Variations in Soil P Forms Under Sugar Cane After Organic and Inorganic P Fertilization. (S04-killorn082025-Poster)

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Abstract:

Soil and crop management practices modify the different P forms in the soil impacting P availability for crops in time and intensity. The change produced by P fertilization on soil P forms and its relationship with crop response was studied. A field experiment was conducted on a Typic Hapludand in Juan Vinas, Costa Rica. Sugar cane (var. H-611721) was cropped two cycles. Tons of cane/ha and Kg of sugar/ton of cane were measured. The treatments were 0, 50 and 100% of recommended P fertilization in combination with 0 and 8 accumulated tons of compost/ha. A modified soil P fractionation scheme proposed by Hedley et al. (1982) was used to analyze soil samples. Sugar cane yield increased 33% when mineral and organic fertilizers were applied at the higher levels. The yield was positively related to P extracted by resin, NaHCO3-Pi, NaOH-Pi and HCl. A poor relationship was found between yield and organic, residual, and total P fractions. Compost application increased the concentration of organic P forms 46 ppm. The total sum of all P fractions varied from 1500 ppm to 1800 ppm. Overall means of the relative content of P forms were 0.11%-resin-P, 0.32%-NaHCO3-Pi, 2.38%-NaHCO3-Po, 6.38%-NaOH-Pi, 30.16%-NaOH-Po, 9.13%-HCl and 51.51%-Residual. In spite of the high organic matter content of this soil (15% O.M.) only 32% of the total P was related to organic P forms suggesting the importance of the mineral P fraction. The results suggest that organic and inorganic fertilization had an important impact on P forms in the soil. Crop production under no applied fertilizer will in time deplete all of the P forms in the soil.

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