

Re-vegetation of cover soils and coal discard material ameliorated with class F fly ash

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ABSTRACT

Coal discard material is a difficult medium to prepare for successful re-vegetation. It is possible to re-vegetate the covering topsoil, but the sustainability of conventional procedures is often poor. This covering topsoil is acidified, over time, by the capillary action of water generated by the underlying coal discard material. Roots are unable to grow properly and vegetation eventually dies. The objective of this experimental work was to identify other amelioration strategies for the cover soil and coal discard, using bituminous coal combustion by product - class F fly ash as a soil ameliorant. Due to the lower CaCO₃ equivalent of class F fly ashes compared with agricultural lime, heavier applications are required to neutralize such acidity. This research, concentrated on different combinations of amelioration of both the cover soil and the discard material compared to an untreated control, and the agricultural lime and fertilizer treatment. One treatment also included the use of class F fly ash as a barrier (buffer zone) between the covering topsoil and the coal discard. The cover soil was then planted to two grasses, Rhodegrass (*Chloris gayana*) and Smutsfinger grass (*Digitaria eriantha*) commonly used in rehabilitation in South Africa. Significant increases in yield, of up to 200%, were noticed for class F fly ash treated soil and discards relative to the untreated control in a specific season. Class F fly ash as an ameliorant has, therefore, the potential to be used in creating a more sustainable soil environment to ensure a more stable vegetation to facilitate effective reclamation of coal discards.

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