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Eco-Efficient Post Treatment Of Digestate From Farm And Collective Biogas Plants To Improve Nutrients (N&P) Recycling

Anne Trémier¹, Fabrice Béline¹, Claire Déchaux¹, Lynda Aissani¹, Mette Hjort Mikkelsen² and ^{2*}Marianne Thomsen

1. IRSTEA – National Research Institute of Science and Technology for Environment and Agriculture, 2. Aarhus University, Faculty of Science and Technology, Dep. of Environmental Science, * Corresponding author

ABSTRACT

Anaerobic digestion (AD) of organic waste from agriculture and others sectors is a widely used technology which shows increasing implementation due to its capacity to produce renewable energy and also to reduce greenhouse gas emissions from waste management. The development of AD is also an opportunity to improve nutrient recycling from organic waste through the development of an eco-efficient post-treatment system. In this context, LCA was applied to evaluate the sustainability of different raw digestate post-treatment technologies regarding recycling of nutrients from agricultural and organic waste to agricultural soils for decreased resource depletion and climate mitigation. Substitution of the use of N and P mineral fertilizers with recycled soil health improver or organic fertilizers products as function of five different post-treatment technologies and raw digestate characteristics was evaluated. A particular attention was carried to (1) the gaseous emissions (NH₃ and N₂O) from process (post-treatment) but also after land spreading and (2) the carbon cycle considering the CO₂ carbon costs of fertiliser production and the soil carbon sequestration benefit.