Decision Support System for Insects Production

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Online Life Cycle Assessment Tool

Susinchain Tool

This calculation and recommendation tool has been developed by DIL e.V. in the scope of SUSINCHAIN project in 2021. It allows to calculate the approximate environmental impact in four categories of global warming potential (GWP), non-renewable energy use (NRE), Land use (LU) and Water use (WU). Additionally it provides the estimation on the potential cost of such production, in euro according to the prices in 2021. The tool is intended for the use by the companies and start-ups dealing with the insect mass rearing for food and feed. By using the tool, insect stakeholders can estimate the production impacts and costs at the design stage and identify the improvement strategies

Authors
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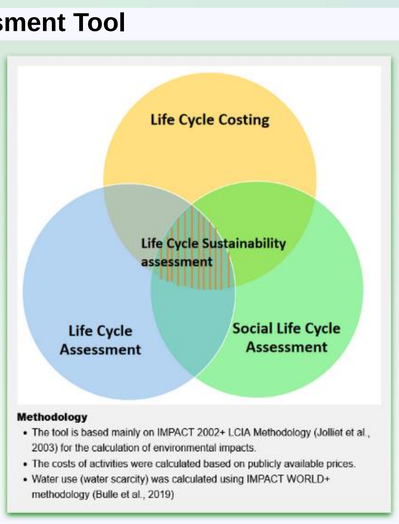
Click here for tool

http://susinchain.herokuapp.com/index

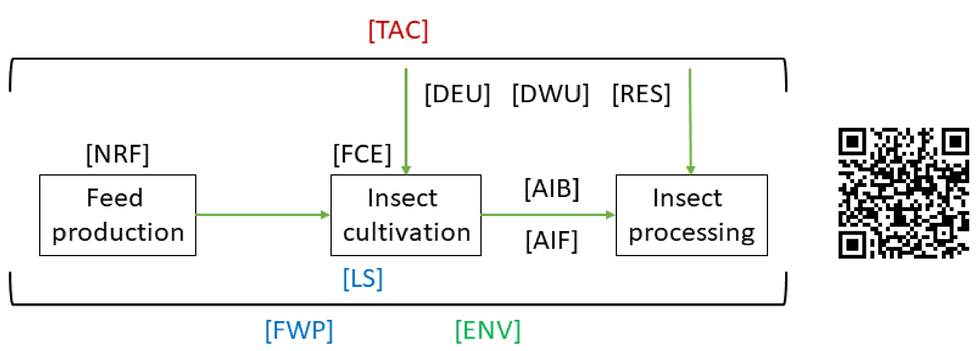


Methodology
- The tool is based mainly on IMPACT 2002+ LCIA Methodology (Jolliet et al., 2003) for the calculation of environmental impacts.
- The costs of activities were calculated based on publicly available prices.
- Water use (water scarcity) was calculated using IMPACT WORLD+ methodology (Bulle et al., 2019)

SUSINCHAIN Decision Tool

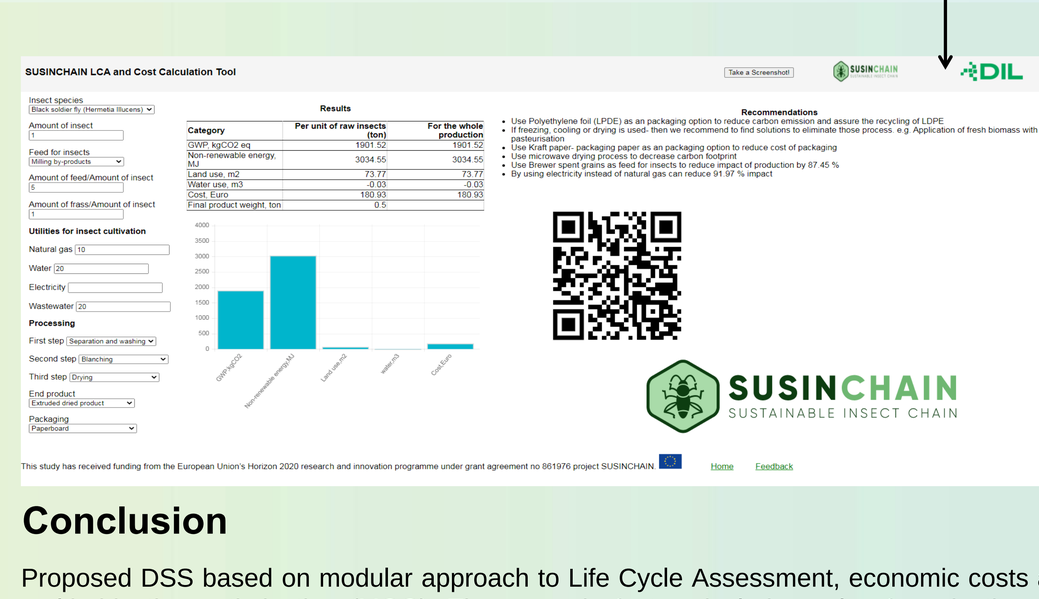
This study has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 861976 project SUSINCHAIN

Key factors identified for Multi-Objective Optimization (MOO)

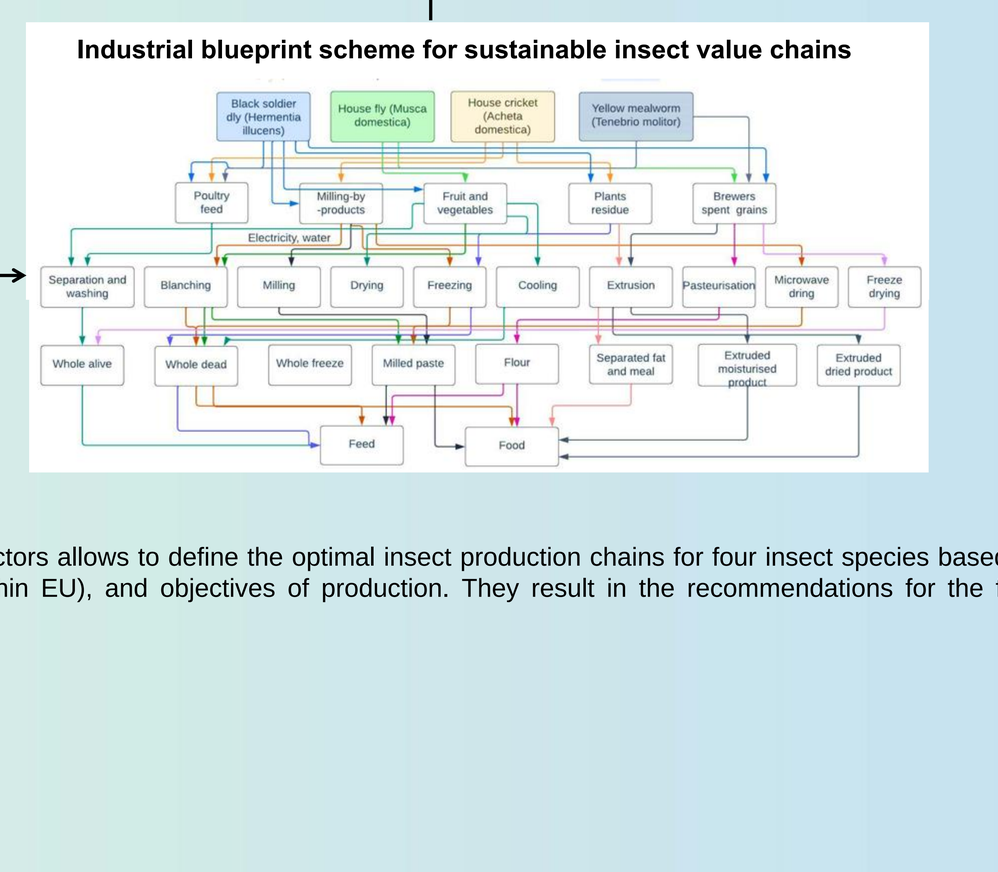


Criteria is in square brackets, red – economic, green – environmental, blue – social, black – applicable to a few aspects; AIB – amount of insect biomass; AIF – amount of insect frass; DEU – direct energy use; DWU – direct water use; ENV – integrated environmental impact; FCE – feed conversion efficiency; FWP – fair wage potential; LS – labor safety; NRF – nutritional value of feed; RES – renewable energy share; TAC – total annual cost

Structure of Decision Support Tool, based on modular Life Cycle Assessment and Multi-Objective Optimization algorithms, with web-based online interface for final user



Screenshot of online Industrial DSS



Industrial blueprint scheme for sustainable insect value chains

Conclusion

Proposed DSS based on modular approach to Life Cycle Assessment, economic costs and social factors allows to define the optimal insect production chains for four insect species based on multi-objective optimization (MOO). The scenario factors include scale of production, location (within EU), and objectives of production. They result in the recommendations for the feed compositions.

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