

New strategies to look at old problems: fatal yellowing in palm oil tree

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Biodiesel is more environmentally friendly than fossil-derived diesel and can be produced from oils. The palm oil tree can produce from 3.0 to 5.0 tons of oil/ha, 10 times more than soybeans, currently the most common source of oil for biodiesel. Brazil has a cultivated area of palm trees of approximately 63,853 ha, with the state of Para being the biggest producer. Fatal Yellowing (FY) is a disease that affects palm oil trees and has been devastating to this crop. Despite being studied for the past 20 years by traditional microorganism cultivation methods, the cause for FY has not been uncovered. This disease appears sporadically in the field, and can affect plants in any stage of development. It is known that plants planted in areas where previously were infected palm oil trees, also acquired the disease eight months after replanting. This suggests that FY may be transmitted through soil. The metagenomic approach can be used to identify both the cultivated and uncultivated microorganisms present in a given environment. The purpose of this work is to study the microorganisms (fungi, bacteria and archaea) present in soil collected from the base of palm oil plants at stages 0, 5 and 8 with FY using second generation sequencing. Soil was collected from a palm oil tree farm in the city of Mojú (PA). From each plant two samples (one on each side of the plant) were collected. Physical-chemical analysis of each sample was performed and a PCA (Principal Component Analysis) was used to determine which samples were most similar. To extract DNA from Amazonian soil, different extraction methods were attempted without success. Fortunately, one method worked and large quantities of high quality DNA were obtained. PCR amplifications using specific primers for the 16S rDNA of *Bacteria*, for 16S rDNA of *Archaea* and 18S rDNA of fungi were performed. Pyrosequencing of amplicons is under way. This is the first time that the techniques of metagenomics and second generation sequencing have been used to study FY.

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Key Words: Metagenomics, biodiesel, Fatal Yellowing, next generation sequencing.

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