Hubert Szczerba et al., J Biotechnol Biomater 2017, 7:4 (Suppl)
DOI: 10.4172/2155-952X-C1-079

Development and application of new primer sets for rapid and specific detection of *Blumeria graminis f. sp. tritici* using PCR

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Wheat powdery mildew caused by *Blumeria graminis f. sp. tritici* (Bgt) is one of the most destructive and reemerging foliar diseases worldwide. Despite its significance, the ability to detect and identify this fungal pathogen at its early asymptomatic developmental stages is still limited. In this study, we developed new primer sets targeting beta-tubulin (*Tub2*) and 14 alpha-demethylase (*Cyp51*) genes and used them for the species-specific identification of Bgt, which occurs on common wheat (*Triticum aestivum L.*). Using DNA fungi sequences available in the NCBI (Nacional Center for Biotechnology Information) GenBank database we developed a simplex and duplex PCR assays. Primer pairs were evaluated on environmental samples of infected wheat leaves with visual symptoms caused by Bgt, collected during the 2015/16 growing season across Poland. The PCR assays using the primer pairs LidBg17/18 and LidBg21/22 strongly generated products for all 67 tested samples compared with the primer set LidBg13/14, which failed to amplify seven samples. Primer specificity was confirmed with field samples of *Zymoseptoria tritici, Puccinia triticina* (*syn. Puccinia recondita f. sp. tritici*), *P. striiformis f. sp. tritici* and *Pyrenophora tritici-repentis*. The detection limit for LidBg13/14, LidBg17/18 and LidBg21/22 was determined to be 0.1 pg, 10 pg and 1 pg of fungal DNA (no host DNA added), respectively. The addition of 100 ng of host DNA decreased the sensitivity of the tests by an average of ten times

Biography

Hubert Szczerba has his expertise in design and evaluation of new PCR assays for species-specific identification of plant pathogens. Presently, as a member of research team supervised by Dr. Adam Kuzdraliński, he conducts study to develop new molecular diagnostic tests to identify key fungal pathogens of common wheat (*Triticum aestivum L.*) that have potential application in targeted plant protection. The main objective of his research is to introduce a monitoring system for species composition of fungal pathogens based on molecular tests. This approach would reduce the preventive use of spraying and contribute to a better environmental condition

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