The hazardous waste directive (HWD: 91/689/EEC) defines waste as dangerous when limit values are exceeded for one of these defined hazardous properties!

**Classification based upon R-phrases of the individual components**

- H1: explosive
- H2: oxidising
- H3a: highly flammable
- H3b: flammable
- H4: irritant
- H5: harmful
- H6: toxic
- H7: carcinogenic
- H8: corrosive
- H9: infectious
- H10: toxic for reproduction
- H11: mutagenic
- H12: release of (very) toxic gases
- H13: sensitising
- H14: leachate with hazardous properties

**DISCRISET: a tool to discriminate between dangerous and non dangerous waste materials**

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Project sponsored by MIP (milieu en energie innovatie platform) and industrial partners

**Waste composition known?**

- yes
- no

Classification based upon hazardous properties of the waste itself, using direct tests on the waste material.

HWD proposes to use the tests described in Annex V for testing chemicals (67/548/EEC), but for the toxicological properties the proposed tests are in vivo tests on mammalian test animals. This is both for ethical and practical reasons not acceptable for waste testing!

In this project a set of alternative tests is selected to evaluate the toxicological properties of waste.

**Phase 1: literature -> Conclusions:**

- Chemical methods are suitable for characterising the inorganic fraction (heavy metals, cyanide, pH, ammonium)
- Affinity sensors are the fastest, but like organic chemistry, only useful if you know what you are looking for (targeted analyses)
- Effect sensors: bacterial systems are the fastest and are suitable for designing multi sensor system
- Not all hazardous endpoints can be tackled with alternative methods (yet) (f.i. not all reproductive endpoints)

**TOOLBOX**

**Chemical analyses**

- Analytical tools for organics and inorganics

**Affinity assays**

- Target cell or genetically modified cells
- Toxicant effect

**Biological effect assays**

- (in vitro assays)

<table>
<thead>
<tr>
<th>Bioassay</th>
<th>Toxicity assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>H5/H6 (harmful/toxic)</td>
<td>H7/H11 (carcinogenic/mutagenic)</td>
</tr>
<tr>
<td>H4/H8/H15 (irritating, corrosive, sensitising)</td>
<td>H10 (reprotoxic)</td>
</tr>
<tr>
<td>Microtox</td>
<td>ER/AR-CALUX® Other Calux® systems</td>
</tr>
<tr>
<td>BGPA (ROS, membrane integrity, osmotic pressure...)</td>
<td>YES, YAR (yeast assays for detection of oestrogens, androgens)</td>
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<tr>
<td>Ames® (reverse mutation-frequency)</td>
<td>ELS test on zebra fish (48 h)</td>
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<tr>
<td>Vitotox® (SOS repair – fast test)</td>
<td>E-screen cyttofluorometry (MCF-7)</td>
</tr>
<tr>
<td>Micronucleus kit</td>
<td>Intección® (eye and dermal)</td>
</tr>
<tr>
<td>8-OH-guanidine detection</td>
<td>Aneuploïdie (genoommutaties)</td>
</tr>
</tbody>
</table>

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