

I Jornadas Internacionais sobre Produção e Utilização de Insectos

Desenvolvimentos em Portugal:
EntoGreen – da cave à industrialização.



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Cofinanciado por:



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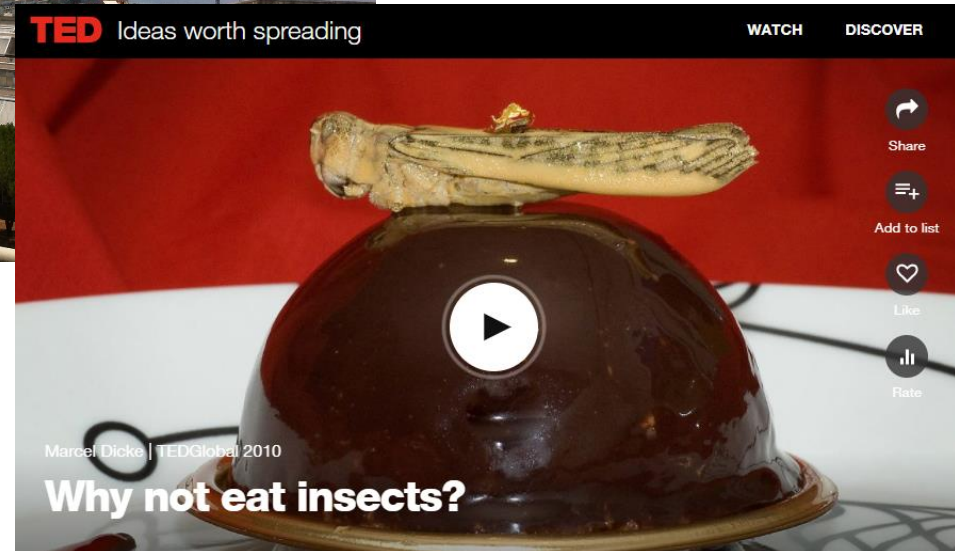
How did I get here?



How did I get here?



2012



Why to start an insect based business?

- ▶ Opportunity
- ▶ Future of food and feed
- ▶ Challenge of Innovation
- ▶ Make a difference
- ▶ New research line



Main initial challenges

- ▶ Public acceptance
- ▶ Colony stabilization
- ▶ Know-how
- ▶ Information
- ▶ Market
- ▶ Legislation
- ▶ Economic sustainability



Start a company – 2014

- ▶ Contact stakeholders
- ▶ Establish partnerships
- ▶ Create the appropriate business environment
- ▶ Invest in sector awareness
- ▶ New research lines with R&D institutes
- ▶ Select a focus



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Insects as food

► *Tenebrio Molitor*



Join forces – 2015

- ▶ EntoGreen
- ▶ New partner
- ▶ New focus
 - Insects as feed
 - Black Soldier Fly
- ▶ New Challenges



Agrifood by-products



Portugal lost 1 million tons of food every year

332k
Tons



77k
Tons



298k
Tons



324k
Tons



Agricultural Soils



Production and animal feeding takes up about 75% of arable land.



2015

Ano Internacional
dos Solos

Desertification and lack of organic
agricultural fertilizers for soils

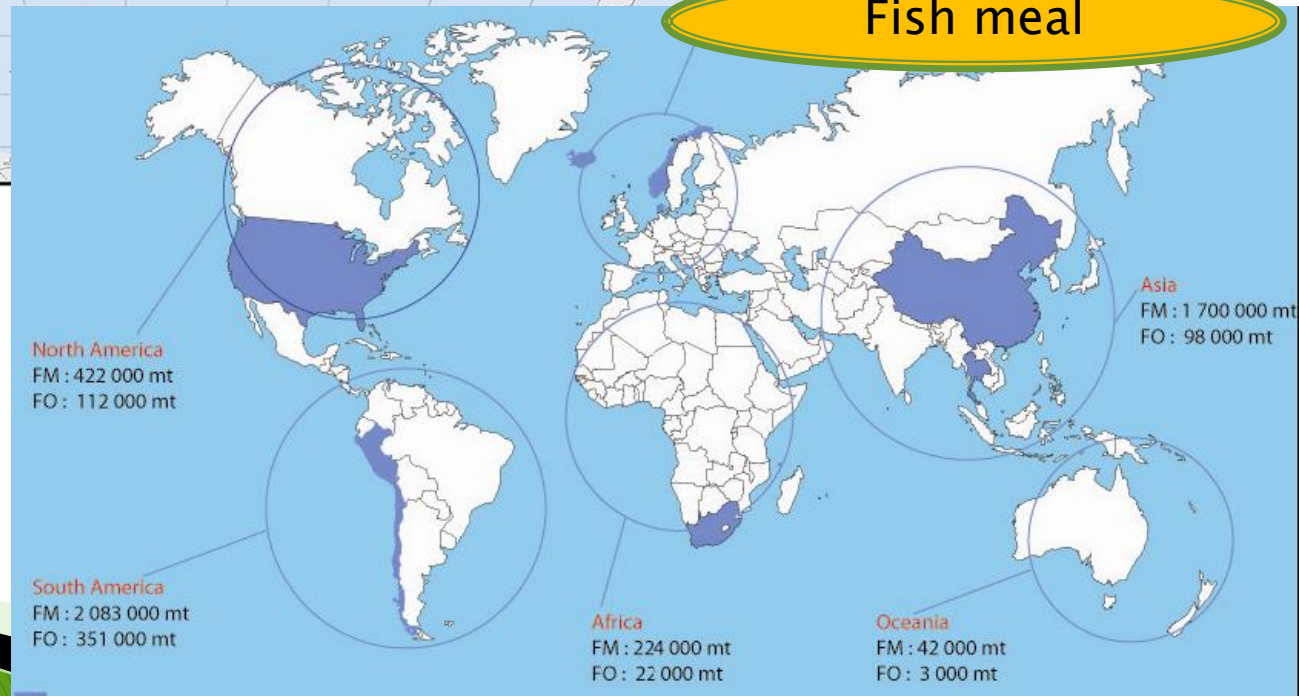
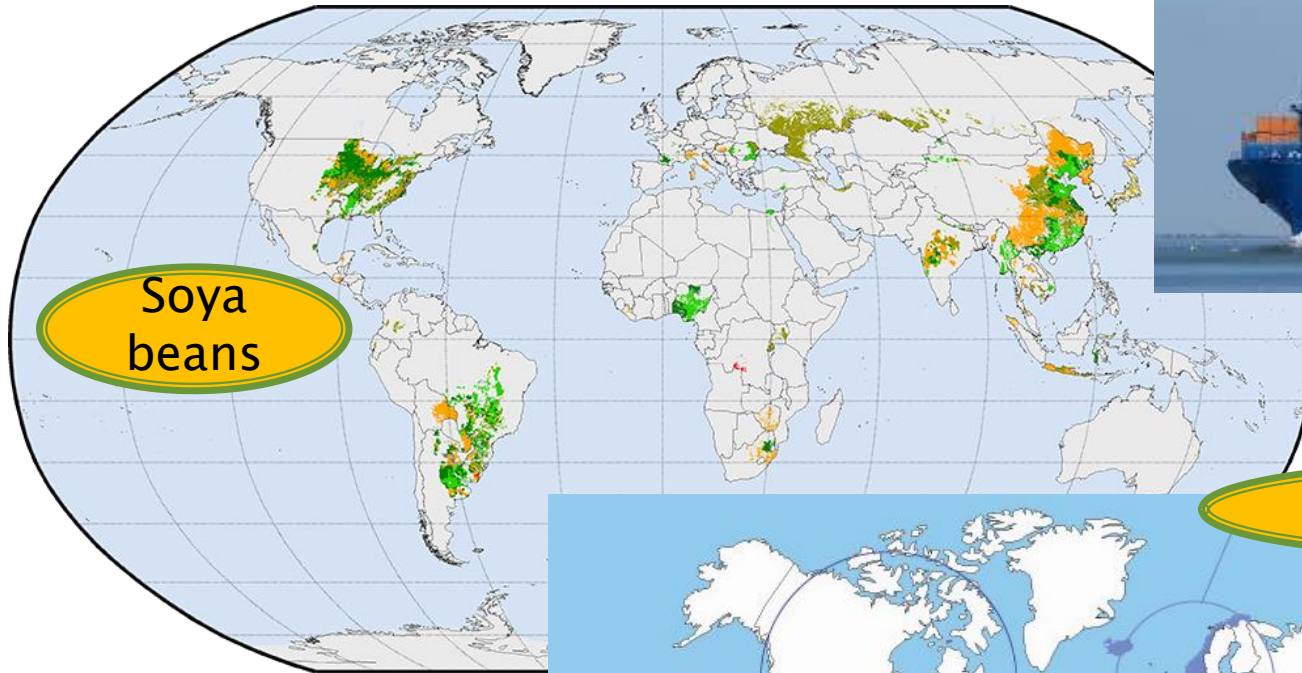
Animal Nutrition



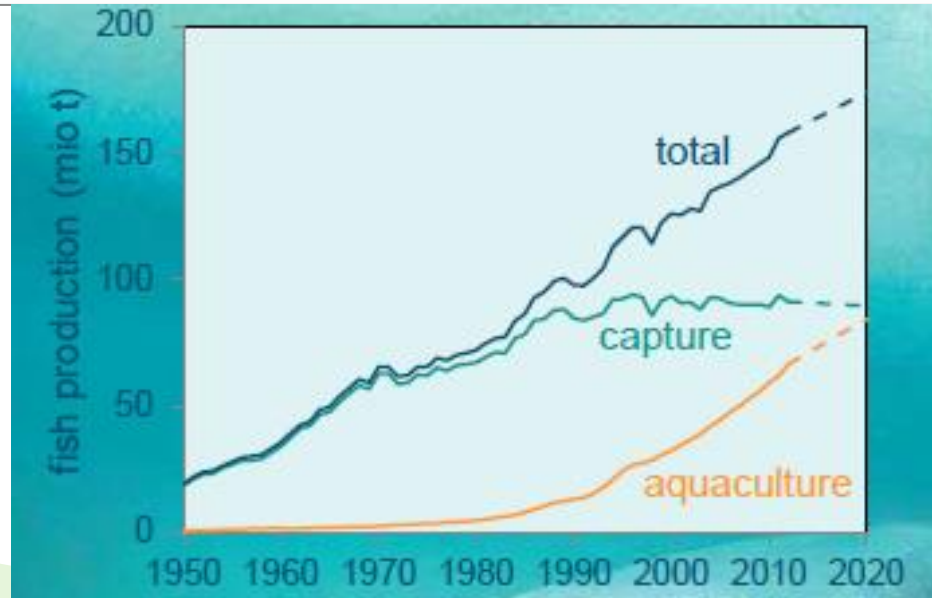
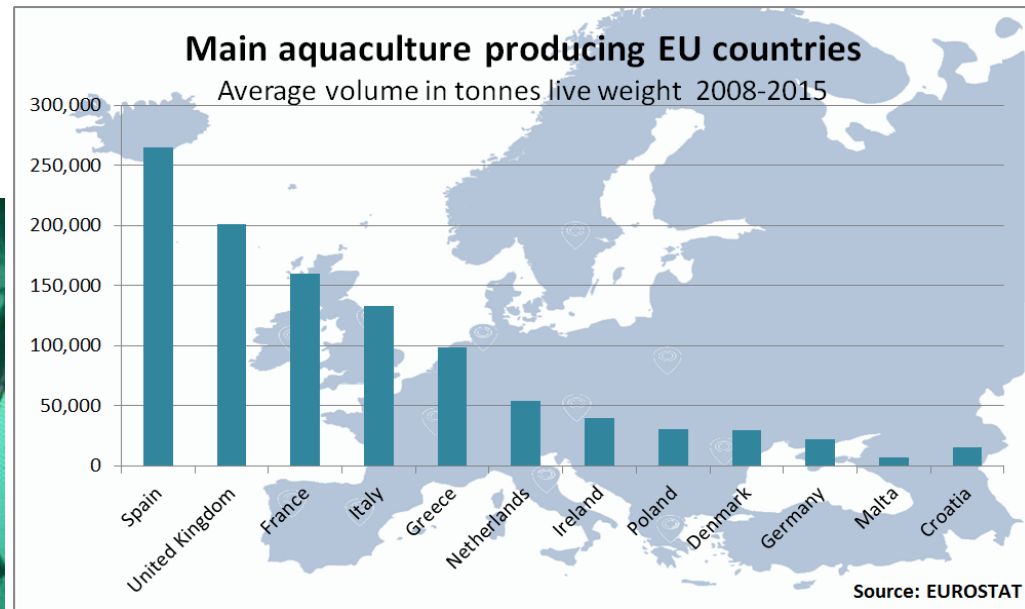
One million tons of feed
produced in 2017

Dependence of world protein sources

Adaptado: washingtonpost.com - 2012



Aquaculture



Opportunity

New proteins

News | 14 Dec 2016 | 16257 views | 2 comments

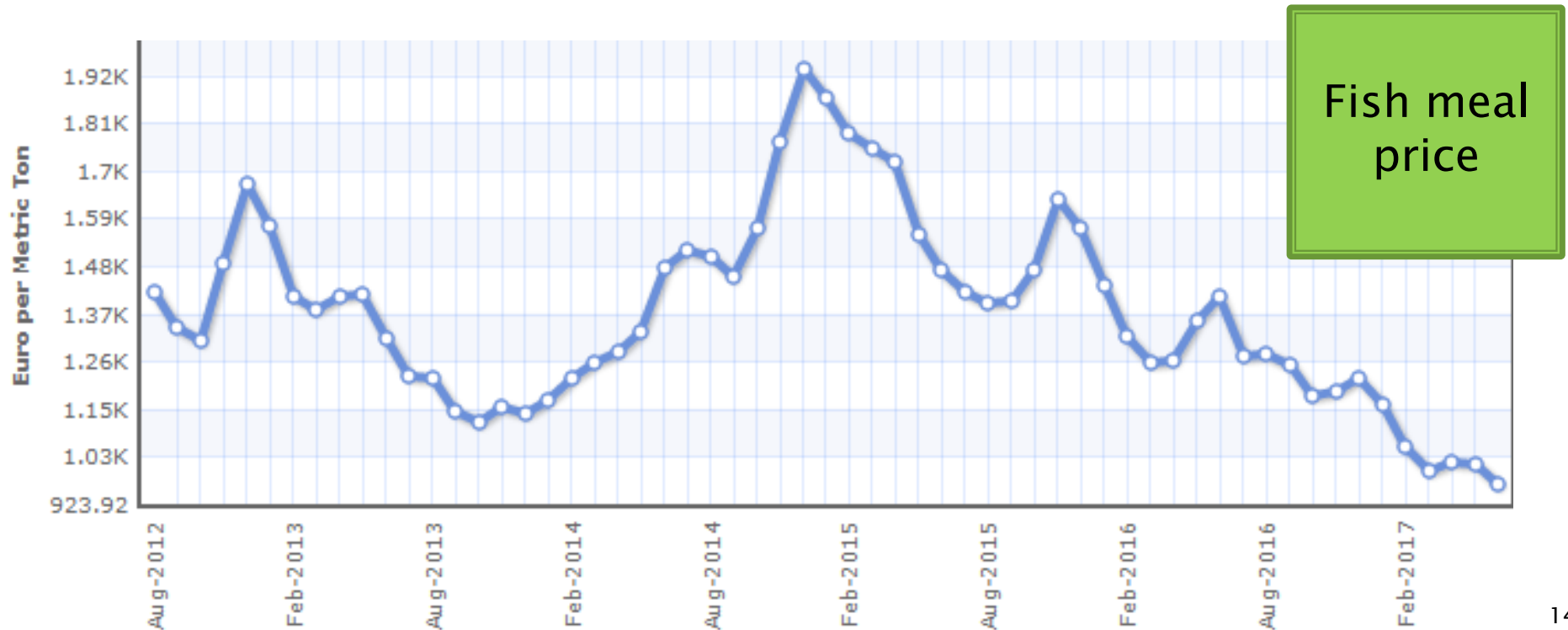
EU agrees on insect protein for aquafeed

New proteins

Background | 25 Aug 2017 | 3232 views

Heading towards total replacement of fish meal

- 500KT/year of fish meal are produced in Europe and 300KT/year are imported
- Regulation (UE) 2017/893 of the European Commission – May 24 of 2017
 - Permission to use insect meal in fish feed



Solution – Bringing the Circular Economy to the agrifood sector



EU Environment

29/1 · 🌐

Economia Circular: alcançar mais com menos!

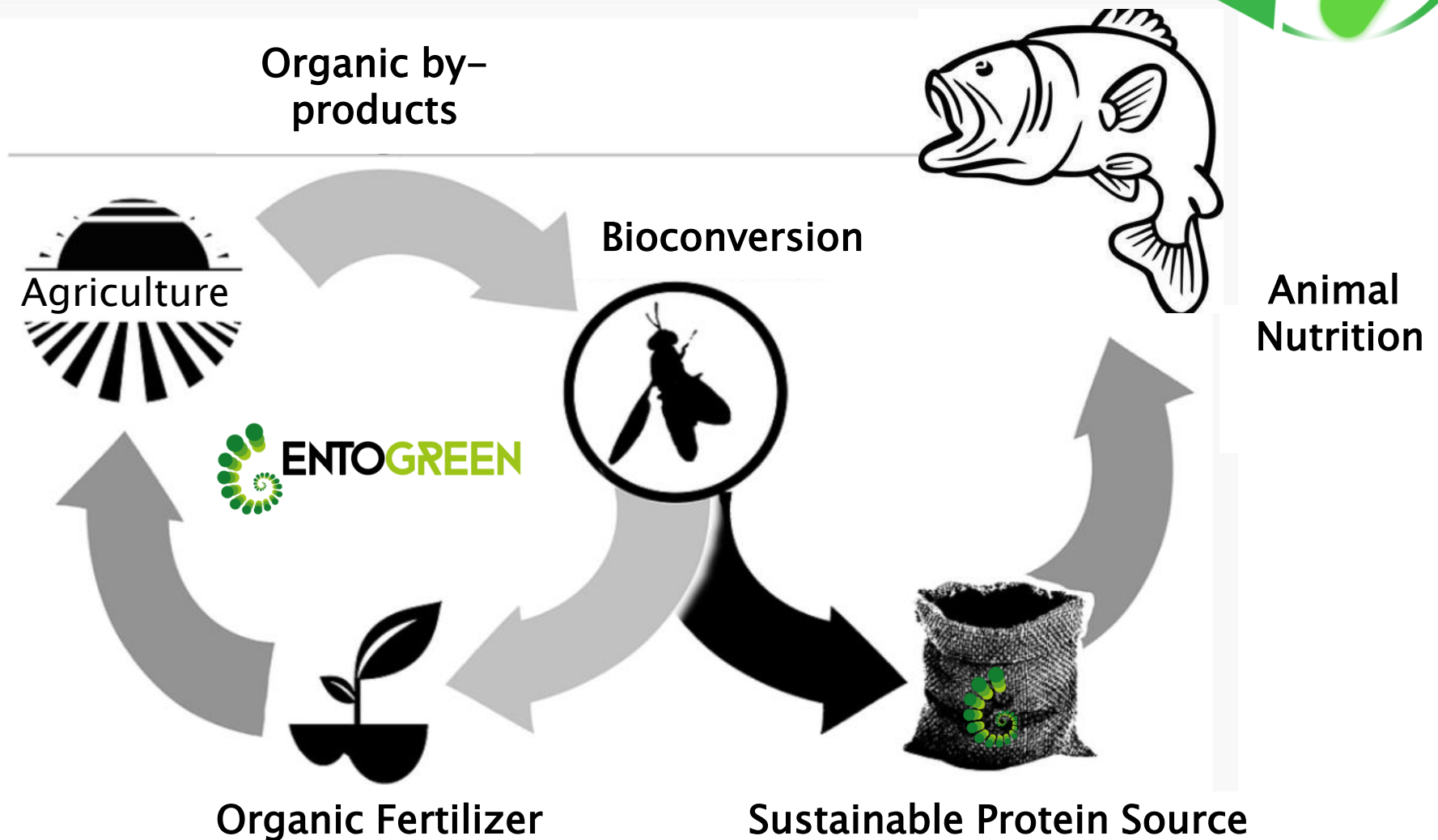


Como fechar o ciclo?

Aproximar a Europa da economia circular daniel.murta@entogreen.com

Solution

The green footprint



Proposed solution



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Black Soldier Fly– BSF
Hermetia illucens



Black Soldier Fly larvae – BSFL

Process



Develop production capabilities

- ▶ Start producing BSF
 - Several technology stages

Low tech



Small victories



Great expectations



Test new approaches

Indoor



Greenhouse



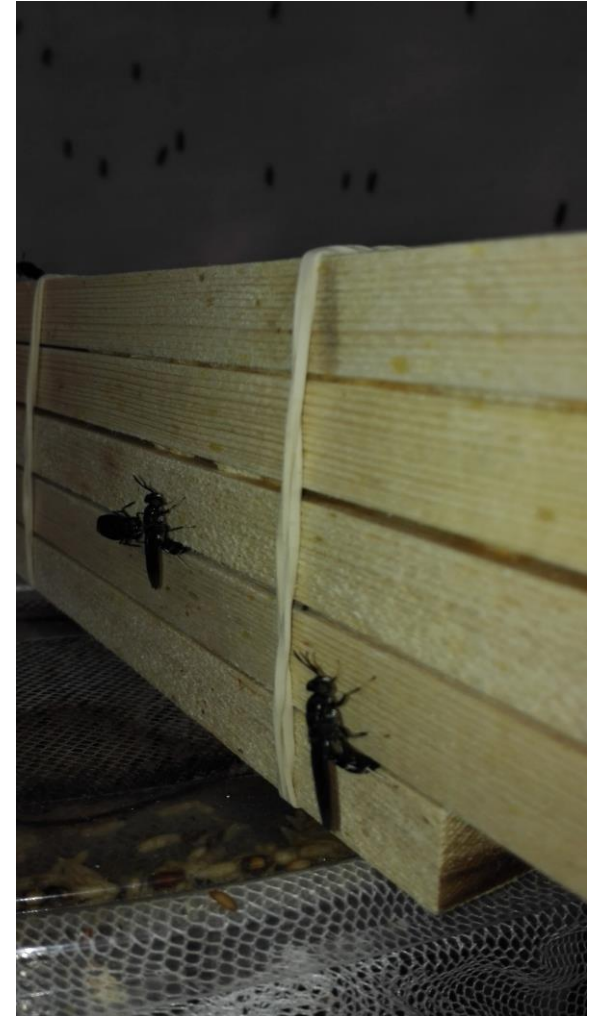
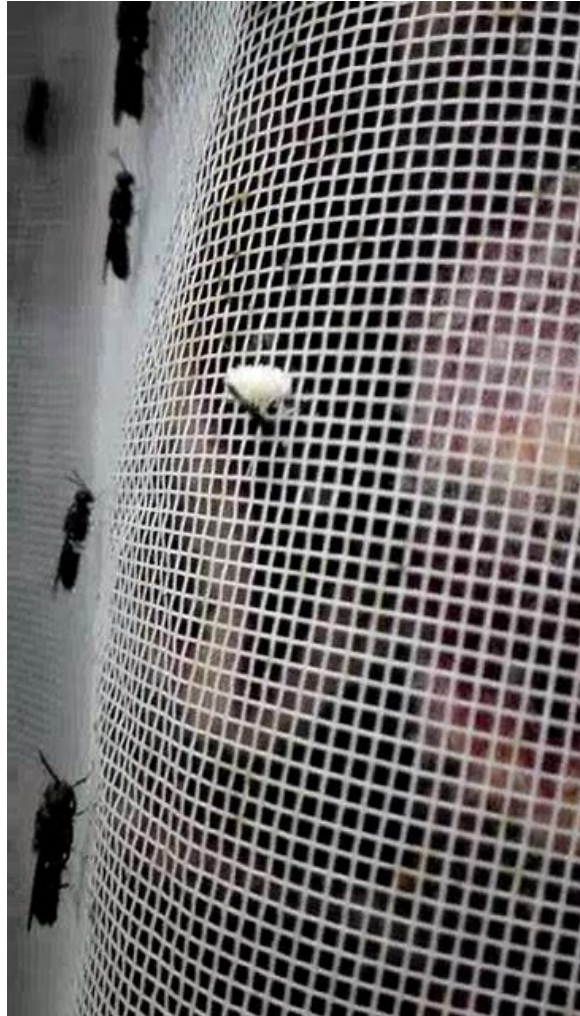
Test new approaches



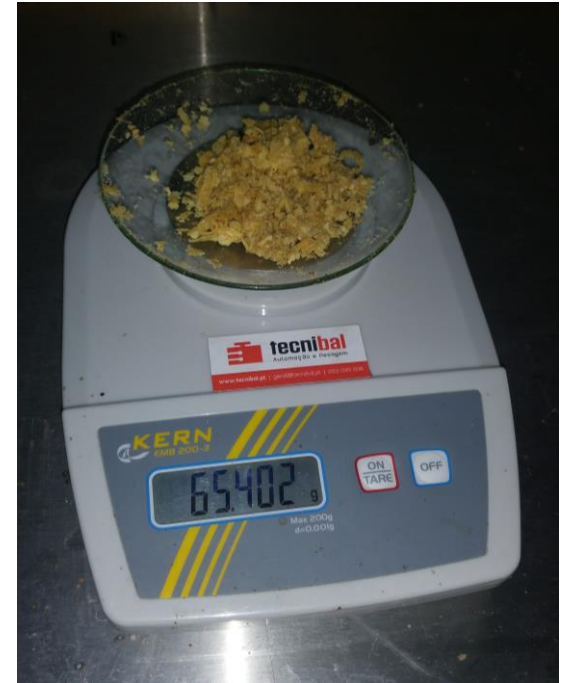
Free indoor



Focus key stages – egg production



Focus key stages – egg production



Focus key stages – bioconversion

- ▶ Different strategies



In boxes – big and small



Focus key stages – bioconversion

- Different strategies



Each development take us to new questions

- ▶ How to face these challenges?
 - Organize a strategies to tackle specific challenges
 - Coordinate research with market stakeholders
 - Prepare the business environment

Find investment and governmental support

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Insects as an opportunity in by-products valorization

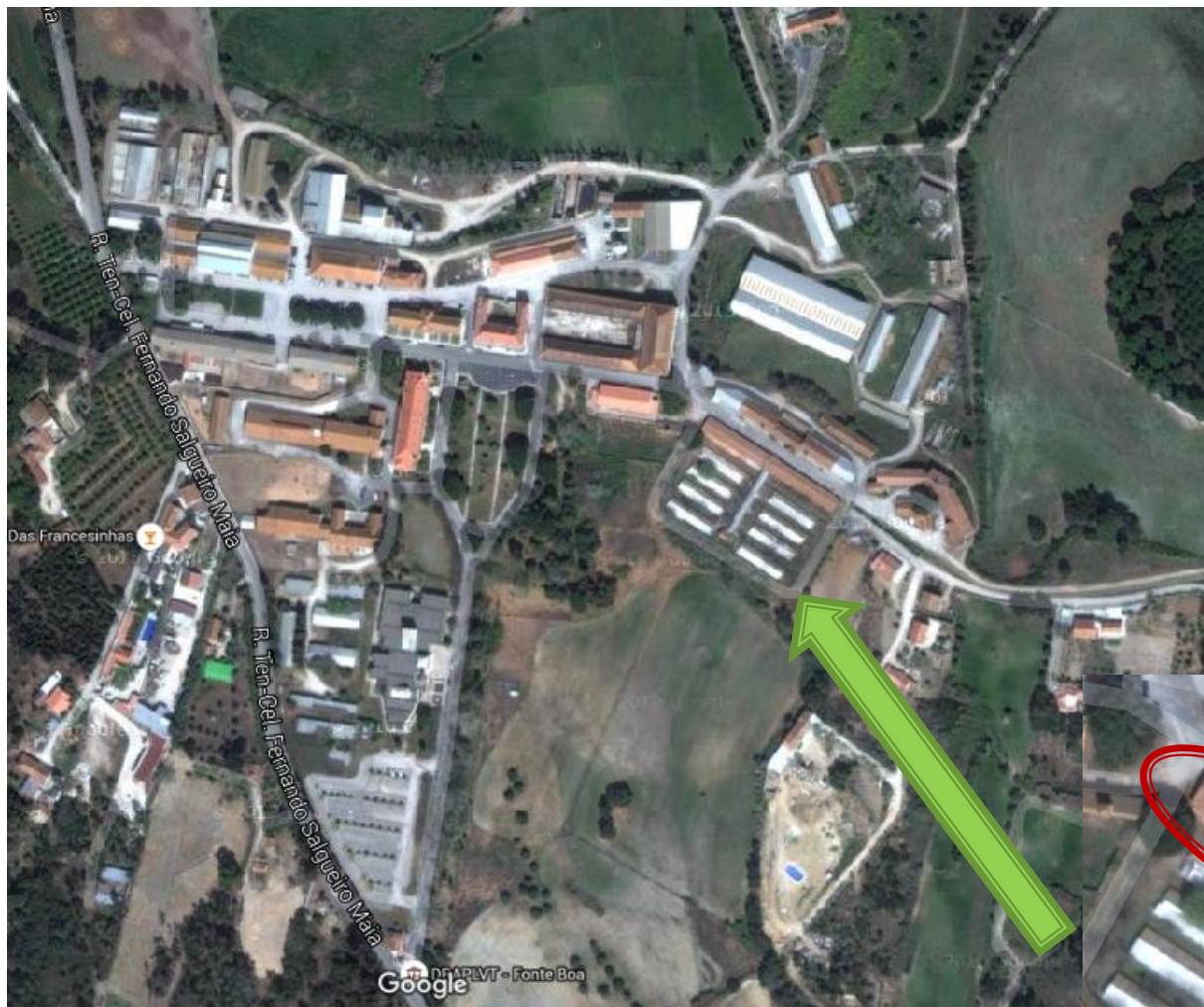
Promoters:



Main objectives

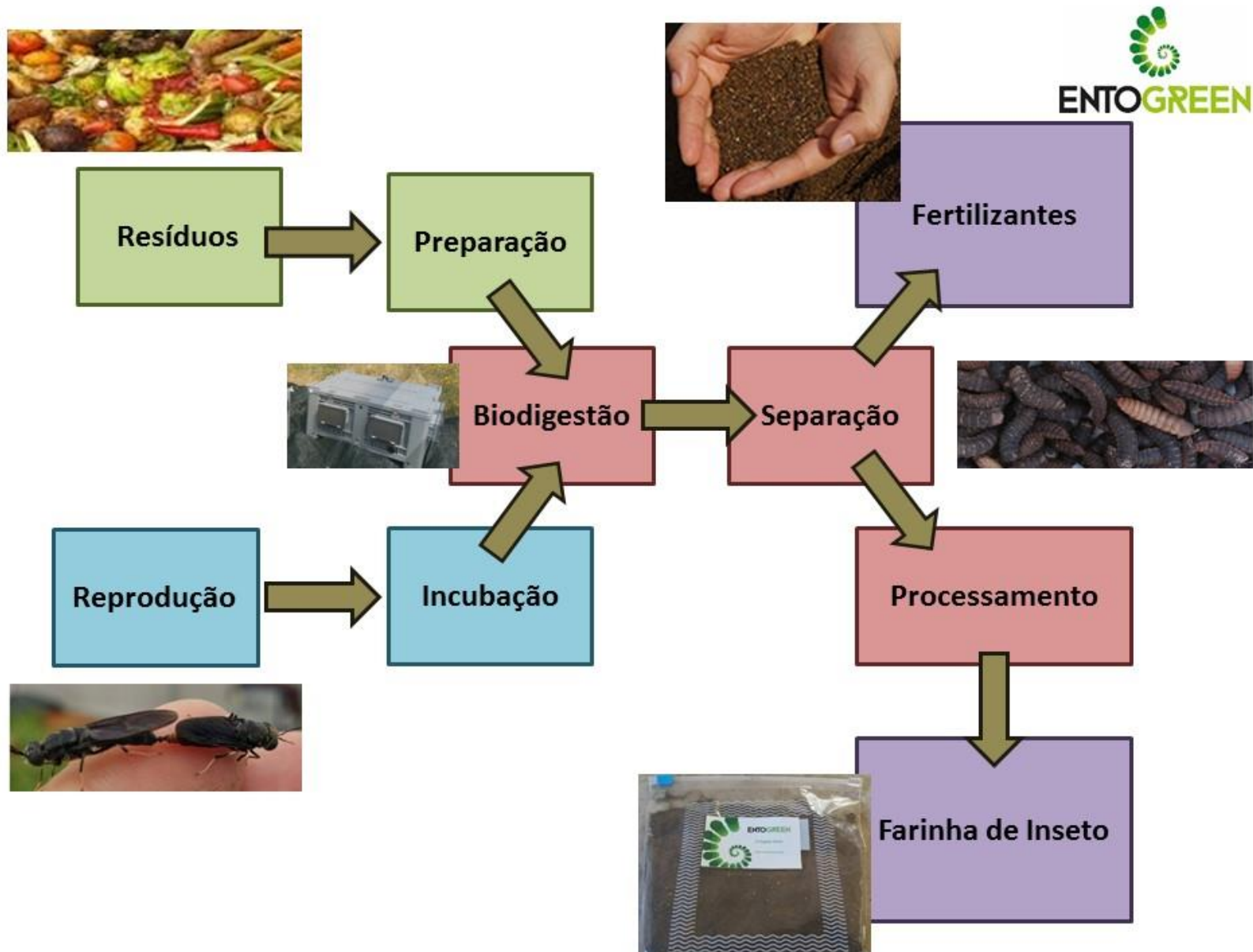
- ▶ Reduce food by-products
- ▶ Reintroduce the nutrients present in organic by-products in the value chain
- ▶ Contribute to the establishment of quality standards and biosafety
- ▶ Perform a proof of concept for industrial and commercial application
- ▶ Develop new products

Pilot unit



INIAV – Fonte Boa
Vale de Santarém

Process plan



Actual capability

1 Ton/Month



Egg production



Total 23 tons of by-products already converted



Larvae production



by-products testing

- ▶ 9 different by-products were tested (laboratory scale)

- Onion
- Potato
- Fermented fig
- Garlic peel
- Olive pomace
- Tomato soup
- Salads
- Fruits
- beer dreche



Onion by-products

- ▶ A regional survey of the different plant by-products available
- ▶ The optimal nutritional mixture was determined

Inoculation



Feeding laying hens and broilers



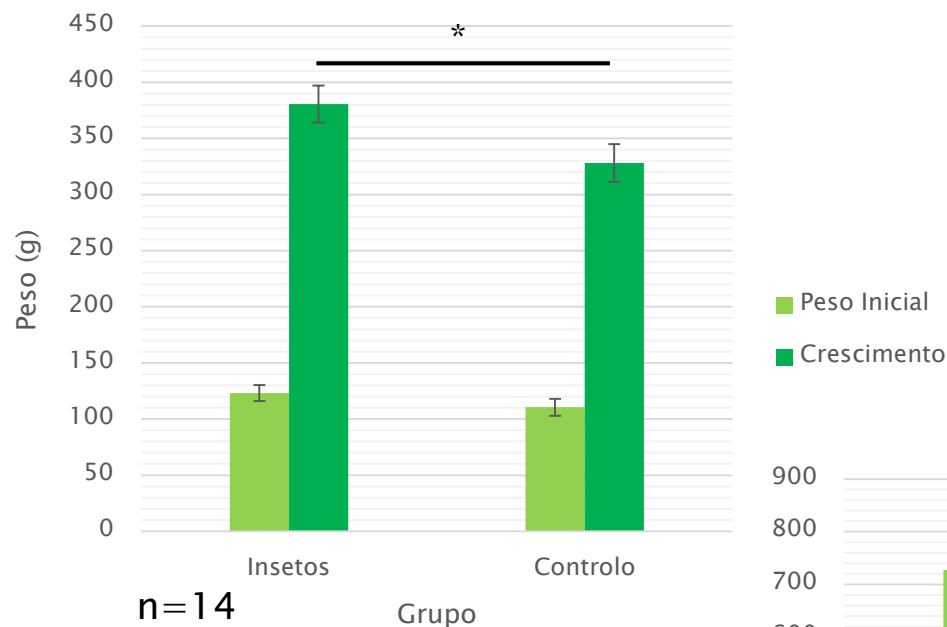
Pilot test with field chicken



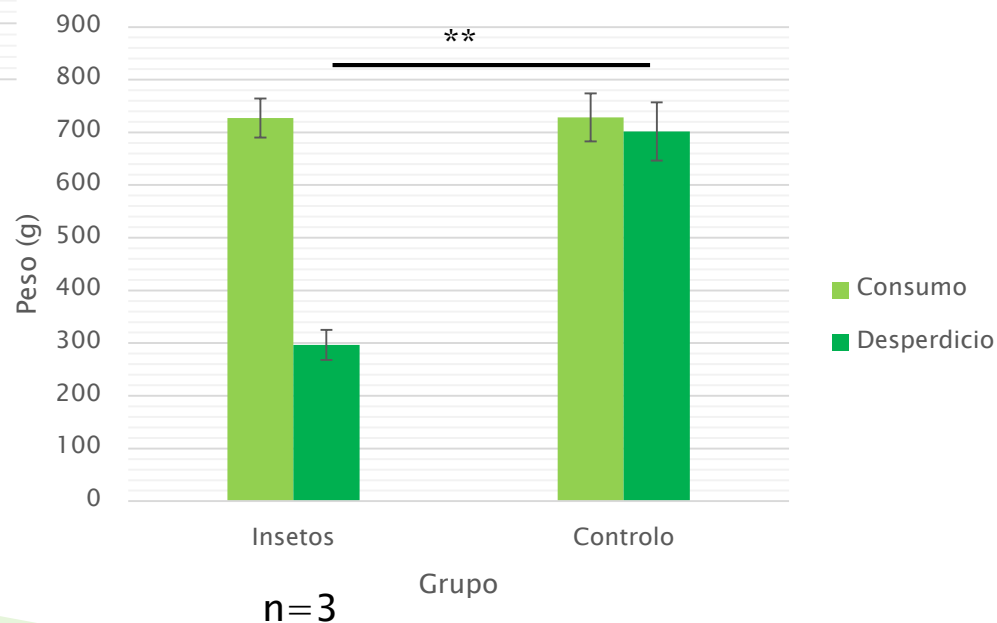
Breeds of native hens

Food ad libitum
10g of live larvae per
animal per day (L larvae)
Duration: 30 days

Preliminary results



Chickens that eat insects grow more
and by-products less food



Diferenças significativas

* $p < 0,05$

** $p < 0,01$

Fertilizer production

- ▶ Three different batches produced
 - Onion – 1 Ton
 - Potato – 100Kg
 - Nutritional mix – 4 Tons



Fertilization Tests



Fertilization Tests



Other approved Projects

Partner:

Funding:



PROGRAMA DE
DESENVOLVIMENTO
RURAL 2014 · 2020



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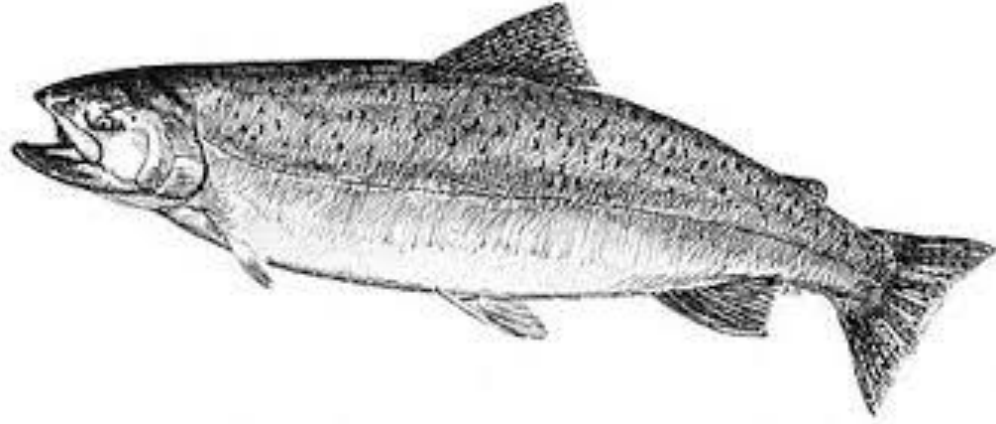


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Aqua projects

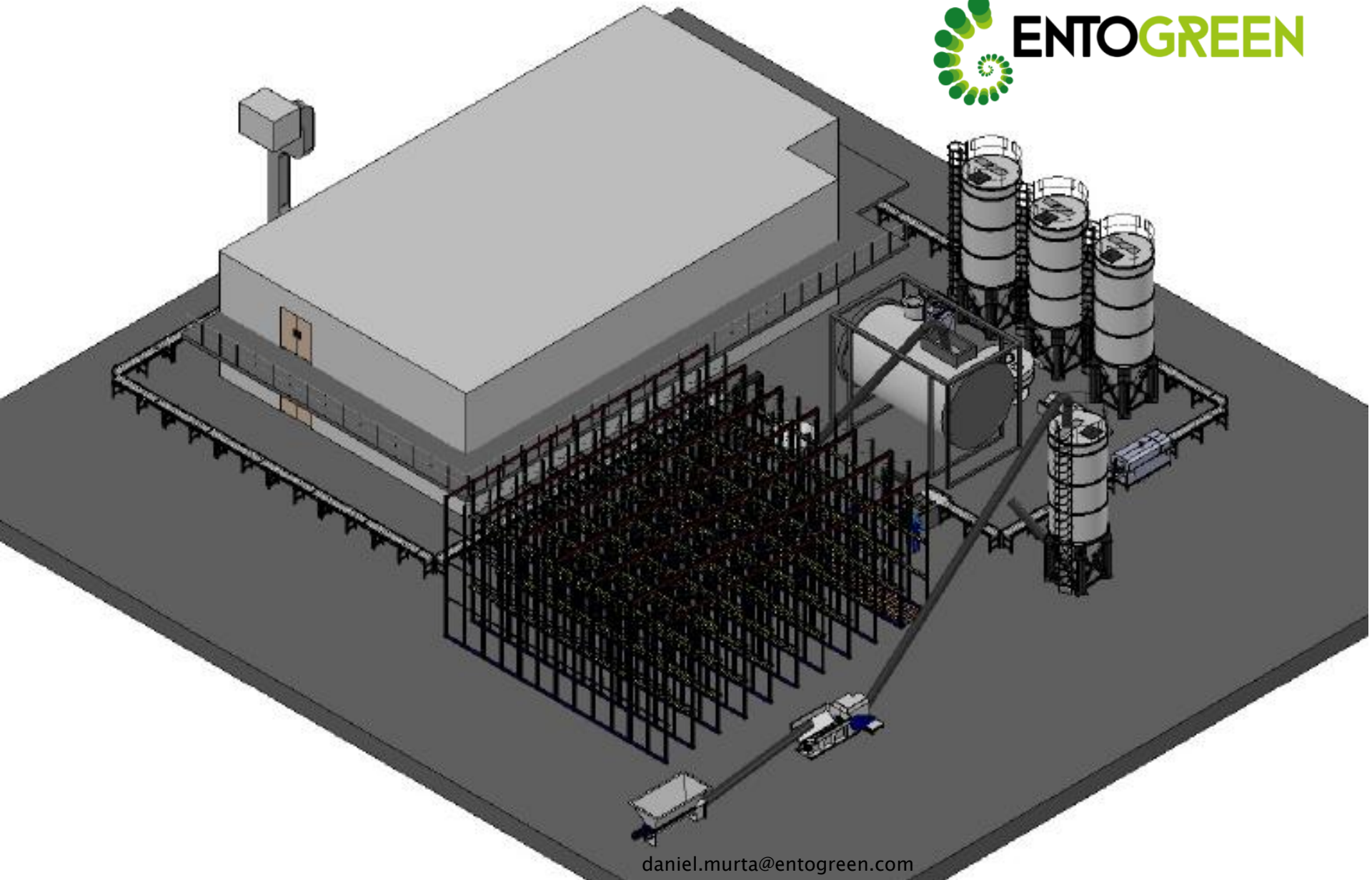


R&D projects:

ANIMAL4AQUA

AQUAMIX_{PROTINSECT}

Production Plant



Production Plant



Creation of an industrial plant for the production of insect meal and organic fertilizer (2500 to 3000 m²).

Assumption

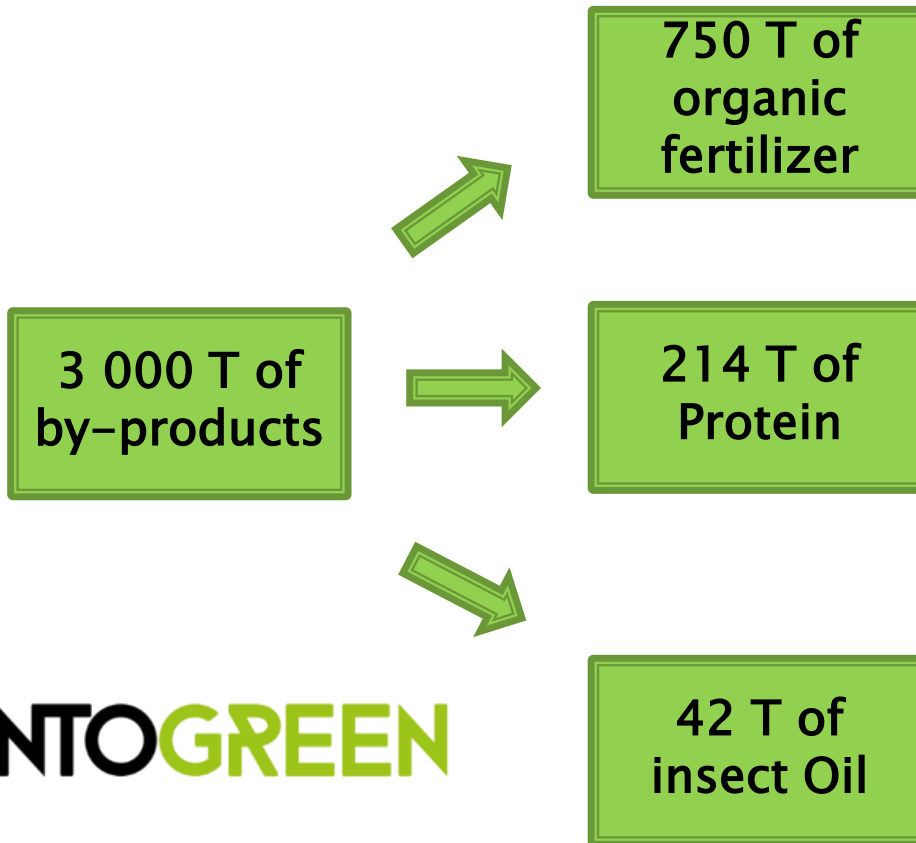
Direct competition in the fishmeal market.

Three main products

- Protein concentrate
- Insect oil
- Organic fertilizer

Unit with capacity to convert 3000T of by-products per month

Production Plant





ENTOGREEN

We return nutrients to plants and animals

Incubations:



INOVISA



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Prizes:



PRÉMIO
EMPREENDEDORISMO
E INOVAÇÃO
CRÉDITO AGRÍCOLA
AGRICULTURA
AGRO-INDÚSTRIA
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INvertebrateIT

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