Sustainable Soil Conservation in Honduras: Harnessing Biovinyl from Sugarcane Waste for Erosion Prevention

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Sugarcane farming, especially in countries such as Honduras and Brazil where sugarcane is the nation's primary industry, has led to large-scale deforestation and further environmental damages. The subsequent incineration of sugarcane waste releases toxic gasses, rendering the area vulnerable to natural disasters such as floods. This study addresses this situation by developing a sugarcane waste based biovinyl enhanced with calcite-forming bacteria which strengthens damaged soil and lignin-decomposing bacteria which ensures the proper decomposition of sugarcane bark. To achieve this, 26 species of calcite-forming bacteria and 18 species of lignin-decomposing bacteria were isolated from the soil of a herbivore habitat. Of the isolated bacteria, the most effective species based on soil strength, water holding capacity, and plant growth were final selected and identified via 16s rRNA sequencing and BLASTN analysis as Glutamicibacter halophytocola and Priestia megaterium. The bacteria were incorporated into the biovinyl created from 0.5% corn starch, 1% molasses, 1% agar, and 1% sugar cane bark (SCB). The bacterial dispersal of a 0.5x0.5 cm SCB biovinyl in sterilized soil is 314 times in 24 hours. In conclusion, this study presents a novel cyclical approach by utilizing sugarcane waste products to treat soil degradation caused by sugarcane cultivation.

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