

Research Article

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Plant available silicon in sugarcane soils and its relationship with soil properties, leaf silicon and cane yield

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Summary

A survey of 74 sugarcane growing fields from South, Central, Marathwada and Vidharbha regions of Maharashtra state (India) was undertaken for plant available silicon (PA-Si) status in soil extracted with 0.5M ammonium acetate (pH 4.8), 0.5M acetic acid and 0.01M calcium chloride and physico-chemical properties. The plant available silicon extracted by 0.5M ammonium acetate, 0.5M acetic acid and 0.1M calcium chloride from soils ranged from 31.42 to 465.76, 66.76 to 590.19 and 12.65 to 134.40 mg kg⁻¹ with the mean content of 194.19, 359.71 and 63.63 mg kg⁻¹, respectively. Extraction pool of PA-Si was found maximum by 0.5M acetic acid followed by 0.5M ammonium acetate and least by 0.01M calcium chloride which were positively correlated to each other. The relationship between PA-Si extracted by different extractants with soil properties revealed that plant available Si content in soil increased with pH, clay content, exchangeable cations and cation exchange capacity of the soil. Phosphate availability was increased in higher PA-Si containing soils. Of the surveyed plots 33 fields monitored for leaf Si concentration at 120 days after sugarcane plantation, cane and sugar yield showed positive strong correlation with 0.5M acetic acid extractable PA-Si compared to 0.5M ammonium acetate. It revealed that the 0.5M acetic acid was suitable extractant to measure plant available silicon from the soil.

Key words : Sugarcane, Plant available silicon, Physico-chemical properties, Cane and sugar yield

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