Fungal-Bacterial Biofilms for Sugarcane (*Saccharum* hybrid species) Trash Decomposition

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Sugarcane trash/crop residue left on the field after harvesting interferes with management of the subsequent ratoon crops since it takes a long period for decomposition. Fungi and bacteria are the most important microorganisms in degrading sugarcane trash/crop residue. Laboratory-level experiments were conducted to develop and evaluate fungal-bacterial biofilms (FBB) to expedite rate of decomposition of sugarcane trash.

The fungi and bacteria were isolated from sugarcane-growing soils and sugarcane trash. The isolated fungi were screened by Fourier Transform Infra Red (FTIR) spectroscopy and slide culture. The bacteria were screened based on their biofilm formation ability, results of acetylene reduction assay and FTIR spectrometry, culture pH and optical density of the bacteria. The selected fungi and bacteria were mixed to form bio-films at the laboratory of the Institute of Fundamental Studies (IFS), Kandy, Sri Lanka.

The decomposition of sugarcane trash by three selected FBBs based on their performance in bio-film formation was evaluated in the laboratory in terms of the C/N ratio of the decomposed trash and their fragmentation and weight loss percentages. The decomposition of trash at two levels of N calculated at the rate of 25 and 50 kg/ha and without FBBs was also determined for comparison.

According to the results, though the C/N ratios of trash with the three FBBs and at two N levels were lower than that of the control, only the latter showed a significant effect. The fragmentation percentages in all treatments were not significantly different from each other. An inverse relationship was observed between C/N ratio and weight loss percentage of trash. These results indicate the importance of nitrogen-fixing ability of the bacteria in FBBs for trash degradation and the work is being continued.

Keywords: Sugarcane, Fungal-bacterial biofilm, Trash, Crop residue, Decomposition

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