

CORS

Conversion of Organic Refuse by Saprophages

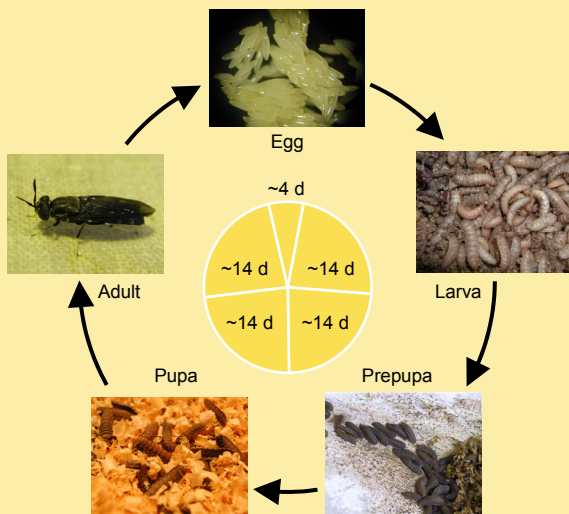
Saprophages are all organisms feeding on dead or decaying organic matter. Typical examples are earthworms, millipedes or insect larvae. Conversion of organic refuse by saprophages is an innovative technique to treat organic waste in low and middle-income countries. Treatment products are the degraded organic matter as well as the saprophage organisms themselves.

	Low-Income Countries	Middle-Income Countries	High-Income Countries
Waste generated kg/cap/day	0.4–0.6	0.5–0.9	0.7–1.8
Organic fraction	40–85%	20–65%	20–50%

High reuse potential

Example of a CORS System: *Hermetia illucens* and its potential as a waste engineer

Thanks to its numerous biological attributes, the soldier fly *H. illucens* can transform organic waste into a nutritious soil amendment by simultaneously producing a high-quality animal food resource comparable to fish meal.



Biological attributes

- Larvae feed on and digest organic material
- Kitchen/market residues
- Faeces (chicken, swine, cattle, human)

Effects on technology

- Waste reduction (~50% dry mass)
- Elimination of pathogens
 - E. coli
 - Salmonella
 - Helminth eggs (?)

Prepupae migrate in search for a dry pupation site

Self-collecting prepupae

Fully grown larvae empty their gut before migration

At their maximum weight and with empty gut, prepupae compose a valuable nutrient source

Adults do not take up food

Minimised risk of disease transmission

Presence of soldier fly larvae prevent house flies from oviposition

Natural house fly control (i.e. poultry houses)

Processing unit and resulting products

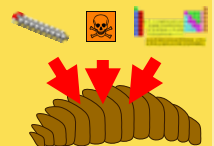


Ongoing research at Eawag

A treatment option applicable especially in low and middle-income countries is currently being developed at Eawag/Sandec by combining both laboratory and *in situ* analyses

Characteristics of prepupae

The prepupae of *Hermetia illucens* are a high-quality animal food resource. Besides energy, protein and fat content, the degree of biomagnification of critical substances (heavy metals, pesticides) will be determined within the larvae.



Pathogen removal

Soil amendments such as compost – or in this case, digested organic material – is applied manually in developing countries. As organic waste contains pathogens, the treatment process must ensure sufficient removal of these pathogens. Helminth eggs are extremely resistant to waste treatment and may be used as an indicator for the inactivation of pathogens by the fly larvae.



Treatment aptitude

To test the suitability of this technology in practice, a pilot plant will be set up in Costa Rica (in collaboration with the Instituto Tecnológico de Costa Rica). Different waste sources as well as daily operation and cost efficiency of this technology will be investigated.

