Effect of ammonium sulphate application on chemical and physical properties in cinnamon growing soils

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Cinnamon cultivation requires effective soil fertility management to maintain plant health and achieve optimal yield. In commercial plantations, continuous application of ammonium sulphate (SA) as a nitrogen source is common practice. However, the long-term effects of SA, particularly its acidifying nature, on soil properties remain underexplored. This study was conducted over a seven-year period (2016–2023) at the Cinnamon Research Station, *Thihagoda,* situated in the Low Country Wet Zone of Sri Lanka, to evaluate both short- and long-term impacts of different SA application rates on soil chemical and physical properties. Six fertilizer treatments were tested: T1 (Control) with urea alone (480 kg/ha/year); T2 to T6 with increasingSA rates (225–976 kg/ha/year) and decreasing urea rates (346–0 kg/ha/year). The experiment followed a Randomized Complete Block Design with four replicates. Soil samples were collected at two time intervals— six weeks (to assess short-term effects)and five months (for long-term effects) after fertilizer application. Sampling was performed at three lateral distances (15 cm, 30 cm, and 45 cm) and three depths (10 cm, 20 cm, and 30 cm) from the plant base. Soil parameters assessed were pH, electrical conductivity (EC), available sulfur, bulk density, moisture content, and soilcolour. Data were analyzed using ANOVA to determine treatment effects. The results showed that both short- and long-term applications of SA significantly ($p<0.05$) affected soil chemical properties. A marked decrease in soil pH was observed with increasing SA rates, with the lowest pH values recorded in T3 and T4 treatments (4.15±0.47 and 4.34±0.32, respectively). EC and available sulfur levels increased significantly with higher SA applications, with the highest EC value (0.022±0.98) observed in T6, where only SA was applied. Conversely, soil physical properties suchas bulk density and moisture content were not significantly affected over the study period. These findings highlight the acidifying effect of prolonged SA use and underscore the need for balanced fertilizer management. The study recommends regular soil monitoring and appropriate liming practices to mitigate soil acidificationand sustain long-term soil health in cinnamon plantations.

Keywords: *Cinnamon, Ammonium sulphate, Soil fertility, Chemical parameters, Physical parameters*