

Utilization of Coal Combustion By-products (CCBP) in Horticultural and Turfgrass Industries: Technical and Environmental Feasibility Studies

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ABSTRACT

Coal combustion by-products (CCBP) contain plant nutrients, have capacity to neutralize soil acidity, can improve physical properties of mineral soils; and therefore, can be usefully applied in agricultural, horticultural, turfgrass and land reclamation settings. However, excesses of Mo, Mn, induced P deficiencies, and low content of N and K in CCBP make them an unbalanced source of plant nutrients. Likewise, utilization of biosolids can be problematic due to nutrient imbalances. Therefore, this study was initiated in early 2000 to determine the feasibility of blended CCBP and biosolids/biosolid products for use as growth media of selected horticultural ornamentals and turfgrass sod. Trace element concentrations in both potting and sod mixes were below USEPA regulatory limits. In the sod production component, experimental mixes were uniformly spread to heights of 2, 3, and 4 cm on compacted subsoil, sprigged with 'TifSport' bermudagrass (*Cynodon dactylon* L.) and maintained under ideal commercial sod field conditions. Following a 16-week maturation period, harvested sod was destructively analyzed to determine its physicochemical attributes and the remainder installed at the Georgia Experiment Station in September, 2000. Post-installation evaluations were made in April, 2001. Finished sod, composed of CCBP, retained significantly more volumetric water, while possessing significantly less gross (wet) weight than the control mix sod. At the end of the production cycle, sod grown in particular combinations of bottom ash, fly ash, and biosolids (sewage sludge), possessed significantly greater biomass than the control sod mix, while requiring only one-fourth the supplemental fertilization. Utilization of the described CCBP-mixes as supplemental growth media in bermudagrass sod production is technically feasible and, when compared to traditional production on some SE US soils, appears advantageous. Greenhouse study results showed plant yield of the CCBP experimental potting mix outperformed the commercial potting mix under limited fertility. These observations, in tandem with similar recently-reported experimental results, indicate utilization of CCBP in horticulture and turfgrass industries as a technically-worthwhile venture.