
NITROGEN STATUS AND ITS SUPPLYING CAPACITY OF TROPICAL SOILS

K A Nandasena,

Department of Soil Science, Faculty of Agriculture, University of Peradeniya

Total Nitrogen content in tropical soils is generally low compared to the most temperate soils. About 98% total nitrogen is associated with soil organic matter which in turn subjects to mineralization and hence releases mineral nitrogen to the soil. Thereby most tropical soils nitrogen supplying capacity or nitrogen mineralization potential is relatively low and declines rapidly during cropping season unless nitrogen sources are incorporated frequently. This investigation conducted to find out the nitrogen status, distribution of different nitrogen fractions and the mineralization potential of some selected agriculturally important soils of Sri Lanka.

Sixteen soils collected from various locations representing different soil types were analysed for total nitrogen. Eight soils from sixteen soils were fractionated and analysed for different nitrogen forms viz; available N, ammonia-N, amino sugar-N, amino acid-N, acid hydrolyzable unknown N and acid insoluble-N after acid hydrolysis. In a laboratory incubation experiment, those eight soils were subjected to follow the nitrogen mineralization potential and to determine the mineralization rates according to the method described by Stanford and Smith (1972). The nitrogen mineralization data during 315 days of incubation were used in Stanford and Smith's first order decay model to calculate nitrogen mineralization rate(k) and nitrogen mineralization potential (No).

Total nitrogen contents in the studied soils varied from 89.36 (Aralaganwila) to 365 mg/100 g soil (NuwaraEliya). Soil organic matter contents also gave similar variation and showed close relationship with total soil nitrogen. The distribution of different forms of soil nitrogen also varied among the soils studied. A major part of organic nitrogen in Sri Lankan soils was found to be associated with amino acid-N fraction followed by the ammonia-N fraction. This was consistent with the other studies conducted in elsewhere (Stevenson, 1957; 1982)

Nitrogen mineralization rate was ranged from 0.0069 to 0.026 N mg/100 soil per day. Highest mineralization rate was given by two paddy soils (Kiribathkumbura and Pilimathalawa). Nitrogen mineralizations potential or nitrogen supplying power also varied from 5.33 to 38.52 N mg/100 g soil. High mineralization potential was also recorded in paddy soils. This may be attributed to the high organic matter contents in those soils. Further these different nitrogen supplying powers of soils reflect their inherit characteristics or potential in supplying available nitrogen for plant usage. One should give serious consideration to those parameters of soil nitrogen when nitrogen fertilizer recommendation practices are conducted for crops to attain optimum yield.