

**Title** The use of Vis/NIR spectroscopy to predict the optimal root harvesting date of chicory (*Cichorium intybus* L.)

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### **Abstract**

The use of Visible/Near Infrared (Vis/NIR) spectroscopy has been evaluated to determine the optimal harvesting date of chicory roots. Indirect maturity parameters, such as the foliage chlorophyll content, root dry matter, sugar and nitrogen content, were measured for two hybrids during the field growing season. The root harvest date, which resulted in the highest percentage of top quality chicory heads after forcing, was chosen as the optimal harvest date. A principal component analysis indicated the presence of both a time and hybrid effect. Partial least square models were constructed to predict the indirect maturity parameters and the number of days before optimal root harvest. Correlations for cross validation between 0.75 and 0.81 were obtained for the prediction of foliage chlorophyll content. For the first time, leaf spectra were used to predict chicory root characteristics with success: root dry matter percentage had a cross validation correlation of 0.81 for the 'Mont Blanc' and 0.88 for the 'Vintor' hybrids. The prediction of root sugar and nitrogen content was poor (cross validation correlation of 0.62 and 0.74). Predicting the number of days before optimal root harvest was done reasonably accurately, with prediction errors of 8.86 d and 10.61 d for 'Mont Blanc' and 'Vintor', respectively. The visual part of the spectrum is not required in these calibration models. Data of more years and hybrids should be taken into account to make the models more robust and applicable for farmer practice.