Integrated Solar-Powered Kitchen Waste Processing System with Energy Recovery

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Abstract:

This research presents an innovative approach to household organic waste management through the development of a compact, solar-powered processing system that simultaneously produces organic fertilizer and recovers electrical energy. The system integrates photovoltaic technology, mechanical waste processing, and anaerobic decomposition in a single portable unit designed for residential applications. The device features an energy recovery mechanism using an alternator coupled to the waste processing motor, creating a self-sustaining cycle that reduces external power dependency. Field testing demonstrates effective waste-to-fertilizer conversion within 2-3 weeks while maintaining energy autonomy through solar charging and mechanical energy recovery. This multi-functional approach addresses both waste management challenges and energy needs in domestic settings, offering a practical solution for sustainable living.

Keywords:

Photovoltaic systems, organic waste processing, energy recovery, sustainable technology, anaerobic digestion.