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LCA of end of life options for two biodegradable packaging materials

Discussion Forum 46:
"End-of-life and waste management in LCA"
Zürich, 06/12/2011

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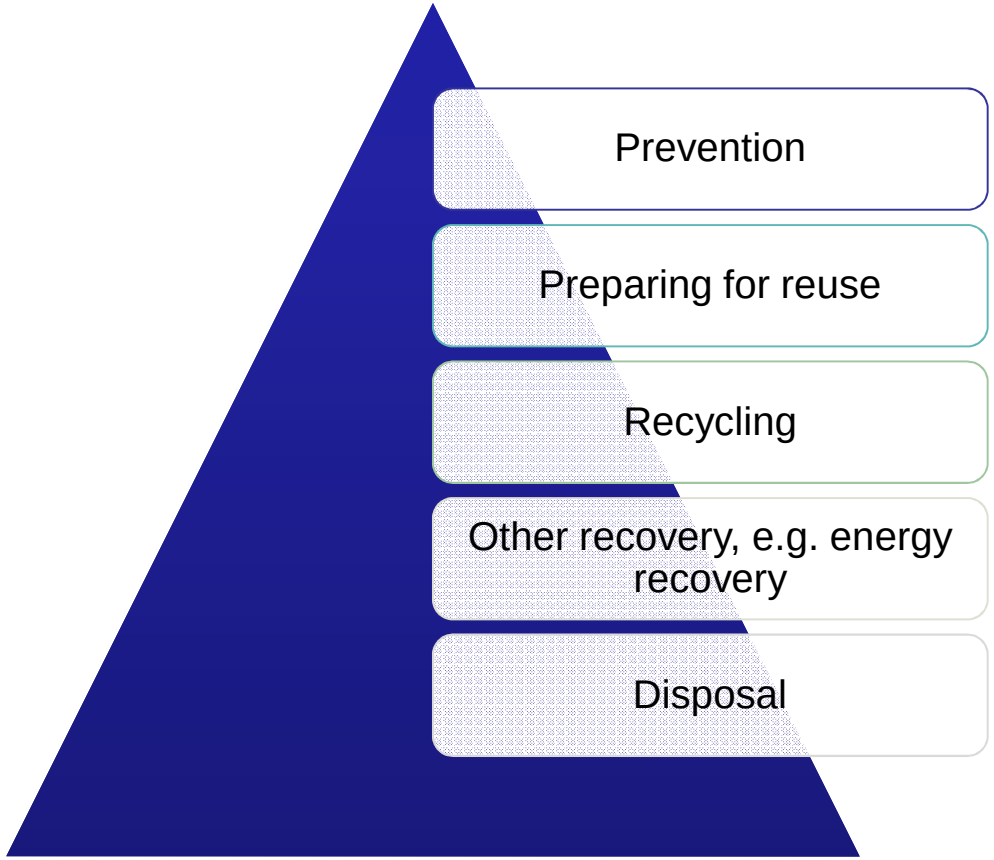
Outline

The European Waste Hierarchy in context

LCA methodology to study end of life options for packaging

Results & conclusions

The European Waste Hierarchy is not a rigid structure



"When applying the waste hierarchy […] take measures to encourage the options that deliver the best overall environmental outcome.

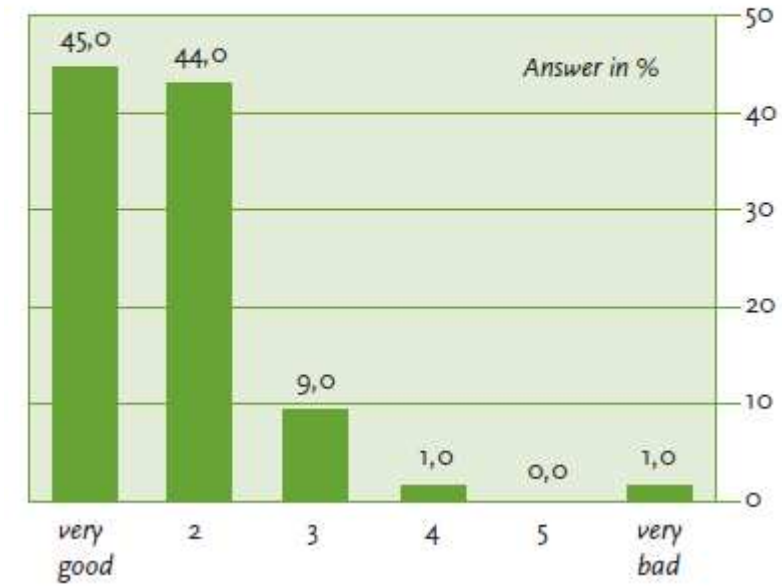
This may require specific waste streams **departing from the hierarchy where this is justified by life-cycle thinking** […]"

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives

Public perception coincides with the relative positions in the hierarchy

Composting

What do you think of the idea of replacing conventional plastic packaging by compostable BDP packaging?



Source: Bidlingmaier *et al.*, 2003

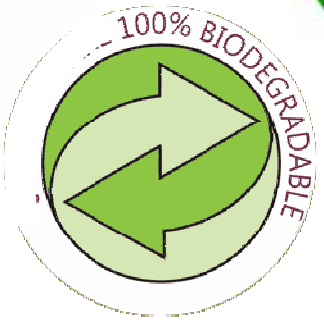
Incineration

gaia
Global Alliance for Incinerator Alternatives
Global Anti-Incinerator Alliance

UK Without Incineration Network
UK win

Borough council says NO to incinerator

New products promoted as biodegradable and “environmentally friendly”



Outline

The European Waste Hierarchy in context

Generally, public perception of composting is positive and of incineration is negative

LCA methodology to study end of life options for packaging

Results & conclusions

An LCA has been performed on end of life options for packaging

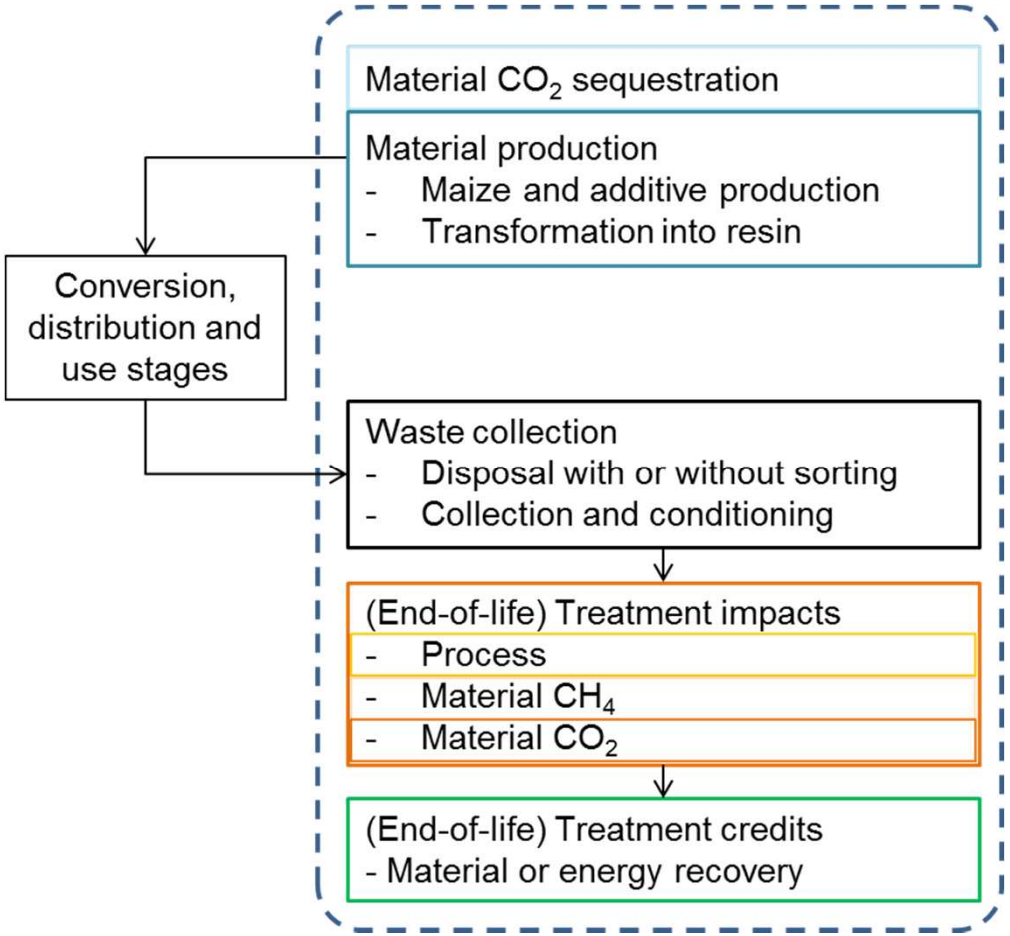
- Packaging materials:
  - Polylactic acid (PLA)
  - Thermoplastic starch (TPS)

- End of life options:
  - Landfill
  - Municipal solid waste incineration (MSWI) with energy recovery
  - Direct fuel substitution
  - Anaerobic digestion (methanisation)
  - Industrial composting
  - Mechanical recycling

The methodology used follows the ISO 14'040 series of standards for an average European scenario

- Functional unit:
  - 1kg of material, disposed of at a user's home
- Region for disposal:
  - Europe
- Life cycle impact assessment (LCIA):
  - Full set of indicators from IMPACT 2002+
  - Focus on global warming score and resource depletion

- System boundaries:



Outline

The European Waste Hierarchy in context

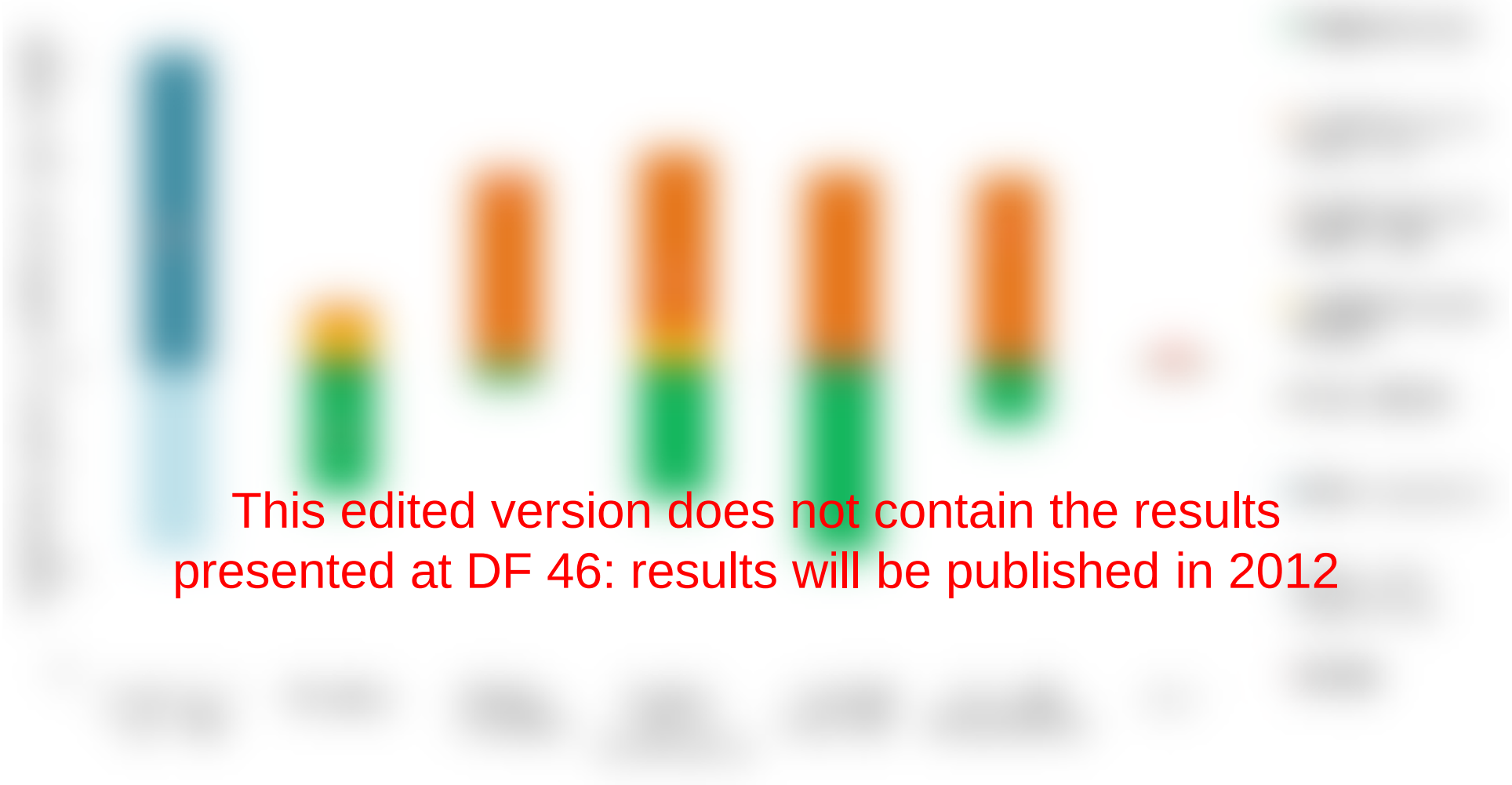
Generally, public perception of composting is positive and of incineration is negative

LCA methodology to study end of life options for packaging

An LCA comparing two materials in formats that can go through all widely available end of life options was performed

Results & conclusions

PLA results for global warming score show high impacts of industrial composting



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TPS results for global warming score show dominance of methane production impacts in landfill

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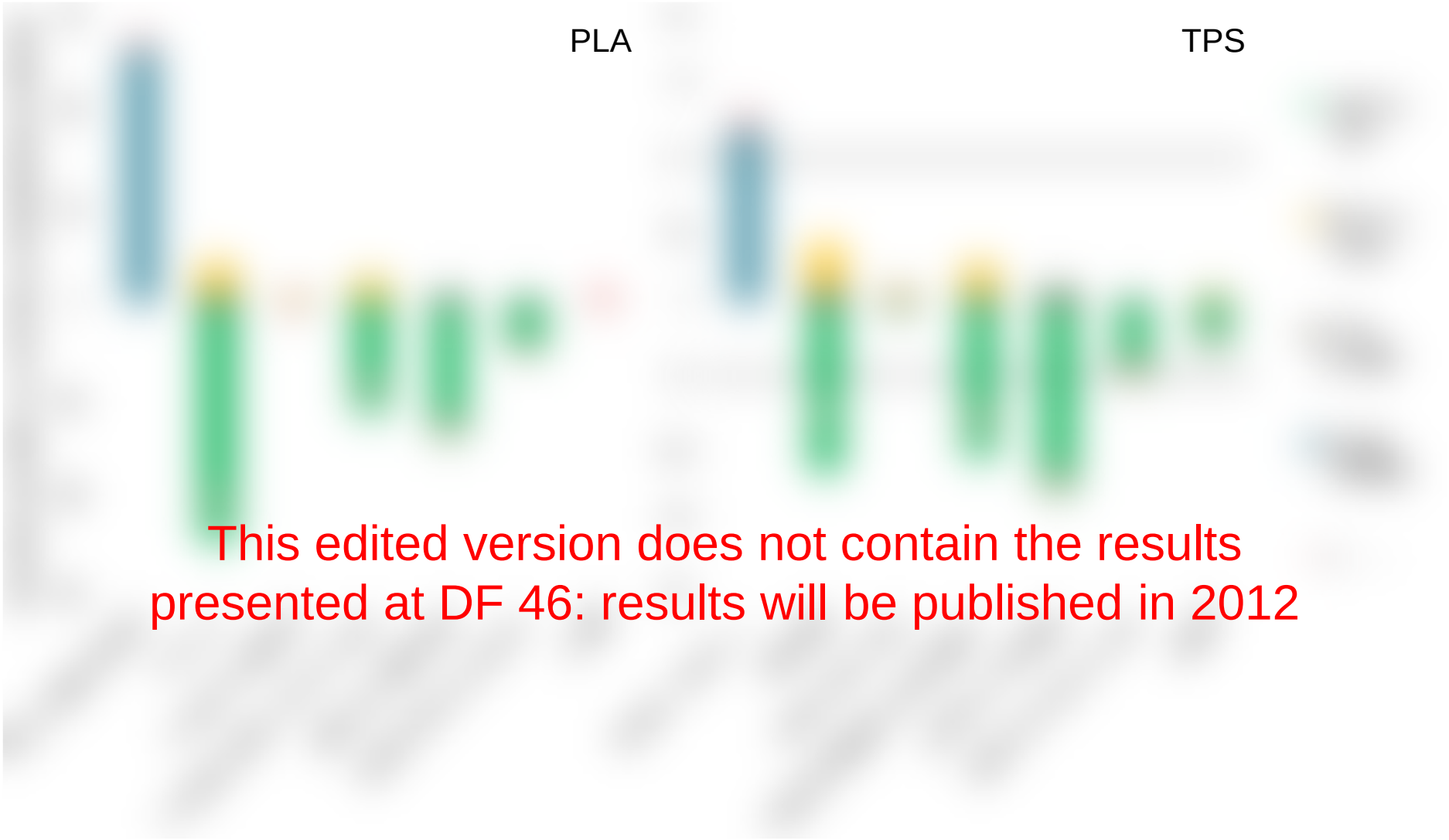
Results for impacts on resources show high impacts for industrial composting



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Summary of the results

- Composting generally has among the highest impacts
- Landfill impacts are dependant on the material
- Operations which recover energy perform well

Conclusion

The European Waste Hierarchy in context	Generally, public perception of composting is positive and of incineration is negative
LCA methodology to study end of life options for packaging	An LCA comparing two materials in formats that can go through all widely available end of life options was performed
Results & conclusions	Contrary to public perception, composting is not necessarily the best alternative Our results support the flexible application of the European Waste Hierarchy

Thanks for your attention

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Life cycle perspective of the products studied (example)

Product systems boundaries