  • Data Source | • Representativeness in term of production or inclusion in the study framework  
  • Statistical representativeness | • Time/age of the dataset | • Geographical differences versus waste reglementation and climate | • Processes steps chaining  
  • The technology |

- Criteria and sub-criteria for Processes:

<table>
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<tr>
<th>Completeness</th>
<th>Aggregation Level</th>
<th>Mass Balance</th>
<th>Allocation Pertinence</th>
<th>Confidence in Upstream Process</th>
</tr>
</thead>
</table>
| • Missing flow impact on LCA results  
  • Quantitative significance of missing flows | • Aggregated flows impact on LCA results  
  • Environmental consistency of aggregated flows | • Relative Error | • Allocation type  
  • Allocation suitability/relevance | • Completeness  
  • Documentation quality  
  • Geographical consistency  
  • Technological consistency  
  • Allocation Quality |
Quality index: weighting

### Qualification of Flows

- **Reliability**: 25%
- **Completeness**: 25%
- **Temporal Correlation**: 17%
- **Geographical Correlation**: 8%
- **Technological Correlation**: 25%

<table>
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<tr>
<th>Data cross-checking</th>
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<th>Source</th>
<th>Representativeness in term of production or inclusion in the study framework</th>
<th>Statistical representativeness</th>
</tr>
</thead>
<tbody>
<tr>
<td>45%</td>
<td>28%</td>
<td>28%</td>
<td>67%</td>
<td>33%</td>
</tr>
</tbody>
</table>

- **Chain of Processes**
- **Technology**

  - Chain of Processes: 67%
  - Technology: 33%

### Qualification of Processes

- **Completeness**: 11%
- **Aggregation level**: 5%
- **Mass balance**: 8%
- **Allocation quality**: 11%
- **Confidence in upstream processes**: 65%

<table>
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<th>Missing flow impact on LCA results</th>
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- **Allocation type**: 33%
- **Allocation suitability**: 67%
- **Completeness**: 20%
- **Documentation quality**: 25%
- **Technological consistency**: 10%
- **Geographical consistency**: 20%
- **Allocation quality**: 25%

- **Allocation type** and **Allocation suitability**:

  - Allocation type: 33%
  - Allocation suitability: 67%
From Quality Index to Confidence Level

- Proposal: Classification of ecoprofiles for chemicals

- Tools developed:
  - Guides for flows qualification and processus qualification
  - Automatic flows and processes quantification forms
  - Automatic quality index calculation form (10-15 min/assessment)

macroscopic scale, fully consistent with our internal tool for environmental impact assessment of chemical product portfolio