

## **Abstract**

# **Non-contact near infrared interactance for rapid estimation of dry matter and starch content of whole potato tubers**

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## **Introduction**

The dry matter and starch content of whole potato tubers are essential parameters for the potato-processing industry. Industrial evaluation of these parameters often comprise under-water weighing, which is a fairly inaccurate approach not suited for whole-batch and on-line characterisation. Near infrared (NIR) spectroscopy has previously been presented as a potential approach for estimation of dry matter and starch contents in potato mash and potato slices. New technology based on NIR interactance, on the other hand, now enables the use of NIR spectroscopy for measuring quality parameters in whole and intact potato tubers. In this study, thus, the feasibility of using non-contact NIR interactance for estimation of dry matter and starch content in whole unpeeled potato tubers was investigated.

## **Materials and Methods**

Potatoes from five different varieties frequently used in the Norwegian potato industry were obtained. The whole tubers were measured using a prototype VIS/NIR instrument. Light from two 50 W halogen lamps was projected on two rectangular regions on the potato surface. Transmitted light was collected through a black cylindrical tube between the two illuminated regions and guided to a spectrometer and a CCD detector. The system comprises 30 channels in the visible and NIR regions. Reference analysis of dry matter and starch were performed using under-water weighing, vacuum drying, and enzymatic kit technology.

## **Results and Discussion**

Sound and robust calibrations for dry matter using the NIR spectral data were obtained, and the calibration performance exceeded results obtained using the under-water weighing approach. The NIR calibration for starch content, on the other hand, only showed modest results. This might most likely be related to the low spectral resolution of the present NIR system.

## **Conclusion**

Non-contact NIR interactance is a feasible tool for rapid estimation of dry matter in whole potato tubers. The NIR interactance approach enables increased sampling volumes compared to standard optical reflection and transmission set-ups and holds promise as a potential on-line technique for estimation of dry matter in whole potato tubers.