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TITLE :

EFFECT OF BLACK SOLDIER FLY LARVAE BIOMASS ON FOOD WASTE COMPOSTING

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ABSTRACT

Due to rising demand for food as a result of rapid urbanization and population growth, organic waste management is becoming increasingly important in the fight against pollution. Currently, organic waste, including food waste, is disposed of through landfill disposal, incineration, and anaerobic digestion; however, these techniques are not sustainable in the long run and need to be replaced. It is becoming increasingly popular to employ Black Soldier Fly Larvae (*Hermetia illucens*) (BSFL) in the treatment of organic waste due to their low cost and low impact on the environment. Remarkably, BSFL may reduce many waste streams while simultaneously generating useful byproducts like oil and protein that can be used as organic fertilizers or consumed by people or animals. Using black soldier fly larvae (*Hermetia illucens*) as a bioconversion agent, we report on our findings in the treatment of food waste. This is conditional on four variables: the influence on various food waste kinds, the amount of food waste, the BSFL, and the type of food waste (either single or mixed). We examine the best circumstances for BSFL to thrive and how it might multiply during waste-handling procedures. All of the samples were put through a battery of tests in the lab to see whether any of the variables affected BSFL's capacity to convert organic waste into fertilizer.

TABLE OF CONTENTS

CHAPTER ONE
BACKGROUND

1.1 Introduction

Over 1.3 billion metric tons of food are lost or wasted every year due to human activity. Raising black soldier fly larvae, also known as *Hermetia illucens* according to its scientific name, is one approach for dealing with this waste that can be used. Farmers raise hundreds of larvae in bins and feed them scraps of food that they have left over. When the larvae reach the conclusion of their life cycle, they become a reliable source of nutrition for fish, poultry, and other types of livestock animals. The objective of farming larvae is to speed up the process by which the larvae are grown into adults by increasing the pace at which they are fed organic fertilizer and, consequently, the rate at which they will mature. Older research on larval feeding provides estimates of the number of larvae required and the rate of consumption, but they don't tell anything about the population size of the host. The purpose of this study is to discover how and where larval communities obtain the food, they require to convert food scraps into fertilizer.

There have been valuable extra activities that have been included in the chain of waste management, whereby wastes have been transformed into other valuable resources, hence lessening the demand for raw materials. The bioconversion of organic wastes using black soldier flies (BSF) is one example of this type of approach. Improper management of large amounts of organic waste, such as that produced by animals, families, businesses, markets, hotels, and other institutions, can pose threats to both the health of humans and the environment. These wastes include things like food scraps and leftovers from restaurants and grocery stores (such as schools and hospitals) (Debrah et al. 2021). Not only does ineffective waste management put our capacity to turn a profit at risk, but it also puts both our health and the health of future generations in jeopardy. It is possible that the worth of the nutrients and energy contained in food and other organic wastes may be beneficial to both humans and the environment if food and other organic wastes were recycled back into the economy.