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(57) Abstract :

A miniaturized dual-mode kitchen device is revealed adjoining nano-catalyst-coated photothermal/photocatalytic chamber and a regulated bio-conversion unit. Photothermal/photocatalytic chamber eliminates moisture and pathogens and removes volatile compounds in food waste. That pretreated waste is processed in the bio-conversion unit to produce stabilized compost or biochar and can include a microbial fuel cell with nano-augmented electrodes to recover energy. A gas management system using photocatalytic oxidation, and adsorption filters is used to reduce odor and emissions. The sensor arrays also measure process conditions such as; humidity, temperature, pH, and gaseous by-products and allow automated control. The unit works in a sizable, modular shape that can be used in the household or institutional environment, with lower energy requirement and better sanitation as opposed to the traditional waste treatment equipment.

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