



# Reduction of Organic Solid Waste Using Black Soldier Fly (*Hermetia Illucens*) (Diptera: Stratiomyidae) Larvae for Municipal Solid Waste Management in Developing Countries.

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## Abstract:

Purpose Improper disposal of organic waste in developing countries pose a huge challenge, especially in the cities of developing countries due to unavailability of sustainable low cost waste treatment technology. Black soldier fly has the potential to degrade organic waste and the prepupae stage of the insect can be harvested and used as valuable nutritious feed for aquaculture and poultry industry. The study investigated the Black soldier fly (*Hermetia Illucens*) (Diptera: Stratiomyidae) larvae potential to reduce and consume a wide range of organic waste and the possible used in the waste management industry.

Methods To assess the consumption and reduction ability of the black soldier fly larvae, Six (6) different organic waste types were specifically chosen; farm waste, meat waste, vegetable waste, fruits waste, fish waste and household/kitchen and mixture of food waste as a control. The waste consumption was determined by varying waste feed treatment (2.0, 2.5, 3.0, 3.5, to 4 kg) of all waste types. Each of the sets up received equal number of viable larvae (i.e. 2,000) which were 5-day old.

Results The results showed that the *Hermetia Illucens* larvae was able to reduce all the waste types investigated. The kitchen/household waste had the highest percentage mean reduction per day by the larvae. Furthermore, the Kitchen waste produced the heaviest larvae within the shorted possible time among the treatment groups. The larvae fed on fruits, vegetables had almost the same weight and length of time as the control feed treatment. The fish and meat waste produced prepupae (harvested stage larvae) with the highest nutritious content. It was found that the black soldier fly larvae had the ability to reduce and consume wide range of organic waste and could be utilised as animal feedstock.

Conclusion Further investigation of black soldier fly larvae as agent of waste management on a large scale system would be helpful in future studies.



## Biography:

Daniel has about 15 years working experience in strategic program design, implementation, management, monitoring and evaluation of Water, Sanitation and Hygiene programmes. Daniel has PhD in Civil Engineering (Water and Environmental Sanitation) and Dual MSc. (Water and Sanitation) and (Water and Environmental Technology) from KNUST-Ghana and Cranfield University-UK respectively. He has rich experience in faecal sludge and organic solid waste management in urban, peri-urban and rural areas. He has experience in project management, supervision and quality assurance of WASH infrastructure and construction in developing countries, including; Ghana, Nigeria, Sierra Leone, Liberia, Mali, Niger, Chad, Ethiopia, Uganda and Rwanda. Daniel has strong interest in WASH in Humanitarian Emergency, Ecological Sanitation and Solid Waste Engineering as well as livelihood empowerment through Climate Change programmes. He has skills in institutional engagement, policy dialogue, fundraising, facilitating concept notes/proposal development, community mobilization, community participation and hygiene promotion. Daniel has demonstrated significant prowess in action research, documentation, capacity building, networking and working in partnership with Government, development partners, academic institutions and other stakeholders. Daniel has extensive experience in human resources development in the provision of capacity building for Water and Sanitation Development Board (WSDBs), WATSANs Committee, CBOs and artisans/masons.

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