

MAJOR NUTRIENTS OF PADDY CULTIVATED SOILS AND RICE GRAINS MANAGED UNDER ORGANIC AND INORGANIC FERTILIZERS

K.H.B.H. Delgoda, N.A.S.A. Neththasinghe, E.D.C.T. Chandrasekara and L.D.B. Suriyagoda*

Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka

**lalith.suriyagoda@gmail.com*

Rice is a staple food which serves as the main source of energy, protein and other nutrients. Due to many health and environment-related consequences associated with the use of chemical fertilizers, Sri Lankan government has taken a decision to introduce organic fertilizer in rice farming. However, the soil and grain nutritional status of organically and inorganically managed rice fields in Sri Lanka is not yet explored. Hence, this study was conducted to determine the (i) concentrations and (ii) relationships of nitrogen (N), phosphorus (P) and potassium (K) in paddy soils and rice grains collected from organically (3 years) and inorganically cultivated soils. A total of 44 soil samples and grain samples were collected representing paddy lands in Anuradhapura, Polonnaruwa and Gampaha districts. Total N, available P and exchangeable K concentrations of soil samples were analyzed using Kjeldhal, Olsen and Flame photometric methods, respectively. The total N concentration of grain samples was measured using the Kjeldhal method, and total P and total K were determined through the colourimetric method. Relationships between soil N, P and K concentrations and grain N, P and K concentrations were analyzed separately for organically and inorganically grown paddy samples. Soil and grain N, P and K concentrations between the districts and fertilizer application method were similar ($p > 0.05$). Only four significant correlations between the tested elements were observed. Soil K and N concentrations and soil K and P concentrations were significantly correlated in organically managed paddy fields ($r = 0.50$ and $r = 0.41$, respectively), thus maintaining the nutrient stoichiometry. For grains, K and P concentrations in organic ($r = 0.53$) and inorganic ($r = 0.56$) paddy fields were correlated. The findings of the present study suggest that the application of organic fertilizers has also supplied sufficient N, P and K for rice grains similar to that of inorganic fertilizers.

Financial assistance from the World Bank, under the Accelerating Higher Education Expansion and Development (AHEAD) (Grant No. AHEAD/RA3/DOR/AGRI/PERA-No16)

Keywords: Correlation, Inorganic fertilizer, Organic fertilizer, Paddy