

**DEVELOPMENT OF MICROBIAL BIOFILMS FOR
BETTER GROWTH OF *Eucalyptus grandis* PLANTS**

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by

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ABSTRACT

Eucalyptus is the highest grown forest plantation species worldwide (Rhoades and Binkley, 1996) and in Sri Lanka, 20 percent is represented by *Eucalyptus grandis* (Bandarathilake, 1996). At present sites available for reforestation in Sri Lanka are generally poor in nutrient status and fertilizer application is required for better growth of seedlings (Bandarathilake, 1996). It has being reported that by increasing the soil organic carbon stock, in other words increasing soil carbon sequestration, crop yields could be increased. Microorganisms play a major role in sequestration of soil carbon. If we can use such carbon sequestering microorganisms in biofilm biofertilizers to improve soil organic carbon content, that will be an advantage as these may have a greater potential to boost the level of soil organic carbon and to enhance the growth of crops in an environmental friendly manner. This study focused on the fabrication of a biofilm biofertilizer for the better growth of *Eucalyptus grandis* plants in a nursery, which could be cost effective and environmental friendly. According to the final outcomes of the study, it is clear that Medawelagama and Pelgahatenna *Eucalyptus grandis* plantation sites contain the highest organic carbon content among the four sites. When comparing the organic carbon content of two soil layers (“0-15cm” and “15-30cm”), it was statistically proved that “0-15cm” soil layer contains significantly higher organic carbon content than “15-30cm” soil layer. Seven bacteria and three fungi types were isolated during this study. Although all the seven isolated bacterial types were combined and cultured with the three isolated fungal types separately to facilitate biofilm formation, only two combinations were succeeded in formation of biofilms with high intensity. There is a positive effect from the fabricated biofilms (“biofilm 3” and “biofilm 5”) for the growth of *Eucalyptus grandis* nursery plants. But further studies are required to understand the continuous effects of the fabricated biofilms on the growth and productivity of *Eucalyptus* plantations including their soil organic carbon content.