

Simultaneous production of L-lactic acid with high optical activity and a soil amendment with food waste that demonstrates plant growth promoting activity

ABSTRACT

A unique method to produce highly optically-active L-lactic acid and soil amendments that promote plant growth from food waste was proposed. Three *Bacillus* strains *Bacillus subtilis* KBKU21, *B. subtilis* N3-9 and *Bacillus coagulans* T27, were used. Strain KBKU21 accumulated 36.9 g/L L-lactic acid with 95.7% optical activity and 98.2% L-lactic acid selectivity when fermented at 43°C for 84 h in a model kitchen refuse (MKR) medium. Residual precipitate fraction (anaerobically-fermented MKR (AFM) compost) analysis revealed 4.60%, 0.70% and 0.75% of nitrogen (as N), phosphorous (as P₂O₅), and potassium (as K₂O), respectively. Additionally, the carbon to nitrogen ratio decreased from 13.3 to 10.6. AFM compost with KBKU21 promoted plant growth parameters, including leaf length, plant height and fresh weight of *Brassica rapa* (Komatsuna), than that by chemical fertilizers or commercial compost. The concept provides an incentive for the complete recycling of food waste, contributing towards a sustainable production system.