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PHOSPHORUS SORPTION AND AVAILABILITY TO CANOLA GROWN IN AN ALFISOL AMENDED WITH VARIOUS SOIL AMENDMENTS

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ABSTRACT



The Aim Of This Study Was To Examine The Influence Of Various Soil Amendments On Sorption And Availability Of Phosphorus (P) In A Biosolid-Amended Alfisol Planted With Canola. For This Purpose A Greenhouse Pot Experiment Was Established In An Acidic Greek Alfisol Amended Once With Sewage Sludge (300 T Ha⁻¹) 13 Years Ago. Five Kg From This Soil Was Thoroughly Mixed With 0 Or 50 G Of Zeolite (Z), Coal Fly Ash (Fa), Sugar Beet Factory Lime (Sbfl), And Compost From Olive Oil-Processing Wastes (Ow) And Cultivated With Canola (Brassica Napus). Additionally, A Non-Biosolid-Amended Soil From An Adjacent Field Was Used As Control. Two Months After Planting, Soil And Plant Samples Were Selected And Analyzed For Available And Total P. Phosphorus Sorption Isotherms Were Prepared On Soil Samples After Plants Were Harvested, And Adjusted To The Freundlich Equation. Phosphorus Distribution Coefficient (Kd) Values Were Obtained By The Same Batch Equilibrium Experiments. Results Showed That 13 Years After Application Of High-Dose Biosolids, Soil Ph Increased From 5.19 To 6.92, Canola Biomass Yield Increased From 1.96 To 5.3 G Pot⁻¹, Olsen P Increased From 25.5 To 57.7 Mg Kg⁻¹, And Plant Tissue P Concentration Increased From 1162 To 2881 Mg Kg⁻¹. Application Of Fa, Z, Sbfl, And Ow To The Biosolid-Amended Soils Increased Soil Ph From 6.92 To 8.05, 7.07, 7.72, And 7.19, Canola Biomass Yield From 5.3 To 8.6, 7.5, 7.6, And 5.4 G Pot⁻¹, And Olsen P From 57.7 To 110.5, 61.2, 80.5, And 64.5 Mg Kg⁻¹ respectively. Application Of Z, Sbfl, And Ow To The Biosolid-Amended Soil Increased Plant Tissue P From 2881 To 3048, 3320, AND 3523 Mg Kg⁻¹, Respectively, Whereas Fa Application Decreased It To 2696 Mg Kg⁻¹. Application Of The High Dose Of Biosolids To The Acidic Alfisol Decreased P_Kd From 23.3 To 12.9 L Kg⁻¹. Application Of Fa, Z, And Sbfl To The Biosolid-Amended Soil Increased P_Kd From 12.9 To 23.19, 13.83, And 14.48 L Kg⁻¹, Respectively, Whereas Ow Application Decreased It To 12.82 L Kg⁻¹. Values Of Kd Decreased As The Concentration Of The Added P Increased In The Test Solution In The Case Of Non-Biosolid-Amended Soil And Fly Ash Treatment But It Relatively Increased As The Concentration Of The Added P Increased In The Test Solution In The Biosolid-Amended Soil And Z, Sbfl, & OTreatments