

ENTOFÔR project - From waste to resource

Lecrenier M.C.^{1*}, Fumière O.¹, Berntssen M.H.G.², Dieu M.³, Fogliano V.⁴, Jaastad G.⁵, Kligen I.⁵, Palmblad M.⁶, Pettersen I.⁵, Rasinger J.D.², Renard P.³, Merel S.², Lock E.J.²

¹ Walloon Agricultural Research Centre (CRA-W), Belgium; ² National Institute of Nutrition and Seafood Research (NIFES), Norway; ³ University of Namur, Belgium; ⁴ Wageningen University and Research Centre (WUR), The Netherlands; ⁵ Norwegian Institute of Bioeconomy Research (NIBIO), Norway; ⁶ Leiden University Medical Center (LUMC), The Netherlands

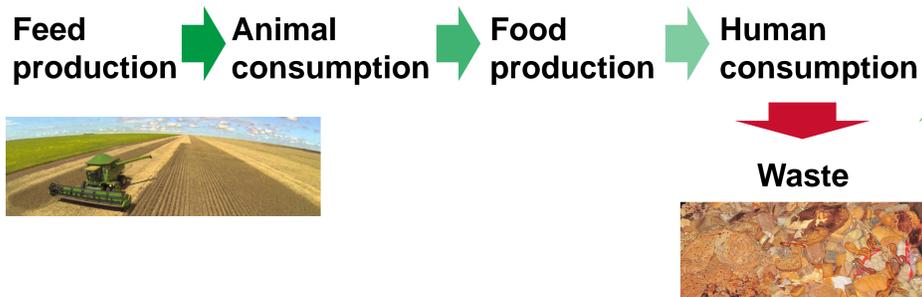
*Corresponding author. Tel.: +32 81 62 03 82; email: m.lecrenier@cra.wallonie.be

Context

Trends towards 2050 predict a steady population increase to 9 billion people, forcing an increased food/feed output from available agro-ecosystems resulting in an even greater pressure on the environment. This increasing demand for food and feed proteins, forces us to produce and use food more efficiently.

Finding innovative ways to increase food and feed production is important, but equally important is to **avoid wasting** valuable nutrients.

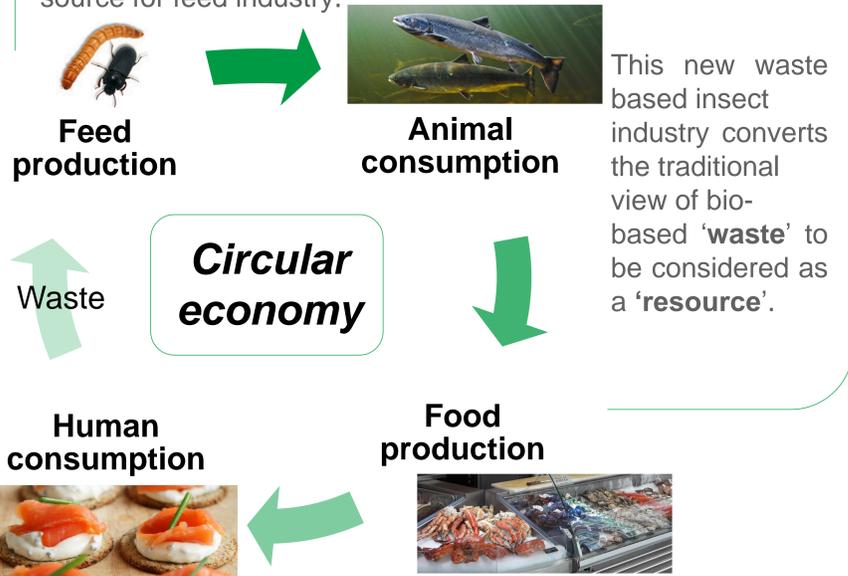
Linear economy



Concept

The project ENTOFÔR answers to this statement by **increasing value creation from bio-based waste**.

This will be done by recycling, or rather upcycling bio-based waste by feeding it to insects which will turn it into protein source for feed industry.



Project

Converting bio-based waste also creates barriers for insect producing companies, feed manufacturers and regulatory bodies.

To suggest how this novel industry may overcome these barriers, a consortium of **researchers from multiple disciplines** (economy, social sciences, entomology, animal nutrition and feed safety) **and the industry** (bio-based waste- and insect industry) was built.

Complementary aspects evaluated :

- Identification of economical criteria for waste evaluation
- Evaluation of potential waste streams using identified criteria

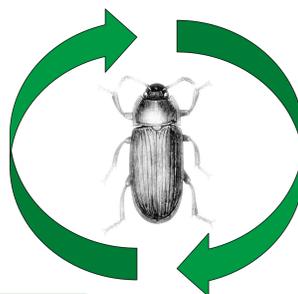
Identification of economical attractive waste able to be converted by insects



Identification of insect species and methods to convert waste to feed



- Determination of the most relevant insect species for bioconverting the selected waste streams
- Evaluation of the optimal conditions for insect breeding



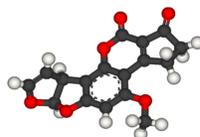
Development of high grade insect material enriched in proteins and lipids



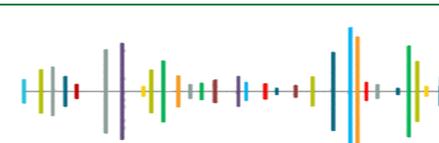
- Development of a cost-efficient method for protein extraction
- Characterisation of the lipid content

- Development and validation of the screening method
- Evaluation of the method on various matrices

Screening method for pesticides and mycotoxins detection on waste and insect products



Development of method for the detection of non-legal waste use



- Peptidomic profiling of insect and waste for spectral libraries generation
- Quantitation of insect PAP or forbidden waste products

Funding

This project is funded by The Research Council of Norway, grant n° 268344/E50