

Predicting the efficacy of fly ash as a soil ameliorant

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ABSTRACT

The amelioration of acidic soils with fly ash raises the pH, improves fertility and increases biological yield. Trials in the past have shown that fly ashes differ in their efficacy. The pedogenesis of the new soil-ash growth medium and its relationship to the composition of fly ash is poorly understood.

It is known that the presence of low molecular weight (LMW) organic acids play a key role in the fertility of the zone surrounding the roots of plants (rhizosphere) where the uptake of cations and anions alter the pH.

In the work described here a series of 7 different LMW organic acids were used to leach a Class F fly ash in an attempt to ascertain the susceptibility of its degradation in the rhizosphere.

Scanning electron microscopy was used to study the alteration of the surface texture of this fly ash. It was found that oxalic and propionic acid were the most effective etchants after a 40-day exposure to an IM solution of the LMW organic acids.

Following this, three fly ashes with different composition were exposed to an IM solution of oxalic and propionic acids. The degree of etching was used to rank the soil amelioration potential of these fly ashes.

The results of these experiments and its implication on the use of fly ash as a soil ameliorant will be presented.

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