LIMING IMPROVES NUTRIENT AVAILABILTY, RHIZOSPHERE SOIL CHEMISTRY AND GROWTH OF YOUNG RUBBER PLANTS IN EXTREMELY ACIDIC SOIL

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Changes in the soil chemical properties and nutrient availability with liming were studied in extremely acidic (pH 4.4) and strongly acidic (pH 5.5) soils by conducting an incubation experiment. Response of young rubber plants to liming and the changes in rhizosphere soil chemical properties were studied by growing rubber plants in polythene bags. Incubating the soil with lime for two months improved pH, cation exchange capacity (CEC) and availability of phosphorus (P) in extremely acidic soil. Similarly, incorporation of lime improved exchangeable potassium (K) and reduced exchangeable magnesium (Mg) and aluminium (Al) in both the soils. Lime treatment improved the diameter and height of young rubber plants in the extremely acidic soil. With the incorporation of lime, apart from the significant improvement in pH and organic carbon (OC), the availability of P and Ca including fractions of P and exchangeable Ca were increased significantly in the rhizosphere. At the same time, significant reduction in the availability of K and Mg including fractions of K and exchangeable Mg were recorded in the rhizosphere of rubber plants with liming. Liming improved the pH from 4.4 to 5.5 in the rhizosphere and improved the growth of plants indicating that a pH of around 5.5 is congenial for growth and establishment of rubber.

Key words: *Hevea brasiliensis*, Liming, Natural rubber, Rhizosphere soil chemistry, Soil acidity

INTRODUCTION

The major part of the soils of rubber plantations are lateritic in nature with kaolinite clay mineral and belong to the Ultisol order as per the USDA system of classification of rubber growing soils (NBSS and LUP, 1999). High content of iron and aluminium oxides and hydrous oxides are the characteristics of these soils.The soil is acidic with pH often less than 5.2 (Karthikakuttyamma *et al*., 2000) and acidity is developed due to high levels of exchangeable Al and the loss of basic cations through erosion, leaching and crop removal (Joseph, 2016). If the rubber plants tolerate a pH range of 3.8 to 8.0, the extremes could affect its growth and productivity and young seedlings tend to be more sensitive to low pH than mature trees (Kortleve, 1928; Vollema, 1949). The optimal pH for rubber lies in the range 4.0 to 6.5 and the ideal pH

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