

A review of vegetable waste bio-processing techniques in rural areas

ABSTRACT

Purpose: Vegetable waste (VW) could cause environmental problems if not properly managed. Due to rural living conditions and a relatively low residence density, VW is usually disposed of in landfills. Waste management should be engineered in a way to process the waste into value-added products in a sustainable manner. This review evaluates four bioprocessing techniques for this purpose: anaerobic digestion (AD), vermicomposting (VC), black soldier fly composting (BSFC), and composting. **Method:** A systematic search involved databases from Scopus using keywords like "vegetable waste; anaerobic digestion; composting; vermicomposting; black soldier fly". By reviewing and synthesizing 173 articles (with 162 from 2019–2023), this paper summarizes and illustrates the information collected. **Results:** In a systematic search, AD and composting easily surpassed 2000 publications (from 2013 to January 2023). Besides composting emerged as a cost-effective (for MYR 1.40/kg) bio-processing technique in terms of production cost. This review on VW composting is based on an acceptable C/N ratio (30–50), moisture content (50% –80%), ratio of VW to additives (typically 30:70), efficient additives, and inoculation strategy. This review also summarizes the maturity index and illustrates the usage of compost and leachate as fertilizer. **Conclusion:** VW composting in rural areas is reliable and beneficial because it uses a small-scale reactor and has the potential for a circular economy in the community.