A need for improvement of food waste (FIAT) pre-treatment methods has been recognized, but few life cycle assessments (LCA) of FIN management systems have considered the pre-treatment with respect to input energy, loss of organic material and nutrients for anaerobic digestion (AD) and/or further treatment of the refuse. The objective of this study was to investigate how FW pre-treatment efficiency impacts the environmental performance of waste management, with respect to global warming potential (GWP). The modeling tool EASETECH was used to perform consequential LCA focusing on the impact of changes in mass distribution within framework conditions that were varied with respect to biogas utilization and energy system, representing different geographical regions and/or different time-frames. The variations of the GWP due to changes in pre-treatment efficiency were generally small, especially when biogas and refuse were substituting the same energy carriers, when energy conversion efficiencies were high and slurry quality good enough to enable digestate use on land. In these cases other environmental aspects, economy and practicality could be guiding when selecting pre-treatment system without large risk of sub-optimization with regards to GWP. However, the methane potential of the slurry is important for the net LCA results and must be included in the sensitivity analysis. Furthermore, when biogas is used as vehicle fuel the importance of pre-treatment is sensitive to assumptions and approach of modelling marginal energy which must be decided based on the focus and timeframe of the study in question. (C) 2015 Elsevier B.V. All rights reserved.
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