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THE INFLUENCE OF PHENOL-RICH PLANT RESIDUES ON SOME BIOCHEMICAL CHARACTERISTICS OF AN ACID TEA SOIL

Part I: Effect on Soil Nitrification

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Tea (Camellia sinensis L.) which is a major agricultural crop in Sri Lanka, has a very high content of polyphenols in the foliage. It has been estimated that about 450 Kg of phenolic material (as polyphenols) are returned to the soil per hectare per annum, both as leaf-fall and as prunings.

Polyphenols are believed to retard nitrification (Basaraba, 1944), inhibits soil urease activity (Fernando & Roberts, 1976) and reduce the biodegradability of organic matter (Basaraba & Starkey, 1966). It was therefore of interest to examine the possible significance of phenol-rich residues on soil character.

In the studies reported here, greenhouse experiments were conducted to examine the comparative effects of plant residues high and low in phenolic content on some biochemical characteristics of an acid tea soil.

Soil was incubated with plant residues having varying phenolic contents. The total plant material added (in staggered applications) was 15 g/Kg soil and the entire incubation period lasted 12 months. The amended soil was used for various analyses.

Data obtained during this investigation revealed that the nitrification capacity of soil was influenced by the chemical composition of the plant residue, in particular the nitrogen content and the polyphenol content. A high nitrogen content in the plant residue increased nitrification capacity greatly, but this effect was decreased by an initial high level of polyphenol in the decomposing residue.

References :

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