Technologies for reducing greenhouse gas emissions from livestock waste

Production | Demonstration and implementation | Item: Livestock | GHG emission reduction

Outline

Technologies enable the effective reduction of greenhouse gas (GHG) emissions during wastewater treatment and livestock manure composting by improving feed composition and utilizing microorganisms.

Background/effect/note

GHG emissions from the process of livestock manure composting and wastewater treatment account for 10~15% of GHG emissions derived from the agricultural sector. The GHG emissions in the process can be effectively reduced by using these technologies.

① Feeding fattening pigs with a low-protein diet supplemented with amino acids reduces GHG emissions from the manure management process by 40% when compared with a conventional diet without affecting rearing performance. - Implementation

② The GHG emissions can be significantly reduced by introducing a carbon fiber reactor to a swine wastewater treatment facility and maintaining an organic matter treatment capacity equivalent to that of the conventional activated sludge treatment method (Fig. 1). - Demonstration

③ During the composting of livestock manure, nitrite accumulation can be eliminated by adding mature compost containing nitrite-oxidizing bacteria to suppress the emission of nitrous oxide as a potent GHG (Fig. 2). - Demonstration
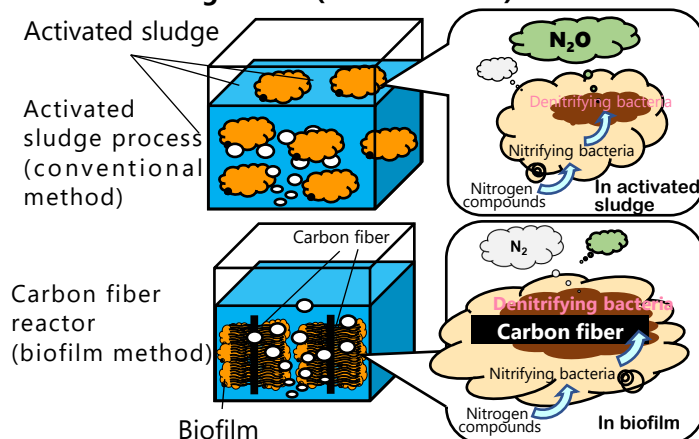

Fig. 1. Differences between the conventional activated sludge method and the carbon fiber reactor (biofilm method) [conceptual diagram]

Fig. 2. Effect of mature compost addition on the reduction of greenhouse gas emissions [conceptual diagram]

Technical details:
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https://www.naro.go.jp/publicity_report/press/laboratory/nilgs/073580.html [Japanese]
②
https://www.naro.go.jp/english/laboratory/nilgs/press-release/CFreactor/index.html [English]
③
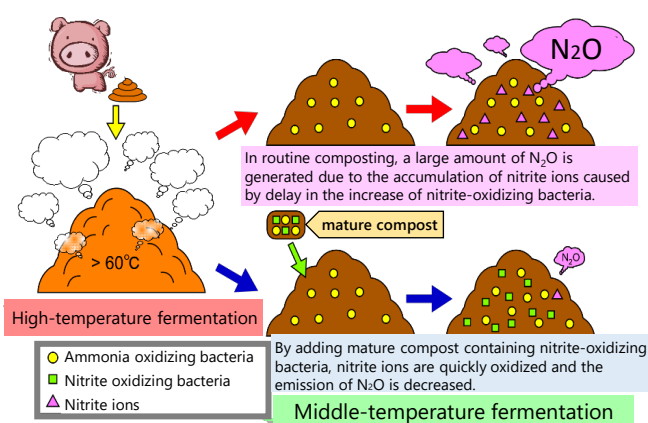https://www.naro.go.jp/english/laboratory/niaes/files/fftc-marco_book2019_067.pdf [English]

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