Pengaruh Durasi Fermentasi Limbah Kantin dengan Effective Microorganism 4 (EM4) terhadap Efektivitas Biokonversi oleh Larva Black Soldier Fly (Hermetia Illucens L.) = Effect of Canteen Waste Fermentation Duration with EM4 on the Effectiveness of Bioconversion by Black Soldier Fly (Hermetia illucens L.) Larvae

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Abstrak

Sampah sisa makanan menjadi salah satu masalah di Universitas Indonesia karena belum terdapat metode yang efektif dan efisien dalam pengelolaan limbah kantin dari fakultas-fakultas yang ada. Salah satu teknik pengelolaan limbah kantin adalah dengan pengomposan menggunakan larva Black Soldier Fly (BSF). Adanya proses fermentasi dan penguraian bahan kompleks oleh mikroorganisme pada substrat organik mampu mengoptimalkan daya biokonversi larva BSF. Namun, hingga saat ini, penelitian terkait pengaruh fermentasi limbah kantin terhadap efektivitas biokonversinya dengan larva BSF belum ditemukan sehingga penelitian ini perlu dilakukan. Penelitian ini bertujuan untuk mengidentifikasi pengaruh perlakuan durasi fermentasi limbah kantin dengan mikroorganisme EM4 terhadap efektivitas biokonversi limbah kantin menggunakan larva BSF dan juga kandungan kompos yang dihasilkan berdasarkan standar SNI 19-7030-2004. Metode penelitian yang digunakan, yakni berupa kombinasi fermentasi EM4 dengan perbedaan perlakuan durasi (0, 5, dan 10 hari) serta larva BSF sebagai agen pengomposan pada limbah kantin. Analisis data dilakukan terhadap berat biomassa larva BSF dan kompos, substrate consumption, growth rate, bioconversion rate, waste reduction index, serta analisis kandungan unsur hara kompos. Hasil penelitian menunjukkan bahwa efektivitas biokonversi larva BSF tertinggi didapatkan oleh perlakuan durasi fermentasi limbah kantin dengan EM4 selama 10 hari (F10) dengan berat biomassa total larva BSF sebesar 50,09 gram; nilai bioconversion rate sebesar 24,55%; nilai waste reduction index (WRI) sebesar 10,79%; dan berat kompos sebesar 27,38 gram. Sementara itu, sebagian besar kandungan unsur hara kompos pada semua perlakuan sudah sesuai dengan standar SNI 19-7030-2004, kecuali nilai kadar C-organik pada perlakuan F10 serta nilai rasio C/N pada semua perlakuan lainnya (F0, F5, F10, KL dan KF). Pada penelitian ini, didiskusikan juga potensi biokonversi dan peluang bioekonomi pengelolaan limbah kantin FMIPA UI dengan larva BSF.

.....Food waste management has become one of the issues at the University of Indonesia due to the lack of an effective and efficient method in managing canteen waste from existing faculties. One common technique in food waste management is composting using larvae of Black Soldier Fly (BSF). The fermentation process and decomposition of complex substances by microorganisms in the organic substrate can optimize the bioconversion efficiency of BSF larvae. However, studies related to the influence of canteen waste fermentation on the effectiveness of bioconversion with BSF larvae have not been discovered to date. Hence, further study regarding this subject is necessary. This study aimed to identify the effects of canteen waste fermentation treatment with EM4 microorganisms on the effectiveness of canteen waste bioconversion using BSF larvae and the content quality of the resulting compost based on the SNI 19-7030-2004 standard. The method used in this study is combining EM4 fermentation with different durations treatment (0, 5, and 10 days) and BSF larvae as composting agent on canteen waste. Data analysis included

the weight of BSF larvae biomass and compost, substrate consumption, growth rate, bioconversion rate, waste reduction index, and content quality analysis of the compost. The results showed that the highest effectiveness of bioconversion by BSF larvae was obtained with a 10-day EM4 fermentation treatment (F10). The total biomass of F10 BSF larvae reached 50,09 grams; with bioconversion rate of 24,55%; waste reduction index of 10,79%; and a compost weight of 27,38 grams. Meanwhile, most of the content qualities in the compost for all treatments were following the SNI 19-7030-2004 standard, except for the C-organic content value in the F10 treatment and the C/N ratio values in all other treatments (F0, F5, F10, KL, and KF). In this study, the bioconversion potency and the bioeconomic opportunities of managing the waste from the FMIPA UI canteen using BSF larvae were also discussed.