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Determination of growing media for black soldier fly (*Hermetia illucens*) production using organic waste ingredients

Abeysingha A.M.S.U.*, Mikunthan G. and Pakeerathan K.

Department of Agricultural Biology, Faculty of Agriculture, University of Jaffna, Ariviyal Nagar, Kilinochchi, Sri Lanka

Black soldier fly (BSF), *Hermetia illucens* L. (Family Stratiomyidae, Diptera) larvae are used to substantiate protein supplements in agro-based industries. This study investigated the biology of larval instars, their growth in different organic solid wastes, and the proximate analysis of BSF larvae powder as poultry feed. Different instars were determined by using Dyer's rule. One-way analysis of variance and DMRT were performed ($p < 0.005$). The length (mean ± SD) and width of eggs were 0.93 ± 0.03 mm and 0.012 ± 0.001 mm, respectively. There were five larval instars and the length and width of larvae varied from 1.39 ± 0.01 mm to 18.98 ± 1.29 mm. The length and width of pupa were 19.28 ± 0.99 mm and 5.54 ± 0.34 mm, respectively. Sexual dimorphism was exhibited in males with lower round tails, whereas females had a scissor-like tail. Papaya fruit wastes yielded larvae of 18.47 ± 0.03 mm in length followed by pumpkin (18.24 ± 0.01 mm) and Jack fruit (18.21 ± 0.01 mm). Rice bran was the best substrate among the flour tested. Jack fruit recorded high larval protein (63.15 ± 0.05%) and ash (29.52 ± 0.01%) whereas mango yielded high lipid (4.98 ± 0.01%) and potassium (0.96 ± 0.02%). The BSF larvae powder had a high protein level compared with other poultry feed ingredients tested. Jack fruit and mango fruit wastes reported the best larval growth and therefore those can produce a better protein source for poultry feeds. Future studies can be done by feeding BSF larvae powder to the poultry to test their egg-laying and growth performances.

Keywords: Fruit and vegetable wastes, larval growth parameters, poultry feed

*Corresponding author: sachiniabeysingha199612@gmail.com