Clinoptilolite zeolite on tropical peat soils nutrient, growth, fruit quality, and yield of Carica papaya L. cv. Sekaki

ABSTRACT

Papaya cultivation on nutrient deficient acidic peat soils causes poor growth, yield, and fruit quality of this crop. Alkalinity and the high affinity of clinoptilolite zeolite (CZ) for macronutrients could improve pH, nutrient availability, and papaya productivity on peat soils. A one-year field experiment was conducted to determine the effects of CZ on: (i) soil ammonium, nitrate, P, and K, and (ii) growth, yield, and fruit quality of papaya grown on a peat soil. Treatments evaluated were: (i) different amounts of CZ (25%, 50%, 70%, and 100% of the existing recommended rate of CZ) + NPK fertilizer, and (ii) NPK fertilizer alone. The peat soils with CZ improved pH, ammonium, nitrate, P, and K availability because of the sorption of these nutrients within the structured framework of the CZ. Co-applying CZ (70% to 100%) and NPK fertilizers improved the NPK contents in papaya leaves and the growth, yield, and fruit quality of papaya because of the significant availability of ammonium, nitrate, P, and K in the peat soil for their optimum uptake by the papaya plants. Ability of CZ to buffer the soil pH reduced the need for liming. It is possible to use CZ to improve papaya productivity because CZ can regulate nutrient availability.

Keyword: Natural zeolite; Nitrogen; Organic soil; Papaya; Potassium; Phosphorus