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Inactivation of pathogens in contaminated cattle manure by Lactic Acid Fermentation and in biogas plants

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In case of a notifiable animal disease like paratuberculosis or salmonellosis, the manure is contaminated and a cause for spread of infections. Before it can be safely used as fertilizer it must be disinfected. This can be performed using heat measures, chemical disinfectants or long-term storage. All these measures entail economic, ecological and logistical problems. The aim of project was to evaluate lactic acid fermentation (LAF) on laboratory scale as an alternative disinfection method.

For this, cattle manure was spiked with different kinds of pathogens like Salmonella Typhimurium, Mycobacterium avium ssp. paratuberculosis (MAP) or Food-and-mouth disease virus (FMDV). Fermentation was initiated by adding different carbohydrate sources (CHO) to the manure and creating anaerobic conditions. The samples were incubated at 21 °C. The microbial shift was determined using culturing methods or titration.

All tested pathogens were inactivated by LAF dependent on the CHO-source within a few weeks. The combination of sucrose and oats revealed the best results in all cases. Altogether, LAF is a valuable option for disinfecting cattle manure.

Another issue is the retention time of pathogens in biogas plants. To investigate this, the contents of fermenters are spiked on lab scale with pathogens and their retention time is monitored. Results are still pending.

Keywords

Lactic Acid Fermentation, livestock, cattle manure, fertilizer, decontamination

Registration ID

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Professional Status of the Speaker

Postdoc

Junior Scientist Status

No, I am not a Junior Scientist.

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