Environmental impact of glucose: influence of the datasets on LCA results

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LCA?

Production → Transport → Use → End of life → Raw material extraction → Production
Glucose?

- It is a simple aldosic monosaccharide and only three of them can be directly absorbed into the bloodstream during digestion …
Glucose?

Agriculture

- Corn
- Wheat

Starch extraction

- Wet process
- Dry process

Hydrolysis

- Corn
- Wheat
Databases?

- Raw material

- Process

- Product(s)

- Energy

- Ressources

- Emissions
Databases?

- Really useful for well-known processes
  - Electricity, etc.
  - And for agricultural processes?

- The two most used
  - GaBi database
  - Ecoinvent database
Glucose?

Agriculture

Corn

Wheat

Starch extraction

Wet process

Dry process

Hydrolysis

Hydrolysis
Glucose?

Agriculture

Corn

Wheat

Starch extraction

Wet process

Dry process

Hydrolysis

Hydrolysis
Agriculture?

- First test with GaBi database:
Agriculture data?

- Belgian data from CRA-W model (fertilizer, transport processes, etc.) with
  - GaBi database
  - Ecoinvent database
- Ecoinvent European dataset for corn/wheat

⇒ Influence on the results?
CRA-W data

- Good accordance GaBi vs Ecoinvent
  - except for mineral resources depletion
Resources depletion?

- Differences in the modeling of the infrastructure
  - Differences in metals consumption (lead, indium, etc.)
  - \( \Rightarrow \) Differences in results!
Non-specific data

- If we use an Ecoinvent dataset (European average) for agriculture:
  - Large differences
  - We should be as specific as possible!
Average studies?

- Comparison impossible...
Take home message

- People that do LCA should be
  - Really smart, fun and beautiful ✗
  - Prudent when using datasets
  - As specific as possible

- Critical view of the results is Mandatory!

- LCA is young, still in improvement

- BUT no other method allows a complete view of the environmental impact!
Thank you for your attention

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