Food and Ag waste improved processing Black Soldier Fly Larvae (BSFL)

with focus on low /no cost start up so that all 8 billion people can benefit quickly from lower livestock feed prices and increased income from better utilization of existing resources

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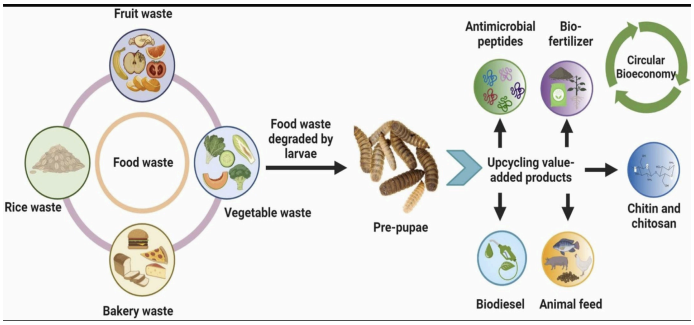
Key Points:

- …Production of one kg dried larvae (BSFL) emits 3.1 kg CO2eq while it prevents 9.7 kg CO2eq. Due to avoiding emissions from landfill, replacing livestock feed ingredients, and replacing chemical fertilizer.
- ….processes such as composting release 70% higher levels of carbon-based greenhouse gasses into the atmosphere in the near-term. ….Compared with sequestering carbon by use of insect-mediated food waste recycling (BSFL)



For California…and for the world. BSFL is faster, releases less methane and produces valuable products compared to composting and landfilling of food waste. The biodiesel, fertilizer produced will reduce the production, transportation and use of petroleum products for added - significant benefits.

Using BSFL instead of composting reduces methane release by 70% (3)

Excerpts from relevant studies

This study was carried out to assess the environmental impacts of black soldier fly larvae (BSFL) in a production unit of Marula agribusiness located in Kampala, Uganda. Life cycle assessment was applied to identify the hotspots of the greenhouse gas (GHG) emissions in the larvae production process. Both environmental burdens and benefits were determined. The obtained results showed that production of one kg dried larvae emits 3.1 kg CO2eq while it prevents 9.7 kg CO2eq. Due to avoiding emissions from landfill, replacing livestock feed ingredients, and replacing chemical fertilizer. Higher GHG emissions per unit of product shows the potential for improvements in the BSFL production in the research region. Our findings show positive environmental impacts of BSFL products to feed livestock. Increasing the efficiency of rearing process (by increasing the larvae growth rate) and reducing the transportation distance can be considered as the options to reduce the environmental impacts of BSFL production (4)

In addition to the GHG benefits for production of BSFL, its land and water requirement is low. Moreover, it has a high contribution to the circular economy by converting organic waste into high-quality feed ingredients. Improving the livelihood by increasing the employment is an important benefit of BSFL production in East Africa. Replacing the commonly used animal feed ingredient with the BSFLs increases the availability of soybean, maize that can feed people in East Africa. (4)

Poore and Nemecek estimate that 50% of croplands are used for human food; 38% is for livestock feed; and 12% is for non-food uses.(1)

Agriculture accounted for an estimated 10.6 percent of U.S. greenhouse gas emissions in 2021 (2)

Compared with sequestering carbon by use of insect-mediated food waste recycling, microbial decomposition processes such as composting release 70% higher levels of carbon-based greenhouse gases into the atmosphere in the near-term. Insects such as the larvae of the Black Soldier Fly capture the excess carbon and store it in the form of proteins, edible oils, and chitin, all of which have potential economic values that are higher than that of ordinary compost. The magnitude of the difference in CO2 production and the value of the resulting products suggest that insect-mediated recycling should be the method of choice for responsibly recycling food waste and other suitable organic materials. (3)

1. Hannah Ritchie and Max Roser (2019) - “Half of the world’s habitable land is used for agriculture” Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/global-land-for-agriculture' [Online Resource]
2. https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=108623#:~:text=Agriculture%20accounted%20for%20an%20estimated,greenhouse%20gas%20emissions%20in%202021.
3. A Comparison of the Greenhouse Gas Production of Black Soldier Fly Larvae versus Aerobic Microbial Decomposition of an Organic Feed Material Douglas A Perednia*, Jennifer Anderson and Andrew Rice Permetia Envirotech, Inc., Portland, Oregon, United States
   Res. Rev. J Ecol. Environ. Sci.| Volume 5 | Issue 3 | July - September, 2017
4. Pishgar-Komleh, S.H., A. Vernooij, P.T. Straub, 2022. Carbon footprint of processing city market waste for animal feed with Black Soldier flies in Kampala, Uganda. Wageningen Livestock Research, Public Report 1382