

Process simulation and techno-economic analysis for fry-drying and torrefaction of organic waste sludge

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One of the materials which can be converted into fuel without competing with food production is organic solid waste (OSW). Refuse-derived fuel (RDF) as organic sludge recycling embodies a waste-to-energy technology created by shredding and drying out combustible waste. In this study, OSW is initially dried and then torrefied to produce bio-solid.

The objective of this study is to model the OSW fry-drying under vacuum and torrefaction process, and to analyze the economic feasibility of this process. A comprehensive model of the bio-solid production plant is developed by using a process simulator (ASPEN Plus). The economic feasibility is analyzed in terms of the payback period (PBP), return on investment (ROI), and internal rate of return (IRR). A sensitivity analysis is carried out for a 45 t/d commercial plant to identify key variables that have a strong impact on the economic feasibility.