

Flue Gas Desulfurization By-products as Sulfur Sources for Alfalfa

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ABSTRACT

Sulfur deficiencies in soil are expected to increase due to growth of high yielding crop varieties, use of S-free fertilizers and removal of S from industrial emissions. Flue gas desulfurization (FGD) by-products are created when coal is burned and SO₂ is removed from the flue gases. These FGD by-products contain a considerable quantity of S and many other essential elements for higher plants. However, there are few reports on the use of FGD by-products as S fertilizers for enhancement of crop growth and environmental impacts concerning such use. Two types of FGD by-products which contain either vermiculite or perlite were applied at 0, 16, and 67 kg S ha⁻¹ to an agricultural soil (Wooster silt loam). Growth of a new planting of alfalfa (*Medicago sativa* L.) was increased 10 to 40% by the treatments compared to the untreated control. FGD by-products were also applied at 0, 8, 16, and 24 kg S ha⁻¹ to five established alfalfa stands in different regions of Ohio. Mean alfalfa yield was increased 4.6% in 2001 and 6.2% in 2002 with S treatments compared to the untreated control which was significant at the $P \leq 0.05$ level. Soil and plant analyses were made to assess potential adverse environmental impacts and none were observed. Thus, these FGD by-products can be safely applied to agricultural soils as S sources and can improve alfalfa yields in S deficient soils.