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# Assessing environmental consequences of increased use of co-products in animal feed

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# Outline

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- Introduction
  - What has been published before?
- Method – example
- Discussion
- Conclusion

# Introduction

- By-products
- Whole chain
- Consequences
- Alternative application



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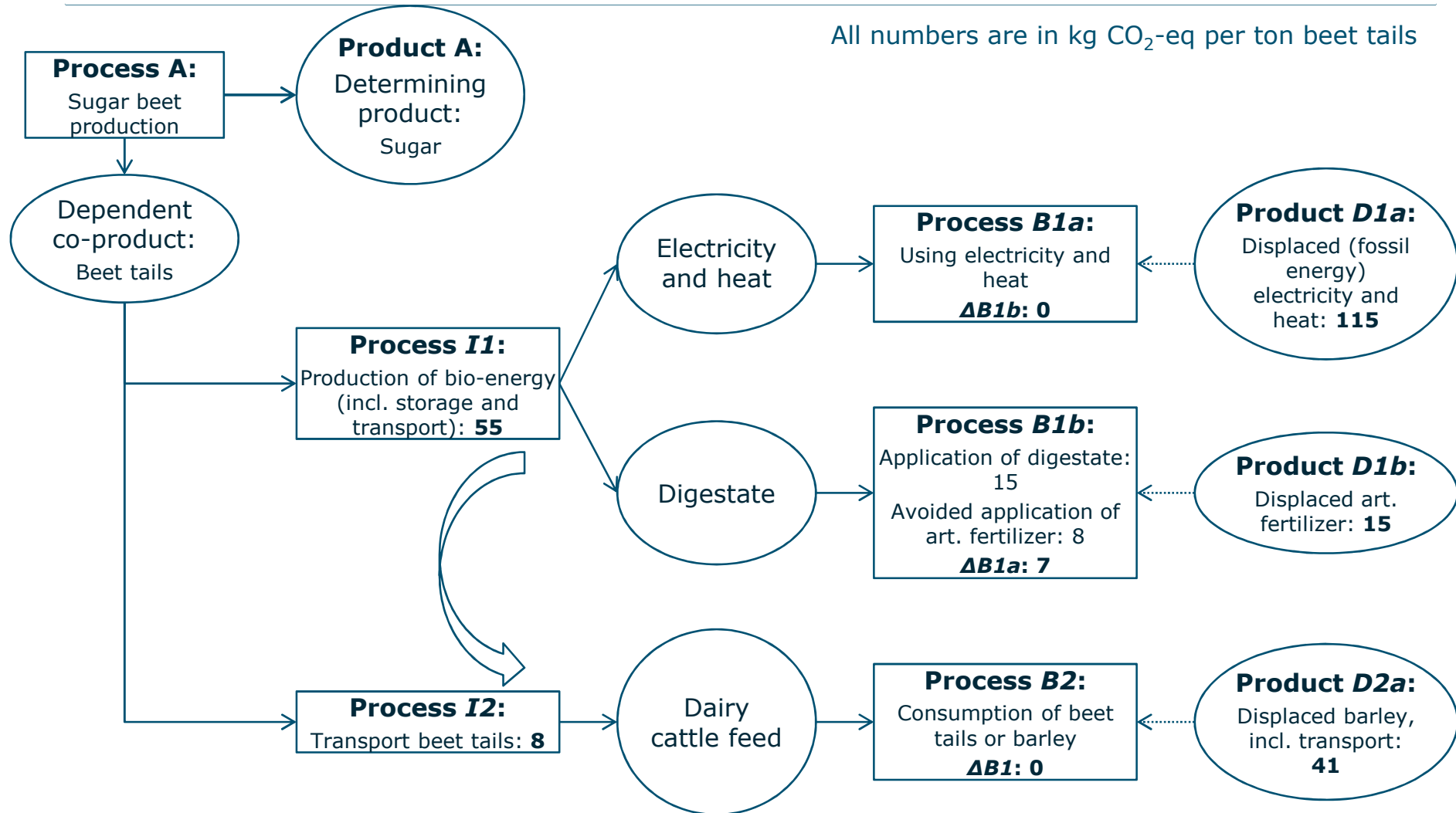
# Literature

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- Theoretical framework (Weidema and Ekvall, 2009)
  - Focus on increased demand
  - No application
  
- We focus on different situation:
  - What is the optimal use of a by-product?
  - Amounts of final products stay equal
  
- So, altered framework needed

# Example: beet tails

All numbers are in kg CO<sub>2</sub>-eq per ton beet tails



$$138 - 103 = 35$$

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# Discussion / Summary

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- Beet tail case:
  - Digestion leads to double application
  - Only GHG shown, land use -148m<sup>2</sup>
  
- Effect of use of by-products depends on:
  - market situation
  - displaced products
  - intermediate processes
  - effects during application

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# Conclusion

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- Use of by-products is not always beneficial
- Mitigation options have to be assessed on their environmental consequences for the expanded system



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# Questions?

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