



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA

Centro per il Miglioramento
e la Valorizzazione delle Risorse Biologiche
Agroalimentari - BIOGEST-SITEIA

SCALTBUR

LEADING A REVOLUTION
IN BIOWASTE RECYCLING

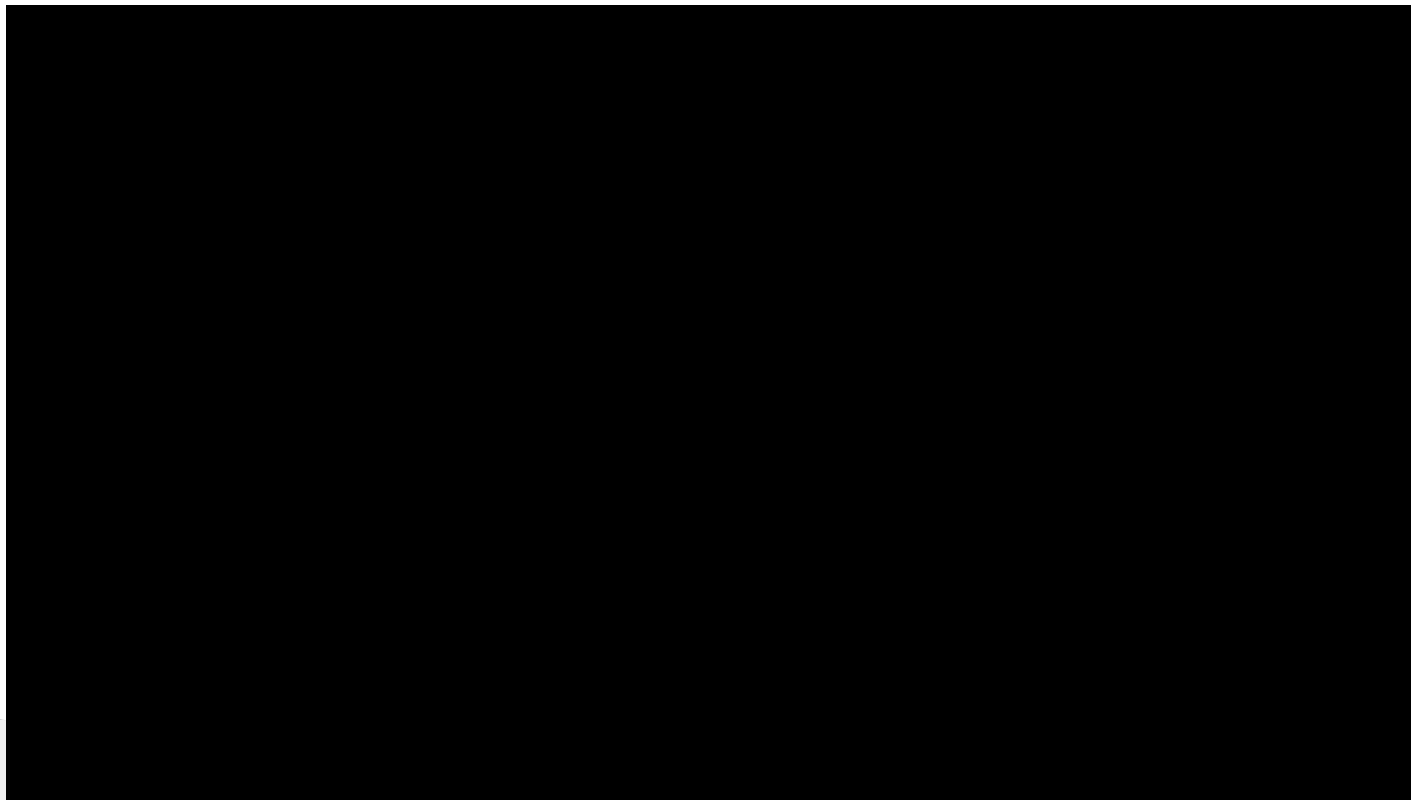
- Seasonal variance of HO.RE.CA.
- leftovers as a feeding substrate for black soldier fly (*Hermetia illucens* L.) larvae
- Giuseppe Montevercchi, Laura Ioana Macavei, Giulia Pinotti, Sara D'Arco, Elena Zanelli, Silvia Buffagni, Francesca Masino, Lara Maistrello,

This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 817788

Andrea Antonelli - UNIMORE



Where we are

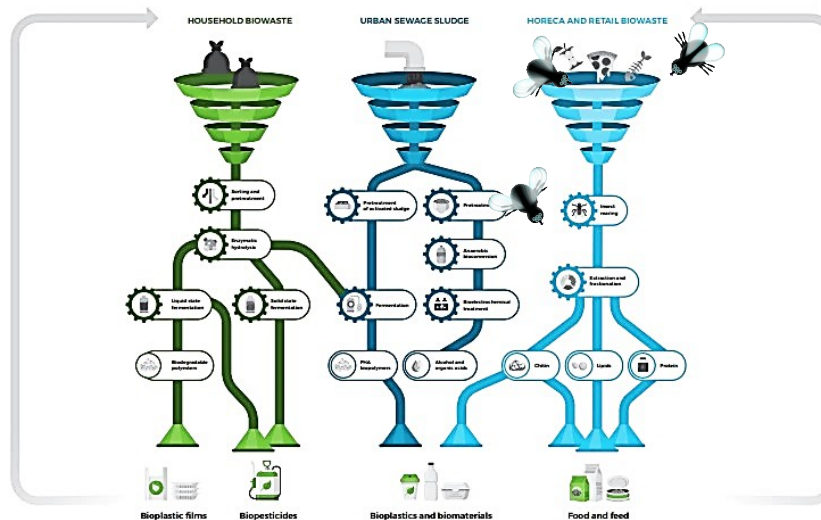


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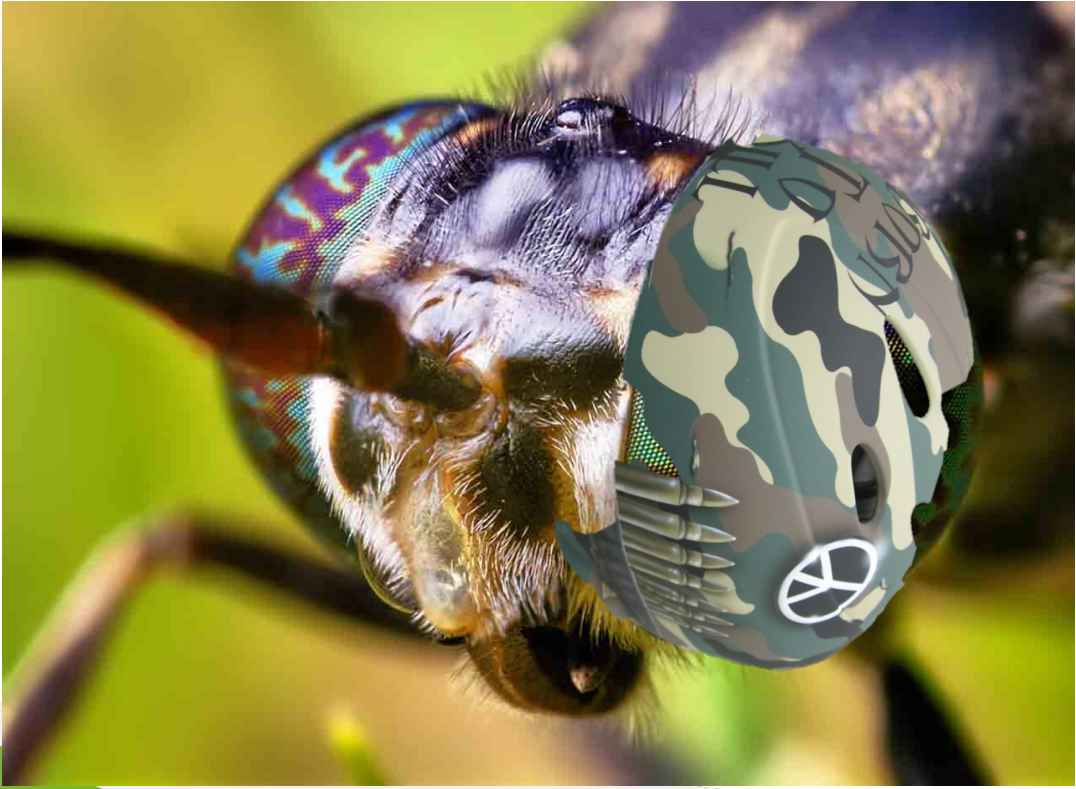
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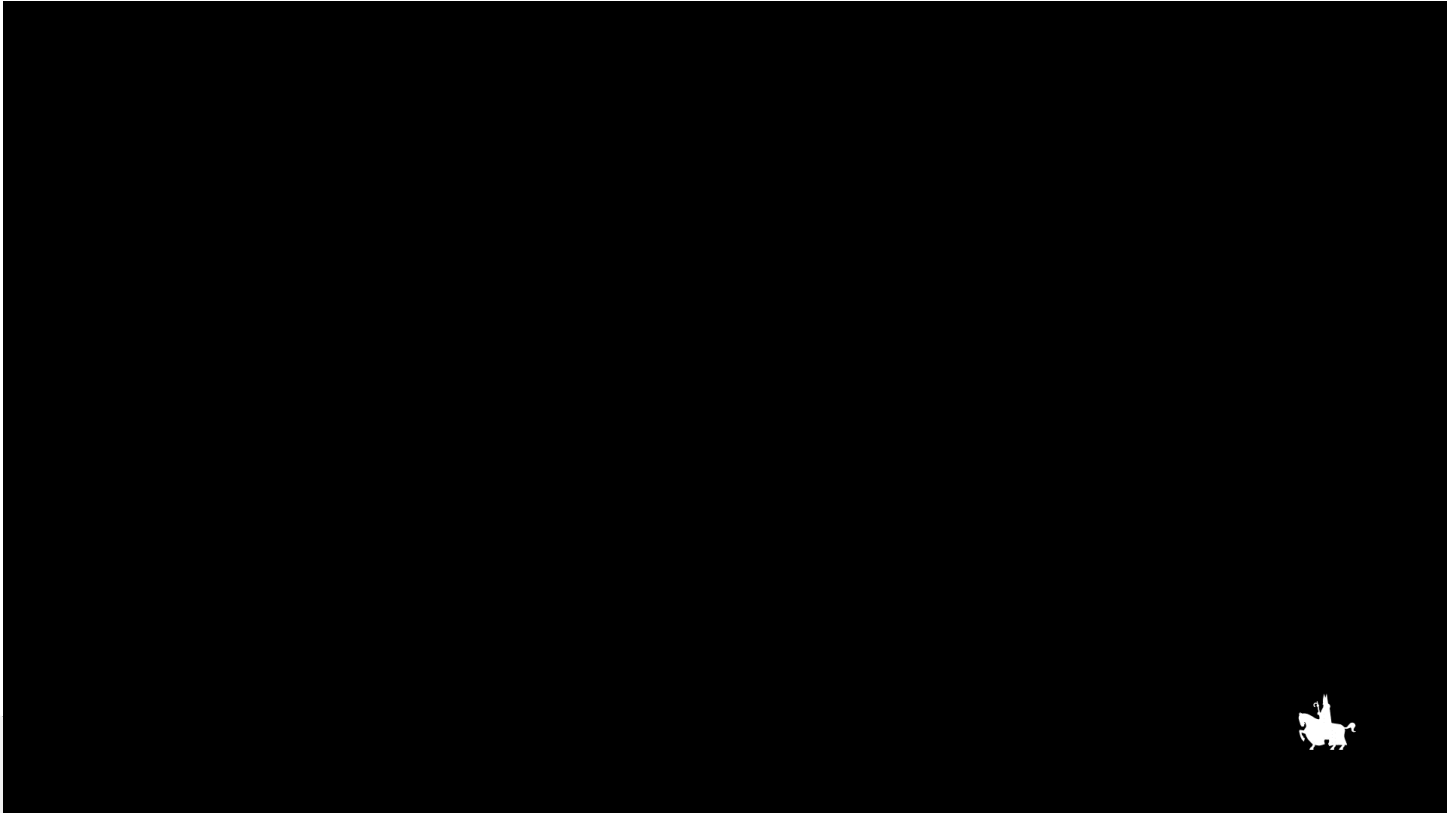
SCALABLE TECHNOLOGIES FOR BIO-URBAN WASTE RECOVERY Leading a revolution in biowaste recycling



Black soldier fly



The pilot plant



Food waste management

Flexible technology

Water removal



Food waste bioconversion

Hermetia illucens

Black soldier fly

steady composition of protein



PRODUCTS FROM INSECT FRACTIONATION

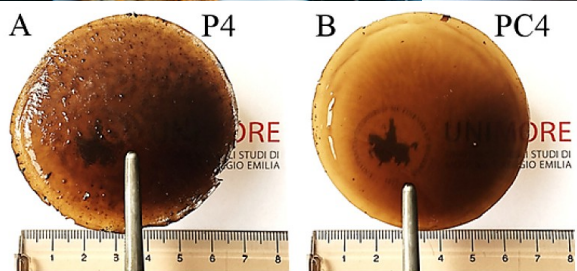
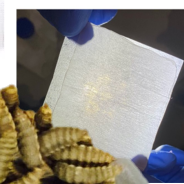
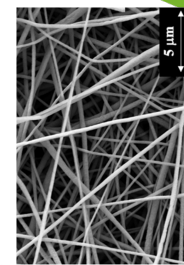


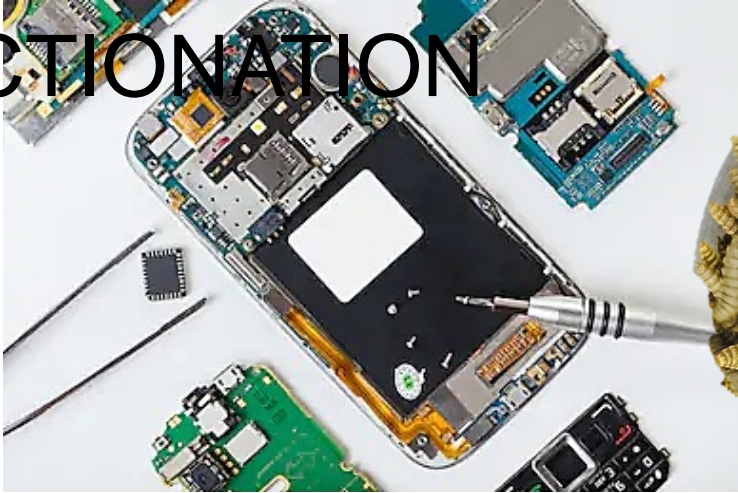
Fig. 1. Images of protein film obtained from film casting of protein solutions: film with whole proteins, P4 (A); film with soluble proteins, PC4 (B). Soluble protein films appear as more transparent and homogeneous with respect to whole protein films.

Hermetia illucens
Black soldier fly



➤ Fractionation concept

PRODUCTS FROM INSECT FRACTIONATION



Hermetia illucens
Black soldier fly

PRODUCTS FROM INSECT FRACTIONATION

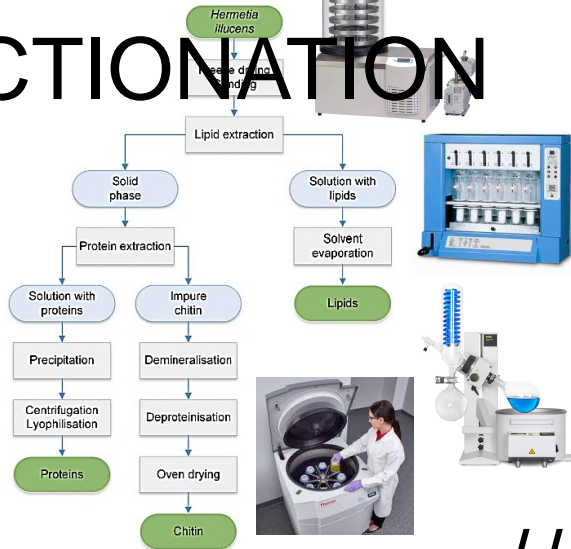
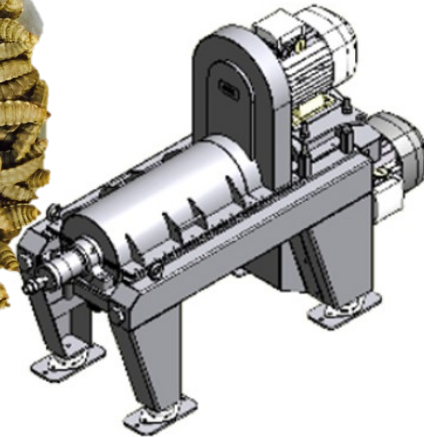
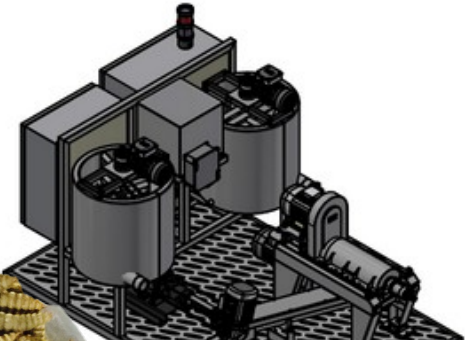


Fig. 1 Overview of the sequential extraction of lipids, proteins, and chitin from larvae, prepupae, and pupae of *Hermetia illucens*



Hermetia illucens
Black soldier fly

PRODUCTS FROM INSECT FRACTIONATION



Hermetia illucens
Black soldier fly

The substrate



The lifelong substrate characterization

Month	HORECA leftover dry matter (% FW)	HORECA leftover moisture (% FW)	HORECA leftover protein (% DW)	HORECA leftover protein (% FW)	Larval average weight (g)
Sep 2020	19.20	80.80	17.93	4.26	0.14
Nov 2020	22.00	78.00	19.69	5.55	0.16
Jan 2021	23.20	76.80	9.46	2.86	0.12
Feb 2021	21.60	78.40	14.24	3.92	0.14
May 2021	24.30	75.70	18.39	5.90	0.17
Jun 2021	15.90	84.10	17.47	3.30	0.13
Jul 2021	27.60	72.40	12.32	4.70	0.16

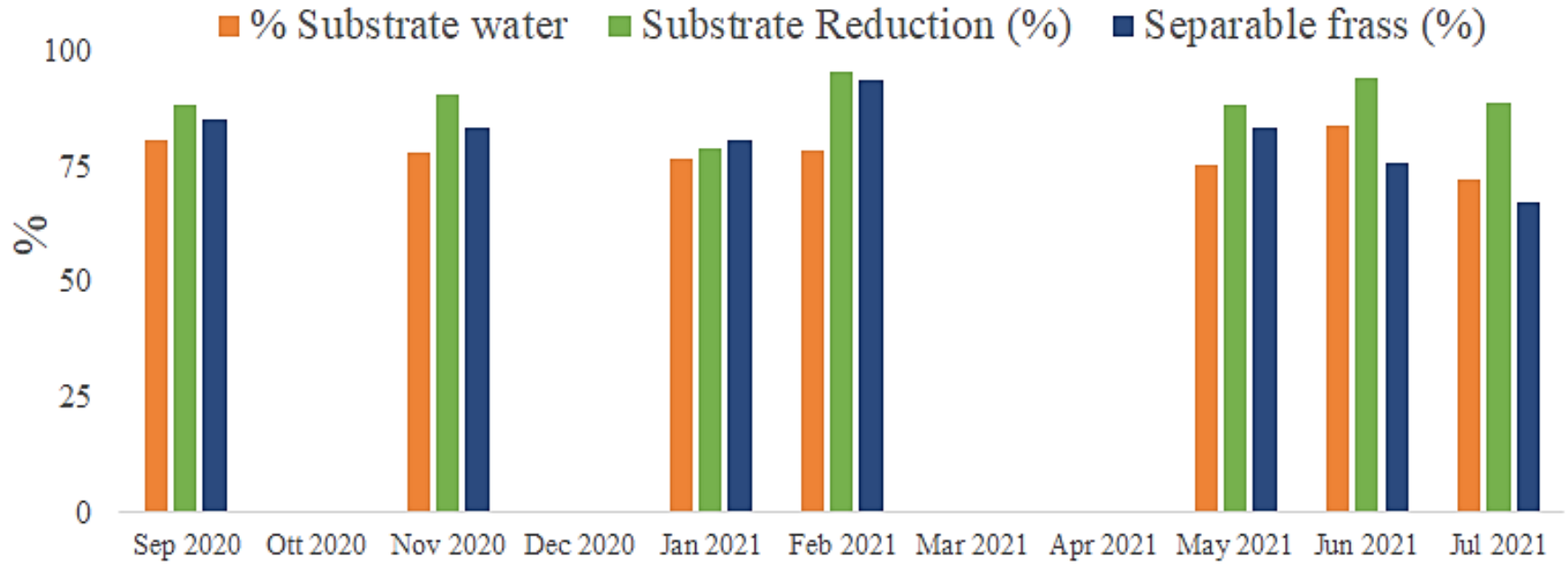


The linear correlation

$$r = 0.96; p < 0.001$$



The absence of correlation





Final remarks

Although HO.RE.CA. leftovers are a suitable feeding substrate because the addition of water is not required, it is essential to include specific thermo-hygrometric control systems in the rearing plant to achieve a high level of frass and mature larvae separation

A preliminary treatment of the substrate through the centrifugal decanter might be convenient to remove fat and further optimize the water content



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