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Efficacy of Mixed Actinomycetes against Fusarium Wilt Caused by Fusarium oxysporum f.sp. cubense

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Abstract : Banana is one of the major fruits in the Philippines in terms of volume of production and export earnings. The Philippines export of fresh Cavendish banana ranked No.1 with 22% share. One major threat to the industry is Fusarium wilt caused by Fusarium oxysporum f. sp. cubense. It tops as a major concern today affecting the Philippine banana industry since 2002 up to the present in Mindanao. Because of environmental and health issues concerning the use of chemical pesticides in the control of diseases, utilization of microorganisms has been significant in recent years as a promising alternative. This study aims to evaluate the potential of actinomycetes to control Fusarium wilt in Cavendish banana. The in-vitro experiments was carried out in Complete Randomized Design (CRD) while field experiment was laid out in a Randomized Complete Block Design (RCBD) with three treatments and three replications. Actinomycetes were isolated from mangrove soils in areas in Quezon and Bataan, Philippines. A total of 199 actinomycetes were isolated and 82 actinomycetes showed activity against the local Fusarium oxysporum (Foc) by agar plug assay. The test for antagonisms (AQ6, AQ30, and AQ121) of three best isolates Foc to were selected inhibiting Foc by 21.0mm, 22.0mm and 20.5mm, respectively. The same actinomycetes inhibited well Foc Tropical Race 4 showing 24.6 mm, 20.2mm and 19.0 mm zones of inhibition by agar plug assay, respectively. Combinations of the three isolates yielded an inhibition of 13.5 mm by cup cylinder assay. These findings led to the formulation of the mixed actinomycetes as biocontrol agents against Foc. A field experiment to evaluate the formulated mixed actinomycetes against Foc in a Foc infested field in Kinamayan, Sto Tomas, Davao Del Norte, Philippines. was conducted. Results showed that preventive method of application of the mixed actinomycetes against Foc showed promising results. A 56.66% mortality was observed in control set-up (no biocontrol agent added) compared to 33.33% mortality in preventive method. Further validation of the effectiveness of the mixed actinomycetes as biocontrol agent is presently being conducted in Asuncion, Davao Del Norte, Philippines.

Keywords : actinomycetes, biocontrol agents, cavendish banana, Fusarium oxysporum f. sp. cubense
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