Normalization references for USEtoxTM-based toxic impact categories: North American and European economic systems

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Normalization references for USEtox™-based toxic impact categories: North American and European economic systems

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Methods & Results

Characterization factors (CF)
- Interim and recommended CFs
- USEtox version v.1.0 (February 2010)

Emission inventories
- Reference years: 2004 (Europe), 2002-2008 (US/CA)
- 2 pesticide modelling approaches
- No extrapolations from other regions

Uncertainties
- Incomplete emission inventory for organics/inorganics
- Incomplete coverage of CFs for several organics and inorganics
- Extrapolations performed to bridge data gaps of covered chemicals (e.g. pesticides)
- Interim status of CFs for some chemicals, incl. metals
- Sensitivity analysis (changes in inventory of metals mainly)
  ⇒ Europe: within one order of magnitude
  ⇒ North America: up to factor 20 (due to metal emissions)

Application in practice

Use of European normalization references as default set

Further improvements

Future updates
- Integration of updated CFs (incl. metals)
- Increased coverage of emitted substances
- Refinement in emission data extrapolations

Expansion to other regions:
- Substances to prioritize when building inventory (based on existing knowledge):

<table>
<thead>
<tr>
<th>Organic substances</th>
<th>Metals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atrazine</td>
<td>Copper</td>
</tr>
<tr>
<td>Chlorpyrifos</td>
<td>Lead</td>
</tr>
<tr>
<td>Benz(a)pyrene</td>
<td>Arsenic</td>
</tr>
<tr>
<td>Benzene</td>
<td>Cadmium</td>
</tr>
<tr>
<td>Cypermethrin</td>
<td>Mercury</td>
</tr>
<tr>
<td>Dioxins</td>
<td>Zinc</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>Chromium, incl. Cr (+VI)</td>
</tr>
<tr>
<td>Acrolein</td>
<td>Nickel</td>
</tr>
</tbody>
</table>

Check with regional conditions (only industrialized countries represented here)

References:


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