

## Gastrointestinal evacuation in black soldier fly larvae

**A. Hosseini<sup>1\*</sup>, M. Kone<sup>2</sup>, M. Gold<sup>3,4</sup>, A. Paul<sup>1</sup>, D. Bruno<sup>5</sup>, M. Bonelli<sup>6</sup>, G. Tettamanti<sup>5</sup>, M. Casartelli<sup>6</sup>, E. Schmitt<sup>1</sup>, A. Mathys<sup>3</sup>, G. Vandenberg<sup>2</sup> and M.H. Deschamps<sup>2</sup>**

<sup>1</sup>Protix, Industriestraat 3, 5107 NC Dongen, the Netherlands; <sup>2</sup>Université Laval, Dép. Sciences Animales, Pav. Paul-Comtois, 2425 rue de l'Agriculture, G1V 0A6, Québec (Qc), Canada; <sup>3</sup>ETH Zurich, Sustainable Food Processing, Department of Health Science & Technology, Institute of Food, Nutrition & Health, Zurich, Schmelzbergstrasse 9, 8092 Zurich, Switzerland; <sup>4</sup>Eawag, Swiss Federal Institute of Aquatic Science and Technology; Department of Sanitation, Water and Solid Waste for Development (Sandec), Überlandstrasse 133, 8600 Dübendorf, Switzerland; <sup>5</sup>University of Insubria, Department of Biotechnology and Life Sciences, via J.H. Dunant 3, 21100 Varese, Italy; <sup>6</sup>University of Milan, Department of Biosciences, via Celoria 26, 20133 Milan, Italy; sali@protix.eu

In some industrial post-harvest processing systems of black soldier fly (BSF) (*Hermetia illucens*), the larvae are minced and homogenised for protein and fat extraction. The quality of the resulting products can be affected by the gastrointestinal content of the insect. This content is poor in nutrients and rich in microbes and digestive enzymes. Post-harvest starvation has been suggested as a gastrointestinal evacuation (GE) method for BSF larvae, however, no direct evidence is available for GE and improvement of the quality of larvae after starvation. In the present study, we determined the GE dynamics through dissection of BSF larvae kept for 72 h under different temperature and substrate conditions after harvest. Different GE patterns were observed, depending on the environmental condition after harvest. At low temperature (10 °C), GE was not completed (>90%). The most complete GE was observed after 6 h in water and after 48 h under fasting. Shortening the pre-slaughter period is important to avoid the decline of nutritional and microbial qualities of larvae. Interestingly, further investigations indicated improvements in the nutritional, colour, and microbial qualities of the larvae after specific GE treatments. These larvae showed higher crude protein and fat, reduced microbial counts, lower wet weight, lighter puree colour, and no change in their dry weight, ash, and fibre contents compared to larvae after conventional fasting. Broadly, results indicate that it may be beneficial to add an optimised degutting method after harvest to improve the quality of larvae for processing.