Biocontrol Potential of Endophytic Bacteria against Brown Eye Spot in Coffee

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Coffee farmers in Cavite, Philippines experience serious yield losses because of the aggressiveness of brown eye spot disease (Cercospora coffeicola) causing severe leaf fall and berry damage. Concurrently, heavy dependence on synthetic fungicides is another concern based on US-EPA. With this, our study aims to find a sustainable and less toxic alternative through “endophytes” which are beneficial microorganisms inside plant tissues that coexist and act as natural enemies against a pathogen. In this study, endophytic bacteria were isolated from the intercellular tissues of Coffea liberica leaves by surface sterilization, maceration, dilution technique, plating on TSA agar and colony selection. All 14 endophytic bacterial isolates were screened for their ability to inhibit the mycelial growth of Cercospora sp. in modified dual culture assay. Isolates HCC10-3SC3, HCC10-3SC2, HCC10-1SC1, ICC10-3SC1 and ICC10-1SC1 yielded the highest Percent Inhibition of Radial Growth with 59-67% that are statistically significant at ($p<0.05$). The top 5 performing isolates subjected to hydrolytic enzyme production assay showed amylolytic, lipolytic, proteolytic and chitinolytic positive activities and cellulolytic positive activities in K. cowanii and S. cohnii revealing their ability to produce enzymes relating to their antifungal properties. Based on the morphological characterization and molecular identification through 16s rRNA sequence analysis conducted by Macrogen, isolates were identified as Bacillus siamensis, Staphylococcus cohnii, Staphylococcus hominis and Kosakonia cowanii. Study shows that endophytic bacteria are potential biocontrol agents against brown eye spot in coffee. Keywords: endophytic bacteria, brown eye spot, coffee, biological control, 16s rRNA sequencing

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