RHIZOSPHERE CHANGES AND GROWTH OF RUBBER (*HEVEA BRASILIENSIS*) SEEDLINGS UNDER VARYING SOIL pH AND BASE STATUS

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Rhizosphere is an important zone of nutrient changes and nutrient activity of plants. The nutrient release, uptake and the chemical activity in rhizosphere are species specific and the changes are in the immediate vicinity of roots. *Hevea brasiliensis*, the important source of natural rubber, generally grown in acidic soils is a major crop of economic importance in the major rubber growing countries *viz*. Thailand, Indonesia, Malaysia, China, Vietnam and India. Repeated cycles, heavy rainfall and topographic conditions lead to excessive acidification and nutrient removal from soils that limits the crop growth and productivity. The present attempt was to know the changes in the rhizosphere pH and nutrient availability and growth of rubber (*Hevea brasiliensis*) seedlings as influenced by three soil pH *viz.* extremely acidic (pH 4.4), strongly acidic (pH 5.5) and neutral soil (pH 7.4) with varying base status. Seedlings were raised in polybags and nutrient status in the rhizosphere at the beginning of the experiment and at intervals of three months and eight months were monitored. It was observed that the extremely acidic pH (4.4) was modified to a pH of around of 5.1 in the strongly acidic range and the neutral pH (7.4) was changed to acidic range (6.2). Soil organic carbon, the major soil health index, was maintained in the initial medium status in all the three soils. The available calcium and magnesium content of the extremely acidic pH and strongly acidic pH were improved whereas the very high status of the neutral soil was decreased significantly. Modifications in the availability of other nutrients were also observed. The observed alterations in the rhizosphere is suggestive of specific rhizosphere adaptations of the rubber plants for extremely varying soil conditions. In extremely acidic soil alkalinization occurred and in neutral soil, acidification occurred when rubber seedlings were grown for eight months. However, the fact that the strongly acidic soil (pH 5.5) did not change, indicated that pH near 5.5 was favorable for growth of rubber seedlings. The study indicated that specific adaptations were operating in the rhizosphere of natural rubber plants to modify the pH and nutrient availability for initial establishment and growth.

Keywords: Base status, Rhizosphere, Rubber seedlings, Soil pH, Soil nutrient availability

Plant rhizosphere is the root zone where nutrient activities associated with plant functions are performed. The nutrients for plant uptake becomes available as a result of the combined effect of soil chemical reactions, species specificity and microbial activities (Jones *et al*., 2004). The rhizosphere and the bulk soil nutrients are different (Marschner *et al*., 1986). Plants have various adaptations to soil nutrient limitations and constraints by root activities and modifications in the rhizosphere. In India,

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