72. Optimization of Black Soldier Fly (Hermetia Illucens) Production for Organic Waste Management in a Small-scale Institutional Facility

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Abstract

Safe management of faecal waste (FW)is challenging, especially in developing countries. Unsafe FW disposal practices greatly risk human health and the environment. Efforts to enhance FW management have seen the evolution of circular-based technologies, that in addition to safely treating waste, also recover the nutrients therein back to the food chain. One such technology is the black soldier fly (BSF) based- technology, which facilitates FW bioconversion. There is, however, a lack of information on BSF-rearing strategies, especially at the non-feeding stages of adult emergence and egg oviposition. This study assessed the optimization of black soldier production at the post-feeding stages of adult emergence and oviposition. The experiment was set up at the Meru University Sanitation Research Institute, (MUST- SRI). FW was obtained from a container-based facility at MUST-SRI while kitchen waste (KW) was from the MUST cafeteria. Black soldier fly- larvae were introduced into containers using different feed substrates and their growth was monitored until post feeding stage. The feed substrates used were FW, KW, and a mixture of KW and FW at a ratio of 1.1. Plastic pipes of different colours were placed in containers for BSF to lay eggs whose weight was monitored. Space requirement was determined by placing pupae in cages of different dimensions. Performance was measured by the number of emerged adults and egg weight. The study used IBM SPSS to analyse data. There was a significant variation at $p < 0.05$ among colours with black being most preferred. A 2.5 m cage had the highest mean weight at 16.38 ± 3.92 compared to a 1m cage at 4.53 ± 1.03. Co-treatment of FW and KW at a ratio of 1.1 resulted in a better substrate for egg production at a mean of 82.53 ± 6.67% in comparison to faecal matter substrate at 70.42 ± 4.92%. Findings from this study can be used for practices in the rearing of BSF for faecal matter management.

Keywords: *Adult emergence, colour preference, faecal waste, kitchen waste, oviposition*