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ORGANIC WASTE MANAGEMENT VIA *HERMETIA ILLUCENS*: A MINI REVIEW

***Richard N. Mutafela*[1]**
***Murat Mirata*[2]**
***Graham Aid*[3]**
***Monika Olsson*[4]**
***William Hogland*[1]**

[1)] *Dept. of Biology & Environmental Science, Linnaeus University, Sweden*
[2)] *Dept. of Management & Engineering, Linköping University, Sweden*
[3)] *Ragn-Sells Group, Sweden*
[4)] *School of Arch. & Built Env., KTH Royal Institute of Technology, Sweden*

Abstract
Increased resource and materials consumption, waste generation and food shortages have characterized the world's rising population. The situation is worsened by inadequate waste management alternatives, declining non-renewable fuel stocks alongside controversies surrounding some renewable fuel sources, and increased food prices due to expensive animal feedstocks. These trends are expected to further increase with population growth as they exacerbate environmental pollution, climate change and other social-economic stresses. This paper presents a review of Black Soldier Fly (BSF) and its circular economy model as a possible solution, focusing on its life cycle attributes and applications in organic waste management, biodiesel and animal feed production. Organic waste management is reviewed in terms of negative effects reduction, and biodiesel production in terms of BSF larvae (BSFL) fat profile, content and replacement potential of conventional biodiesel feedstock crops. Animal feed production, on the other hand, is reviewed in terms of replacement potential of conventional animal feed with BSFL meal. Ultimately, Life Cycle Assessment (LCA) studies of the BSF process are reviewed, comparing conventional biodiesel feedstock with BSFL feedstock and conventional animal feed with BSFL meal in terms of land use, energy use and global warming potential (GWP). BSF considerably reduces waste biomass quantity, odours, trace elements, metals, nutrients and volatile organic compounds. Furthermore, its fatty acids profile shows suitability for replacement of crop-based biodiesel feedstock while BSFL meal shows suitability for conventional animal feedstock replacement of up to 36%. From an LCA perspective, overall the BSF process is a beneficial addition in the organic waste management chain, and is advantageous over crop-based biodiesel feedstock and conventional animal feedstock in terms of land use, environmental emissions and GWP. However, further research with focus on large scale application is recommended.

Keywords: Black soldier flies (BSF), circular economy, organic waste, biodiesel, LCA

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