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Effect of particle size and soil texture on soil nitrogen mineralization

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Decline in soil productivity and environmental quality and progressive deterioration of natural resources in the tropics have led to a search for new methods to sustain crop production via more efficient nutrient cycling. In tropical agricultural systems with limited access to fertilizers, plant residues are often used to meet the N requirements of most of the crops. Plant residues, particularly leguminous residues, are an important source of N to crops in low input agricultural systems, and contribute significantly to the N requirements of crops. A study on Gliricidia leaves decomposition was conducted under laboratory conditions to elucidate the effect of the particle size ($S_1 \leq 0.5$ mm, $S_2 = 4$ mm) and texture of soil (T_1 = Sandy clay loam, T_2 = loamy sand) on nitrogen mineralization after incorporation in to the soil.

The early stages of the incubation were found to be significantly influenced by the particle size of the Gliricidia leaves. However, in the case of NO_3^--N mineralization, no any treatment was found to be significant. Present results revealed that nitrogen mineralization of Gliricidia leaves were affected by the texture of the soil. Sandy clay loam soil (clay 28%) showed higher N mineralization when compared with loamy sand soil (clay 9%). It is important to standardize residue particle size and residue quality determination to relate their intrinsic chemical characteristics with their rate of N mineralization.

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