

BIOFILMED BIOFERTILIZERS FOR SUGARCANE (*Saccharum officinarum*)

K.R.N.L. Wijesinghe , G. Seneviratne² and D.M. Jinadasa¹

¹ *Department of Soils and Water Resource Management, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Amuradhapura, Sri Lanka.*

² *Institute of Fundamental Studies, Hantana, Kandy, Sri Lanka.*

Intensive cropping has led to the depletion of soil organic carbon content and inherent soil fertility resulting in a serious threat to the sustainability of sugarcane production. Microbial bioagents like fungi and bacteria have great potential to restore soil fertility. This study was conducted to develop Biofilmed biofertilizers (BBs) to replace part of inorganic fertilizers and to improve sugarcane production. Twenty three bacterial and twelve fungi strains were isolated from plant-soil system of sugarcane and gram negative bacteria and fungi for fungal-bacterial biofilm (FBB) formation were screened in their ability to produce organic acids in the medium. Nine bacterial and four fungal strains were mixed for biofilm formation. Six combinations of FBBs (E1, H1, B2, H2, C3, D3), a higher order biofilm (HOB), control (without amendments), 50% chemical fertilizer alone and 50% chemical + HOB were used in a greenhouse pot experiment using complete randomized design with six replicates. All treatments were soil applied except D3 which was foliar applied for tissue culture sugarcane plants.

The results indicate the height increments to first leaf (hf), third dewlap leaf (hd), top leaf (ht), tiller number increment (t) and leaf number increment (l) were measured after one month of the application of treatments. D3 was higher than the control for hd ($P = 0.08$), ht ($P = 0.05$) and l ($P = 0.07$). H2 was higher than the control for ht ($P = 0.10$) and t ($P = 0.05$). Therefore, D3 and H2 treatments can be considered as promising treatments for early growth of sugarcane. The study should be continued to examine the effect of the BBs on mature sugarcane.

Key words: Sugarcane, Microbial bioagents, Biofilmed Biofertilizers (BBs), Fungal-Bacterial Biofilm (FBB), Higher Order Biofilm (HOB)