

Black soldier fly larvae (BSFL; *Hermetia illucens*) can quickly convert organic substrates into body proteins and lipids. Due to its high conversion efficiency, this specie has gained significant attention in the field of insects as feed and food. However, there is a lack of understanding of the digestive processes underlying this potential. The main challenges in assessing digestibility in BSFL are accurate feed intake measurement and proper faeces collection, as larvae feed and excrete in the same moist substrate. In this study, a new indicator called Estimated Digestibility (ED) was introduced, which measures the difference between distributed feed and frass macronutrient weight, divided by macronutrient weight in distributed feed. ED was evaluated at increasing larval densities to ensure complete feed ingestion and frass free from refused feed. Initial diet and frass samples were analyzed for dry matter (DM), starch, nitrogen, ether extract (EE), neutral detergent fibre, acid detergent fibre, acid detergent lignin, ash and energy. The results showed a sigmoidal pattern for ED of all fractions except fibres, with asymptotic ED of  $80.3 \pm 1.3\%$  for DM,  $99.0 \pm 2.3\%$  for starch,  $78.6 \pm 1.1\%$  for nitrogen,  $95.3 \pm 1.5\%$  for EE,  $58.4 \pm 1.0\%$  for ash and  $80.6 \pm 1.2\%$  for energy. This new indicator is a way of measuring digestibility in insects living in their feeding substrate. It offers insight into the digestive efficiency of BSFL.

**Keywords:** insect nutrition, alternative protein, insects as feed, macronutrient, density, Diptera

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### **P376. Black soldier fly as a tool for the valorization of tomato waste**

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The tomato is one of the most developed horticultural products in Italy and the tomato industry, particularly cannery industry, with 2.5 M tons/y produces enormous quantities of waste for which safe and cost-effective disposal must be developed. In particular, the re-use of washing and sorting residues, consisting of green leaves and stems and defective raw tomatoes (unripe, green or damaged), which represent 2-3% of the weight of the starting material, has been little studied.

In this work, tomato production residues were used as a substrate for the growth of larvae of *Hermetia illucens* (Diptera: Stratiomyidae), also known as the black soldier fly (BSF), that can grow on numerous organic substrates, converting them into valuable larval biomass rich in proteins and lipids. For this aim, different types of tomato wastes, such as stem, red or green tomatoes, leaves, seeds and peeling waste, were fed to groups of 500 BSF neonate larvae, with three replicates per each experimental trial. Growth parameters, bioconversion and substrate reduction indexes were then evaluated, and the larvae were analyzed to assess their final chemical composition. Results highlighted the ability of BSF to grow on the tomato waste, particularly those consisting of peeling waste (peel and seeds), or where tomato fruits were present in a higher percentage. In order to re-use waste biomass to obtain high added-value products, also in line with the EU's plan on the circular economy, tomato waste deserves further investigation for its exploitation for the production of BSF larvae.

**Keywords:** edible insects, *Hermetia illucens*, circular economy, vegetable waste

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