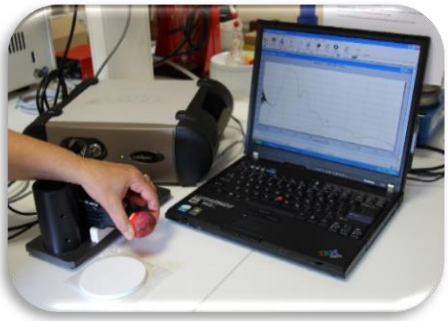
Near-Infrared inter-spectrometer transfer

From benchtop lab spectrometer to portable micro-spectrometer

➢ Context / customer need

The National Interprofessional Bureau of Prunes (B.I.P.), wants to develop a **non-destructive measurement tool** applicable directly to the orchard, in order to better estimate the maturity of the fruits to predict the optimal harvest date for plums

The B.I.P. has implemented considerable resources to establish a 4-years database of nearly 6,000 samples. Each plum sampled was measured by near infrared spectroscopy, with an **ASD LabSpec 4®** spectrometer (Malvern Panalytical) and then measured in the laboratory to obtain the Brix degree and the acidity of the fruit.



➢ Ondalys solution

The MicroNIR™ OnSite® (VIAVI Solutions Inc.) was chosen for a measurement directly at the orchard. Using the large database acquired on the **ASD LabSpec 4®** at laboratory, augmented with the new data acquired on the MicroNIR™ OnSite®, Ondalys developed robust models to predict the plum sugar (Brix degree) and acidity. Ondalys has tested three standardization techniques, the **Local Centering**, the **Direct Standardisation** (DS) and the **Piecewise Direct Standardisation** (PDS) methods. The very satisfactory fruit-to-fruit performances are excellent on an orchard scale.

➢ Results / Customer benefits

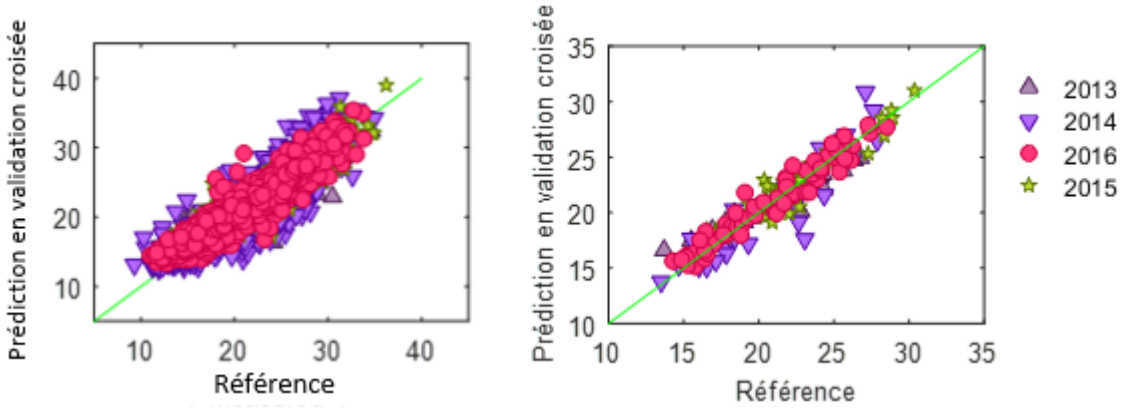
The spectral transfer from the ASD LabSpec 4® VIS-NIR lab spectrometer to the MicroNIR™ portable spectrometer has been completed. This standardization made it possible to develop high-performance models for sugar prediction in plums, from a four-year historical spectral dataset.

The developed models are thus directly applied to the orchard, improving significantly the time saving and efficiency of the B.I.P teams, as well as optimizing the harvest dates of Ente plums.

Incrementing this database with the spectra acquired at the orchard with the MicroNIR™ spectrometer in the next years will make it possible to update the models and ensure their robustness.

These good results led the B.I.P. acquire a handled spectrometer and continue testing to enrich the database with spectra acquired on this new instrument.

Predictions in cross-validation of Brix degree, fruit-to-fruit (left) and in average by orchard (right).



➢ Publications / Communications

LALLEMAND Jordane, ROUSSEL Sylvie, RASHIDI Salim & CAPELLE Monique - Evaluation of Ente plum maturity by infrared spectroscopy – 17th International Conference on Near Infrared Spectroscopy (NIR 2015) – Foz do Iguassu, Brazil.

CAPELLE Monique & AUBERT Sandra - Évaluation de la maturité de la prune d'Ente par Spectroscopie proche infrarouge – 20èmes Rencontres HélioSPIR 2019 – Montpellier, France.

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