عنوان مقاله:

Assessing microbial population dynamics, enzyme activities and phosphorus availability indices during phospho-compost production

محل انتشار:

مجله بین المللی بازیافت مواد آلی در کشاورزی, دوره 8, شماره 1 (سال: 1398)

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خلاصه مقاله:

Purpose This study assessed changes in bio-quality indices and plant available P released during aerobic–thermophilic cocompostingof different mix ratios of non-reactive ground phosphate rock (GPR) with poultry and cattle manures.Methods Aerobic–thermophilic co-composting of different mix ratios (5:5, 8:2, 7:3 and 9:1) of non-reactive GPR withpoultry and cattle manures was carried out. Compost piles without GPR addition were included as control. Compost sampleswere taken at mesophilic, thermophilic, cooling–stabilization and maturing phases for microbial counts, enzyme activitiesand P assessment.Results Abundance of different microbial groups across the composting phases varied greatly ($p < 0.001$) mostly dominatedby fungi that was generally more in the cattle than poultry manure-based phospho-composts. Fungi and actinomycetes countsin the composts were positively correlated with alkaline phosphatase and β-glucosidase. A strong inter-correlation betweenβ-glucosidase and alkaline phosphatase ($r = 1.000$, $p < 0.001$) was observed, suggesting that both enzymes possess sameorigin. Alkaline phosphatase and β-glucosidase contents in the phospho-composts showed negative correlation with watersoluble P ($r = – 0.65$, $p < 0.001$), and Bray P1 and Fe–P contents ($r = – 0.15$, $p > 0.05$) indicating inhibition of the P forms.Quantitatively higher P was obtained from poultry manure-based phospho-compost and in the 8:2 mix ratio at compostmaturity. Microbial diversity and enzyme activity exerted positive impact on P mineralization and availability from thenon-reactive GPR signifying the beneficial effect of co-composting.Conclusions Co-composting of P-rich non-reactive GPR with organic wastes containing variable chemical compositionpromotes microbial diversity during composting and increases plant available P content and compost fertilizer value.

کلمات کلیدی:

Phospho-compost · Compost bio-quality indices · Enzyme activities · Available P · Non-reactive phosphate rock