

MORPHOLOGICAL AND MOLECULAR CHARACTERIZATION OF BACTERIA INFECTED IN IMPORTED MAIZE SEEDS IN SRI LANKA

S. G. S. Harshana¹, D. M. J. B. Senanayake², M. C. M. Zakeel¹ and M. H. A. D. Subhashini²

¹*Department of Plant Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Puliyankulama, Anuradhapura*

²*National Plant Quarantine Service, Department of Agriculture, Canada Friendship Road, Katunayake, Sri Lanka*

Maize (*Zea mays*) seeds are imported annually to the country for both cultivation and consumption purposes. Although only one bacterial disease pertaining to the maize cultivation observed in Sri Lanka introducing new bacterial diseases to local fields through imported seeds is a risk. Morphological and biochemical identification methods that are currently used in identifying disease-causing bacteria of imported maize consignments do not provide accurate pathogen identification. Precise pathogen identification is therefore a necessity to implement required quarantine measures and protect the local maize cultivating lands from the quarantine pathogens and ultimately to reduce the crop losses. Therefore, this study was carried out for morphological, biochemical and molecular characterization of bacteria that infect imported maize seeds. Twenty nine maize seed samples collected from imported consignments were subjected to bacterial isolation and identification of colony characters. Based on the morphological characteristics such as colony color, shape, opacity and biochemical reactions, *Bacillus subtilis*, *Erwinia chrysanthemi*, *Erwinia stewartii* and *Erwinia carotovora* were identified. KOH test was positive for 14 out of 29 samples confirming the presence of gram negative bacteria in the consignments. Nitrate reduction test was positive for 19 samples confirming the ability of different bacterial species to perform nitrification on nitrate and nitrite. Only two samples showed positive results for gelatin hydrolysis confirming the presence of gelatinase-positive bacteria, whereas oxidative fermentation and catalase reactions yielded positive results for all samples confirming the presence of oxidative and fermentative bacteria. This was aided for differentiation of bacterial isolates in the consignments. Polymerase chain reactions (PCR) were carried out with specific primers, and universal primers for *B. subtilis* and *E. stewartii* after extracting bacterial genomic DNA and samples were positive for *B. subtilis* and *E. stewartii*.

Keywords: Bacterial diseases, Biochemical reactions, Molecular identification, Morphological identification, Polymerase chain reaction (PCR)