

## **Abstract: BSF bioconversion by Bestico BV**

### Highlights:

- Biological conversion of animal waste to insect protein meal, insect fat and fertilizer
- Agent: Black Soldier Fly larvae (*Hermetia illucens*)
- System adaptable to many different wastes
- Expertise of Bestico BV:
  - Finished and tested industrial scale facility design
  - Reliable large-scale production of BSF eggs
  - Highly automated facility design for manure conversion
  - More than 45 years of experience in insect mass production

The Black Soldier Fly (*Hermetia illucens*) is a non-pest insect found in large numbers on organic wastes on most farms in tropical and subtropical regions world wide. The species is attracted to livestock operations, dumpsters etc., because their larvae can grow very well on manure and other wastes found in these locations. The adaptation to this habitat has made BSF larvae the perfect converter of organic side streams.

Bestico BV has spent the last four years optimizing their facility designs for the mass production of BSF eggs, the conversion of organic side-streams to BSF larvae and the processing of these larvae to feed ingredients. The steady supply of eggs is needed to run Conversion Facilities which don't need to support the full life cycle of the fly, but only use the period of fastest larvae growth.

The growing process takes about 10 days. Within this period, the larvae reduce manure weight by 40-60% and yield 20-30% larvae biomass, depending on the nutritional profile of the manure. The final protein meal contains up to 65% protein.

Protein from BSF has proved a good feed ingredient for farmed fish, poultry and other livestock. It provides essential amino acids which are low in feeds from plant origin and is easily digested by most animals.

The byproduct from the Conversion Facilities (residue substrate) is a good fertilizer with reduced nutrients, which allows the application of more material on a smaller area of land. It is heavily reduced in smell and contamination with pathogenic microbes.

The fat fraction of the larvae can be extracted during processing. This fat can be sold to feed mills or converted to biodiesel or other products. Chitin can be extracted and processed to bioplastics or other materials.

Bestico BV is currently looking for partners to adapt the technology to fit into the standard operations of industries with large organic waste production. Uniformity of physical and nutritional properties of waste is very important to allow precise planning. This makes manure from livestock operations the perfect source.

Partners in the feed industry could help in the introduction of BSF-based feedstuffs, while fertilizer companies are invited to cooperate on the marketing of residue substrate.

The efforts of Bestico BV are supported by its mother company, Koppert Biological Systems. Koppert is the leading provider of arthropods and microbes for biological control of agricultural pests and has developed expertise in the production of insects since 1967. Koppert is an internationalized firm with subsidiaries in 27 countries.