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73477 Effect of Different Silicon Sources On Acetic Acid-Extractable Silicon Content of Two Alluvial Soils of Louisiana.

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Silicon (Si) is the second most abundant element in the Earth's crust and primarily exists as silicate minerals. Several studies have documented that the application of silicate slags has increased biomass, grain yield and Si uptake of many agricultural crops. Most Si sources are derived from industrial by-products which have variable amounts of plant-available Si and heavy metals depending on processing and origin of materials. This study was conducted to investigate the influence of different calcium silicate slags on perennial ryegrass biomass production and plant-available Si content of two alluvial soils of Louisiana. Treatments included four different types of calcium silicate slags (blast furnace -BF, caster - CS, basic oxygen furnace – BOF, and ladle metallurgy furnace - LMF), two soil types (Norwood fine sandy loam and Commerce silt loam), and three rates of calcium silicate slag (0 , 4 and 8 MT ha^{-1}) arranged in a randomized complete block design with three replications. Each plastic pot was filled with 2.2 kg of soil. The top 15 cm of soil was taken out from the pot and placed in a plastic bag where a corresponding amount of treatment was added and mixed thoroughly. Ryegrass seeds were sown at the rate of 48 g m^{-2} at approximately 1 cm deep. All pots received N, P_2O_5 and K_2O at rates of 120, 90 and 90 kg ha^{-1}, respectively. Biomass and soil samples were collected every 30, 60 and 90 days after sowing and processed, weighed and analyzed for Si content. The high concentration of Si in CS and BF (17% Si) made these materials effective in increasing acetic acid-extractable Si attaining almost 1.5 (4 MT ha^{-1}) and 2.5 (8 MT ha^{-1}) times higher than the control. While LMF has considerable lower Si content (5%), the initial amount of acetic acid-extractable Si of both soils was raised by 100 and 150% with the application rates of 4 and 8 MT ha^{-1}, respectively. Among these slag materials, only CS influenced ryegrass biomass production on both soils linearly implying that CS has the highest potential as Si source for crop production