

**SOIL ACIDIFICATION AND ITS INFLUENCE ON SOIL ORGANIC CARBON LEVELS ALONG A CHRONOSEQUENCE OF *EUCALYPTUS GRANDIS* PLANTATIONS IN SRI LANKA**

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*Eucalyptus* plantation forests are one of the highly grown plantations in Sri Lanka. However, it is generally believed that these plantations degrade soil fertility, mainly through soil acidification, either shortly or over decades. To verify this soil pH and total organic carbon were measured along a chronosequence of *Eucalyptus grandis* plantation forests to investigate any relationship. Soil pH and Total organic carbon (TOC) in two soil layers (0-15 cm and 15-30 cm) were measured in different-aged plantation forests (5, 11, 20 and 28 years old) located in the same agro ecological zone in Passara area. An adjacent patana grassland (land use type prior afforestation) was also sampled as a control. The results indicated that pH in the upper layer of the 5 years old plantation was more basic (average, 5.37) compared to the lower layer (average, 5.27) but later at 28 years the upper layer had become more acidic (Upper layer average, 4.57; lower layer average, 4.65). Furthermore, afforestation with *E. grandis* caused decrease in soil pH in both layers and changes were depended on the stand age ( $P = 0.000$ ,  $R^2 = 75.60\%$ ). TOC in the upper layer at the age 5 was 6090.43 mg/kg but it increased up to 7530.35 mg/kg at the age 28 years. Similarly lower layer also increased from 1003.09 mg/kg at the age 28 years. However, along the chronosequence TOC content showed an initial phase of decline and then increased significantly overtime ( $P = 0.000$ ,  $R^2 = 80.97\%$ ). The data resulted a significant negative relationship between pH and TOC content in soil ( $P = 0.000$ , Pearson correlation = 0.683). There was a significant effect from soil layer to TOC level in soil ( $P = 0.000$ ), though there was no significant effect from soil layer to the soil pH ( $P = 0.177$ ). Soil pH has decreased by 0.4 in top layer and 0.36 in lower layer than the patana grass land after 28 years of plantation. However, TOC had increased in 13705.24 mg/kg. The increasing soil acidity over time may have retarded the microbial activities in soil influencing the decomposition process. This slow decomposition has led to the increase in soil organic matter levels with time. The results demonstrated that even though soil acidification was obvious after afforestation with *E. grandis*, there was also a progressive increase in TOC content. Further studies are required to understand changes in the soil properties resulting from afforestation with *E. grandis* to envisage future trends.

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