

Scientific paper: Field Detection of Rhizoctonia Root Rot in Sugar Beet ~~by Near Infrared Spectrometry~~

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Rhizoctonia root and crown rot (RRCR) is an important disease in sugar beet production areas, whose assessment and control are still challenging. Therefore, breeding for resistance is the most practical way to manage it. Although the use of spectroscopy methods has proven to be a useful tool to detect soil-borne pathogens through leaves reflectance, no study has been carried out so far applying near-infrared spectroscopy (NIRS) directly in the beets. We aimed to use NIRS on sugar beet root pulp to detect and quantify RRCR in the field, in parallel to the harvest process. For the construction of the calibration model, mainly beets from the field with natural RRCR infestation were used. To enrich the model, artificially inoculated beets were added. The model was developed based on Partial Least Squares Regression. The optimized model reached a Pearson correlation coefficient (R) of 0.972 and a Ratio of Prediction to Deviation (RPD) of 4.131. The prediction of the independent validation set showed a high correlation coefficient ($R = 0.963$) and a root mean square error of prediction (RMSEP) of 0.494. These results indicate that NIRS could be a helpful tool in the assessment of Rhizoctonia disease in the field.

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