

Nitrogen Enriched Compost Inoculum Prepared with Biomass and Biochar at Low Temperatures

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Organic farming concepts are gaining ground over inorganic systems to cultivate larger extents. Earlier, compost was accepted to be a soil conditioner, but now made differently, it becomes an organic fertilizer, overcoming disadvantages such as; the need to add large quantities, nutrient losses, rapid degradation in tropical soils, and high production time. This research was conducted to develop effective processes using the worse conditions of small static pile composting to enhance nitrogen content, thus reduce nitrogen losses during the biochemical transformation process. Three treatments (with biochar) and control (without biochar) were prepared with 18 kg of shredded immature *Panicum maximum* grass and 2 kg of *Gliricidia sepium* leaves. Biochar, 3%, 6% and 9% on dry weight basis was incorporated for treatments. Further, 2.5 kg of biochar was used as the bedding material and blanketing for each composting pile, except the control. A novel approach was developed to determine actual loss or gain in nitrogen content during the composting process based on total fixed solids percentage. The highest temperature, 34°C, was recorded in the 3% bio-char mixed pile. After 35 days, total nitrogen content was in the order of 6% biochar (17.3 mg/g) > 9% biochar (12.8 mg/g) > 3% biochar (12.3 mg/g) > control (11.2 mg/g). Nitrogen loss is low in biochar mixed piles because of nitrogen adsorption and absorption than the control where 24% loss was observed. After 35 days, 6% biochar mixed pile gained 13% over the feedstock rather than lose nitrogen, unlike the other treatments. This can be a nitrogen source for making organic fertilizers and could be used as an inoculum for large scale fertilizer productions.

Key words: Biochar, Compost, Nitrogen, Organic fertilizer