

Abstrak

Diko Ing Noto Joyo Wicara, 2021, Pengaruh Jenis Makanan Dan Frekuensi *Feeding* Terhadap Reduksi Sampah Kota Menggunakan Larva *Black Soldier Fly* (*Hermetia Illucens*), Tugas Akhir, Program Studi: Teknik Lingkungan, Fakultas Teknik, Universitas PGRI Adi Buana Surabaya, Dosen Pembimbing: Dr. Rhenny Ratnawati, S.T, M.T.

Dalam konteks Ekonomi Sirkular, penggunaan *Black Soldiers Fly* (BSF) untuk pengolahan limbah hayati dapat menjadi pilihan yang signifikan baik untuk mengelola sampah organik maupun menyediakan sumber daya dalam hal material dan energi. Memang, dalam tahap larva BSF mampu memetabolisme dan menstabilkan sejumlah besar limbah yang dapat membusuk, mengubahnya menjadi biomassa berharga yang kaya akan protein dan lemak, cocok untuk digunakan masing-masing untuk pakan ternak dan produksi biofuel. Penelitian ini menggunakan larva *Black Soldier Flies* (BSF) atau *Hermetia illucens* (*Diptera: Stratiomyidae*) sebagai reduksi sampah domestic dengan bahan baku sampah sayur (selada), sampah buah (tomat), dan sampah sisa makanan. Penelitian ini bertujuan untuk memahami kemampuan larva BSF dalam mendekomposisi sampah organik biodegradable. Penelitian ini bertujuan: 1) Mengkaji kemampuan larva BSF dalam mendekomposisi sampah organik biodegradable, 2) Mengkaji pengaruh jenis makanan terhadap karakteristik rasio C/N, kadar air, dan nilai pH dari residu dekomposisi sampah organik biodegradable yang dilakukan oleh larva BSF, dan 3) Mengkaji pengaruh frekuensi feeding terhadap karakteristik rasio C/N, kadar air, dan nilai pH dari residu dekomposisi sampah organik biodegradable yang dilakukan oleh larva BSF.

Penelitian dilakukan dengan menggunakan larva BSF berumur 7 hari. Sebanyak 200 larva ditempatkan dalam kandang plastik dengan volume 1 L untuk setiap perlakuan feeding. Variabel penelitian meliputi variasi jenis makanan dan frekuensi feeding. Jenis makanan yang diberikan adalah sampah sisa makanan, sampah tomat, dan sampah selada. Porsi makanan yang diberikan yaitu rata-rata 20 mg (berat kering)/larva.hari. Frekuensi feeding yang digunakan adalah sekali dalam sehari dan sekali dalam tiga hari. Berat 10% larva diukur setiap tiga hari sekali. Pada penelitian dilakukan penimbangan berat larva dekomposisi setiap reactor. Hasil penelitian menunjukkan bahwa feeding satu kali sehari dan feeding tiga kali sehari sampel tomat diumur larva 19 hari mengalami berat yang lebih besar, dimana feeding satu kali

sehari didapatkan 43 gram, sedangkan feeding tiga kali sehari mendapatkan 39 gram. Dihari 25 umur larva mengalami penurunan feeding satu kali sehari yang didapat 35 gram, sedangkan feeding tiga kali sehari didapat 32 gram. Berat larva mengalami peningkat diumur larva 22 hari frekuensi feeding 57 gram dengan feeding satu kali sehari, dan 50 gram untuk feeding tiga kali sehari. Sampel sisa makanan diumur larva 25 hari mengalamai penurunan didapat 50 gram untuk Feeding satu kali sehari. Untuk Feeding satu kali tiga hari didapat 46 gram. Dapat dilihat tabel 4.7 Berat larvas ampel smpah sisa makanan. Sampel selada diumur 22 hari puncak tertinggi frekuensi feeding satu kali hari berat yang tertinggi yaitu 31 gram, dan frekuensi feeding tiga kali sehari didapatkan 25 gram. Sampel di hari 25 mengalami penurunan yaitu 26 gram Feeding satu kali sehari dan juga Feeding satu kali tiga hari dengan 22 gram.

Kata kunci: *black soldier fly, larva, reduksi, sampah organik biodegradable*

Abstract

In the context of the Circular Economy, the use of Black Soldiers Fly (BSF) for biological waste treatment can be a significant option both for managing organic waste and providing resources in terms of materials and energy. Indeed, in the larval stage BSF is able to metabolize and stabilize large quantities of decomposing waste, converting it into valuable biomass rich in protein and fat, suitable for use for animal feed and biofuel production, respectively. This study uses larvae of Black Soldier Flies (BSF) or *Hermetia illucens* (Diptera: Stratiomyidae) as domestic waste reduction with vegetable waste (lettuce), fruit waste (tomatoes), and food waste as raw materials. This study aims to understand the ability of BSF larvae to decompose biodegradable organic waste. The aims of this study were: 1) to examine the ability of BSF larvae to decompose biodegradable organic waste, 2) to examine the effect of the type of food on the characteristics of the C/N ratio, water content, and pH value of the residue of decomposition of biodegradable organic waste carried out by BSF larvae, and 3) To examine the effect of feeding frequency on the characteristics of the C/N ratio, water content, and pH value of the residual decomposition of biodegradable organic waste carried out by BSF larvae.

The study was conducted using 7 days old BSF larvae. A total of 200 larvae were placed in a plastic cage with a volume of 1 L for each feeding treatment. The research variables included variations in the type of food and the frequency of feeding. The types of food provided are food waste, tomato waste, and lettuce waste. The portion of food given is an average of 20 mg (dry weight)/larva.day. The frequency of feeding used is once a day and once in three days. The weight of 10% larvae was measured every three days. In this study, the weight of the decomposition larvae was weighed in each reactor. The results showed that feeding once a day and feeding three times a day tomato samples at the age of 19 days experienced greater weight, where feeding once a day got 43 grams, while feeding three times a day got 39 grams. On the 25th day of age, the larvae experienced a decrease in feeding once a day, which was 35 grams, while feeding three times a day got 32 grams. The weight of the larvae increased at the age of 22 days, the frequency of feeding was 57 grams with feeding once a day, and 50 grams for feeding three times a day. Samples of food waste at the age of 25 days of larvae decreased, obtained 50 grams for feeding once a day. For feeding once in three days, 46 grams are obtained. It can be

seen in table 4.7 Weight of larvae from food waste ampel. Lettuce samples at the age of 22 days had the highest peak frequency of feeding once a day, the highest weight was 31 grams, and the frequency of feeding three times a day was 25 grams. The sample on day 25 decreased, namely 26 grams of Feeding once a day and also Feeding once three days with 22 grams.

Keywords: black soldier fly, larvae, reduction, biodegradable organic waste