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Full Length Research Paper

Preliminary evaluation of the effects of carbonized chicken manure, refuse derived fuel and K fertilizer application on the growth, nodulation, yield, N and P contents of soybean and cowpea in the greenhouse

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Abstract

Carbonized organic materials have not traditionally been applied to grain legumes such as soybean (*Glycine max* L. Merrill) and cowpea (*Vigna unguiculata* L. Walp) although the potential for favourable agronomic responses exist because of their high contents of available P. We explored the effects of carbonized chicken manure and carbonized refuse derived fuel (RDF) from municipal organic waste with or without inorganic K fertilization on the growth, nodulation, seed yield, N and P contents of soybean and cowpea in a vinyl house pot experiment. Growth, nodulation, plant total N and P contents were evaluated at peak flowering stage of legume growth. The application of carbonized chicken manure only increased seed yield by 41 and 146% for soybean and cowpea respectively while the

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carbonized chicken manure with inorganic K fertilizer increased seed yield by 53 and 185% for soybean and cowpea respectively relative to the un-amended control. The application of carbonized RDF only increased seed yield by 20 and 59% for soybean and cowpea respectively while the application of carbonized RDF with inorganic K fertilizer increased seed yield by 45 and 126% for soybean and cowpea respectively relative to the absolute control. The application of both carbonized organic materials with inorganic K fertilizer increased number of nodules more than their sole application. Results suggested that the application of carbonized chicken manure and carbonized RDF improved the growth, nodulation, seed yield, N and P contents of both grain legumes due to their high content of P. The application of the carbonized organic materials with inorganic K fertilizer further increased seed yields of both grain legumes suggesting that K was limiting the response to P from the organic materials in the experimental soil.

Key words: Carbonization, chicken manure, grain legumes, refuse derived fuel, seed yield.

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