Instituto Nacional de Investigação Agrária e Veterinária, I.P.

ENTOVALOR

Nutritive Value of Black Soldier Fly (*Hermetia illucens*) larvae reared with onion residues

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Introduction

ENTOVALOR - Insects as an opportunity in by-products valorisation

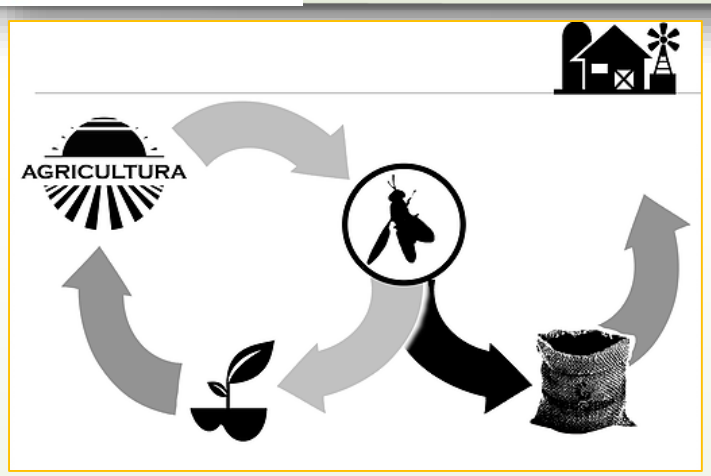
Objectives:

- ✓ **Reuse 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**

Coordination: Ingredient Odyssey/Entogreen

- **1 Research Entity**(INIAV)
- 4 **Agro/Feed Enterprises** (ENTOGREEN,AGROMAIS, Rações Zêzere, CONSULAI)

Introduction



- Biological based technology using insects to transform lost nutrients in nutritional resources for plants and animals

- CIRCULAR ECONOMY
- ZERO WASTE

- PROCESS Development
- PRODUCT Development

Tasks in progress at INIAV

- Chemical evaluation of substrates and larvae
- *In vitro* digestibility of larvae
- *In vivo* digestibility and balance studies with poultry
- Egg sensory analysis
- Agronomic valorization

Experimental Objetives

- **Valorization of Onion Residues by Black Soldier Fly (*Hermetia illucens*) larvae**

- **Nutritive value of larvae**

  2 exploratory studies

  - ✓ **Effect of the substrate**
  - ✓ **Effect of larval development stage**

Methodology

Larvae Production

2 substrates (60% moisture) :

- ✓Commercial meal
- ✓Commercial meal + Onion residues

Larvae Sampling

- ✓ Larvae at 24 days incubation
- ✓At larval development stages of Prepupa and Pupa

Chemical Characterization (substrates, larvae):

- ✓DM, Ash, CP, CF, NDF, ADF

***In vitro* Digestibility** (larvae): Boisen and Fernandez , 1997

Preliminary Results – Effect of Substrate

Chemical composition of substrates

	DM	CP	EE	CF	Ash
	(%)	% DM			
Commercial meal	90,1	15,6	2,2	14,3	7,2
Onion waste	7,2	15,6	0,6	10,1	6,5
Digestate commercial meal	68,6	17,1	0,41	26,6	14,5
Digestate onion waste	61,7	16,0	0,43	29,9	16,1

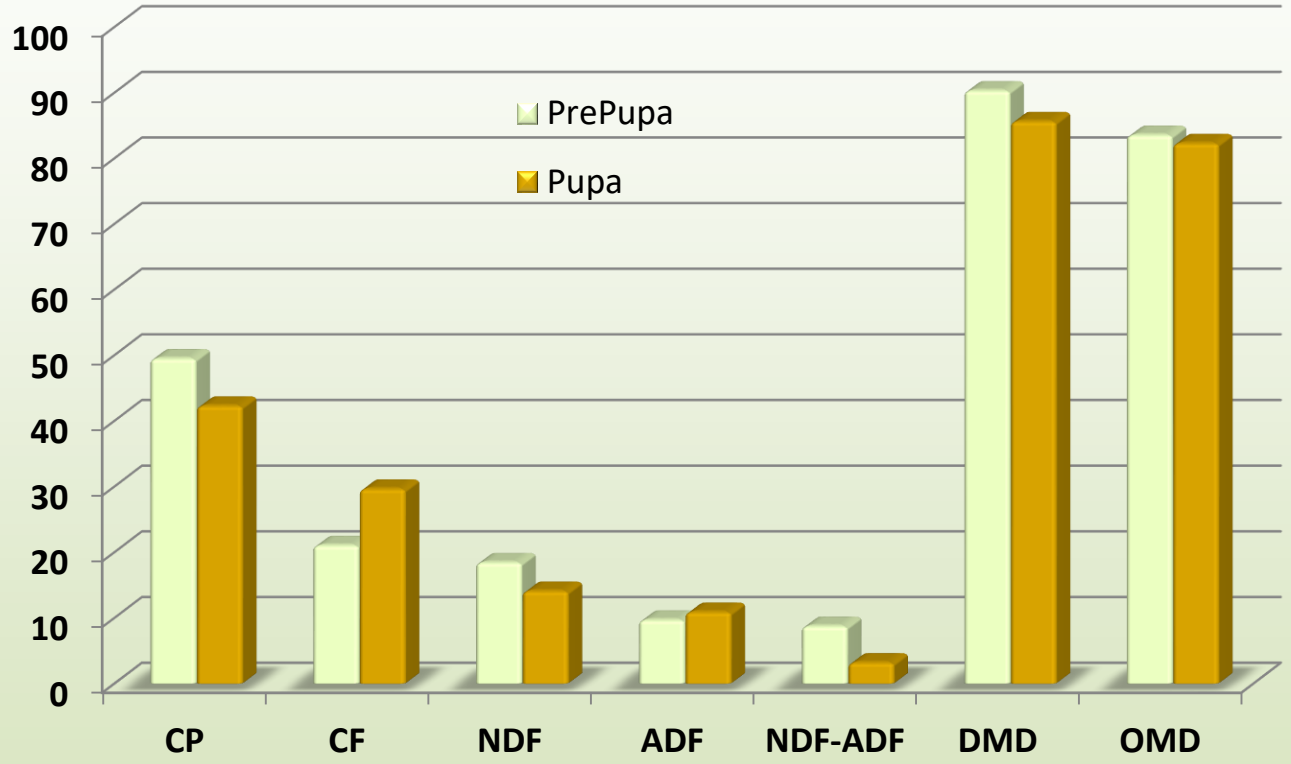
Preliminary Results – Effect of Substrate

Chemical composition and *in vitro* digestibility of BSF larvae

	DM	CP	EE	CF	Ash	DMD	OMD
	(%)	% DM				(%)	
Commercial Meal	32,1	45,3	23,1	9,9	13,9	86,0	85,9
Onion Residue	22,7	45,6	23,6	10,5	12,6	90,6	89,7

Preliminary Results – Effect of larval stage

Chemical composition (% DM) and *in vitro* digestibility (%) of larvae reared in onion residues



Final remarks

- Process devellopped by ENTOGREEN with success
- Onion wastes were well accepted by BSF Larvae
- Preliminary results were presented on larvae composition, although requiring to be supported by complementary lab scale experimentation.
- Ongoing experimental work
  - Quitin, fatty acid and heavy metal composition of larvae reared in onion wastes
- Study of potato wastes

THANK YOU FOR YOUR ATTENTION

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