



## Co-application of triple super phosphate and chicken litter biochar improves phosphorus availability of mineral tropical acid soils to reduce water pollution

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### ABSTRACT

Although organic amendments could increase P use efficiency, unbalanced use of organic amendments and P fertilizers in farming systems is uneconomical and environmental unfriendly. This study explored if the right combination of chicken litter biochar (CLB) and triple superphosphate (TSP) could improve soil P availability to minimize P losses through leaching to prevent ground water and other water bodies' contamination through for example eutrophication (Algae bloom). Rates of 75%, 50%, and 25% of 5 t ha<sup>-1</sup> chicken litter biochar and 75%, 50%, and 25% of 130 kg ha<sup>-1</sup> (existing TSP recommendation for *Zea mays*, L.), respectively were evaluated in a leaching study using standard procedures. Results revealed that CLB treatments minimized P leaching compared with the treatment without CLB. This resulted in significant improvement in available P. This was possible because CLB improved soil pH, P, K, Ca, Mg, and Na besides reducing P fixation by Al and Fe ions. Leaching of available P following application of chicken litter biochar only occurred within the first 10 d after which the leaching significantly reduced. This finding further suggests that if the availability P is not in synchrony with optimum crop uptake in agricultural systems, available P could be lost from the soil profile to contaminate or pollute water bodies. Chicken litter biochar can be used to improve P availability but it is not an excellent organic amendment to sorb P for a long period.

*Keywords:* Organic amendments; Eutrophication; Phosphorus fertilizers; Nutrient loss; Water quality

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