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MOLECULAR ASSAY FOR RAPID QUANTIFICATION OF *RHIZOCTONIA SOLANI* AG2-2IIIB

Tests de génétique moléculaire pour une quantification rapide de *Rhizoctonia solani* AG2-2IIIB / Molekulargenetische Tests zur schnellen Quantifizierung von *Rhizoctonia solani* AG2-2IIIB

ABSTRACT

Rhizoctonia solani (Kühn) is the casual agent of late crown and root rot in sugar beet (*Beta vulgaris* subsp. *vulgaris*), which causes considerable yield losses worldwide. Thus, a high soil inoculum potential of *R. solani* is the main prerequisite for the development of sugar beet rots. However, due to Rhizoctonia soilborne nature it is very difficult to quantify *R. solani* densities in soil. Moreover, currently there is no monitoring system available for routine measurement of Rhizoctonia concentration levels in soil. In order to study the impact of different agricultural practices on the inoculum potential of *R. solani*, a specific molecular quantification assay was developed. The assay is based on a seed baiting technique combined with quantitative real time-PCR and was called quinoa-qPCR-assay. First, quinoa (*Chenopodium quinoa*) seed baits were used to extract the actively growing mycelia from the soil. Then, the Rhizoctonia infested quinoa seeds were used for total DNA extraction in order to quantify the most aggressive type of *R. solani* (AG2-2IIIB) using qPCR. Furthermore, in order to estimate sclerotia numbers per gram soil, a standard curve was set up by using Rhizoctonia-infected poppy seeds, which were comparable in size of typical sclerotia formed by *R. solani*. One infested poppy seed was set equal to one sclerotium (or 1 CFU). The quinoa-qPCR-assay was very sensitive (detecting 1 sclerotium in 1 kg soil) and very fast (only 7 days). However, for routine soil testing pooled samples of 150 g to 300 g were most cost and time efficient. Depending on available equipment and staff up to 100 samples were processed simultaneously.