



# Sequential data fusion for prediction of moisture and soluble solids content in pear fruit

Several portable spectrometers are available in the market as a low-cost solution to perform NIR spectroscopy. However, portable spectrometers, being lower in cost than a benchtop counterpart, do not cover the complete near infrared (NIR) spectral range. Often portable sensors either use silicon-based visible and NIR detector to cover 400–1000 nm, or InGaAs-based short wave infrared (SWIR) detector covering the 900–1700 nm. However, these two spectral regions carry complementary information to improve fruit properties prediction.

## Objective of this study

Perform data fusion from two portable spectrometers, i.e., Felix F750 (~400–1000 nm) and the DLP NIR Scan Nano (~900–1700 nm) to improve pear quality prediction i.e. moisture and soluble solids content.

## Results

Fusion of data from the two portable spectrometers led to an improved model prediction (higher  $R^2$  and lower RMSEP) of Moisture Content (MC) and Soluble Solids Content (SSC) in pear fruit.

## Conclusion

The study concludes that data fusion from complementary spectrometer can improve the predictive performance of NIR models.

## Relevant for industry

The developed models will allow industries to predict precisely moisture and soluble solids content in pears. Advanced data fusion approaches can be used to improve the predictive performance of NIR models to support enhanced decision making.

Mishra, P., Marini, F., Brouwer, B., Roger, J.M., Biancolillo, A., Woltering, E. and Hogeveen-van Echtelt, E., 2020. Sequential fusion of information from two portable spectrometers for improved prediction of moisture and soluble solids content in pear fruit. *Talanta*, 223, p.121733.

*Data fusion improved the predictive performance of NIR models.*

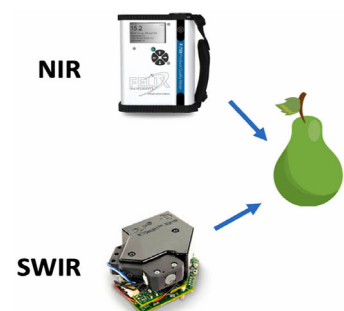


Figure 1:  
Fusion of information from two portable sensors.

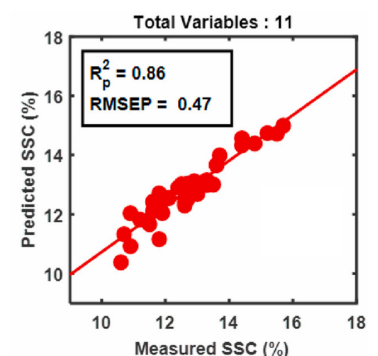


Figure 2:  
Prediction results for Soluble Solids Content (%).

## Information

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