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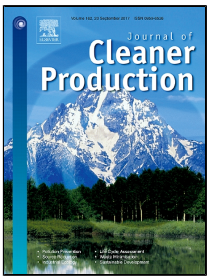

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Chemometric analysis and NIR spectroscopy to evaluate odorous impact during the composting of different raw materials

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Abstract

This study evaluated odor generated during the first stage of the composting process in a dynamic respirometer using different raw materials such as the organic fraction of municipal solid waste (OFMSW), a mixture of this organic fraction with orange peel waste (OFMSW-OPW), sewage sludge with bulking agent (SL) and a mixture of strawberry extrudate, fish waste, sewage sludge and bulking agent (SFWSL). The combination of near infrared reflectance (NIR) spectroscopy and chemometric analysis is proposed to correlate the chemical composition and the operational variables of each raw material to odor generated during the composting process. The operational variables temperature, dynamic respirometric index (DRI), airflow (Q), odor concentration (OC)

Abbreviations: DET, detrend; DRI, dynamic respirometric index (mg O_2/kg VS·h); MSC, multiplicative scatter correction; NIR, near infrared reflectance; OC, odor concentration (ou_E/m^3); OER, odor emission rate (ou_E/s); ou_E, European odor units; OFMSW, organic fraction of municipal solid waste; OFMSW-OPW, organic fraction of municipal solid waste with orange peel waste; PC, principal component; PCA, principal components analysis; PLS, partial least squares; Q, airflow (m^3/s); SFWSL, strawberry extrudate, fish waste and sewage sludge; SL, sewage sludge; SNV, standard normal variate; VOCs, volatile organic compounds; VS, volatile solids; WWTP, wastewater treatment plant.