Separation System Using Integrated Microwave-Infrared Technology to Reduce Greenhouse Gas Emissions and Potential Pathogen Impacts Associated with Cow Manure

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ABSTRACT

Researchers at the University of California, Davis have developed a separation system using microwave-infrared technology to effectively eliminate pathogens and reduce both the moisture content and potential greenhouse gas emissions of cow manure.

FULL DESCRIPTION

Current handling of dairy cow manure includes flushing it from barns, then separating solid from liquid via various processes. One limitation to current handling processes is the high moisture fraction of manure. In addition, the anaerobic digestion associated with the decomposition of the manure can produce large volumes of the greenhouses gases methane and carbon dioxide. The use of manure as a soil amendment for crops can also be problematic due to the risk of manure-borne bacteria, some of which are pathogenic to humans. Thus, existing manure-handling methods can require extended elapsed time periods in order to reduce both moisture content and pathogen risks substantially.

Researchers at the University of California, Davis have developed a separation system using microwave-infrared technology to reduce pathogen risk substantially, while also reducing total greenhouse gas emissions associated with manure management. This treatment process occurs in 10-12 minutes and yields a stabilized, field-ready, manure product that poses no pathogenic bacteria risks to crops. The technology has the capability to reduce manure-borne bacteria to a non-detectable level (in 1-2 minutes of treatment) and lowers net greenhouse gas emissions. In addition, this process quickly reduces the weight of the manure by 80-85%, making the final product much easier and more cost-effective to handle and transport. This process of microwave-infrared solid separation allows for significantly more efficient handling of manure than current separation and treatment technologies. Preliminary economic analysis has shown the method to be very cost effective.

APPLICATIONS

- Improved manure-handling process that drastically reduces total end-product weight
- Reduces greenhouse gas emissions associated with manure management
- Eliminates human pathogens from manure

FEATURES/BENEFITS

- Treatment process complete in 10-12 minutes
- Allows dried manure to be used safely in multiple applications

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	2022015500	05/19/2022	2019-591

INVENTORS

- Pandey, Pramod

OTHER INFORMATION

KEYWORDS

Composting, Microwave, Solid Separation, Manure, Greenhouse Gas Emissions, Pathogen Reduction

CATEGORIZED AS

- **Environment**
  - Other
- **Agriculture & Animal Science**
  - Chemicals

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