

## Effects of fruit and vegetable wastes and biodegradable municipal wastes co-mixed composts on nitrogen dynamics in an Oxisol

### ABSTRACT

Organic waste generation in developing countries is increasing and appropriate disposal methods are needed. An open aerobic composting using 20 L bins was carried out using 6 composts made using ratios of 3:1, 1:2 and 1:4 fruit and vegetable wastes (FVW): biodegradable municipal waste (BMW), with and without addition of homemade indigenous microorganisms (IMO), for 30 days to monitor compost quality. The nitrogen contents of the composts ranged from 1.52 to 2.76% N equivalent to 76–138 kg N ha<sup>-1</sup> at 5 t ha<sup>-1</sup> compost application rates. Heavy metals measured were below permissible levels of compost quality standards. Selected composts were incubated for 60 days to study nitrogen mineralization dynamics when applied to an Oxisol at the rates of 0, 5 and 10 t ha<sup>-1</sup>. The results showed significant differences ( $p \leq 0.05$ ) in the amounts of NH<sub>4</sub>-N, NO<sub>3</sub>-N and cumulative NH<sub>4</sub>-N + NO<sub>3</sub>-N released. Ammonium nitrogen released was higher on days 3, 21 and/or 40 for composts 3:1 – IMO at 10 t ha<sup>-1</sup>, 3:1 + IMO at 10 t ha<sup>-1</sup> and 3:1 – IMO at 5 t ha<sup>-1</sup>. Cumulative N (NH<sub>4</sub> -N + NO<sub>3</sub> -N) released over control were 77.98, 64.09 and 64.35% higher for application of 3:1 + IMO, 1:2 – IMO and 1:2 + IMO, respectively, at an application rate of 10 t ha<sup>-1</sup>. The increased nitrogen content, low heavy metals concentrations and the amount of mineralized N from the composts exhibit potential for increased nutrient availability when applied to a soil.

**Keyword:** Composts quality; C/N ratio; Co-composting; Mineralizable N; Ammonium; Nitrate