

Improved non-destructive prediction of moisture and soluble solids content in pear fruit

Near-infrared (NIR) spectroscopy is a non-destructive technique in which the interaction of light with matter is studied. In particular to fresh fruit, the light interacts differently when fruit are at different maturity levels. The technique and developed models may be used to predict non-destructively moisture and soluble solids content in fruit.

Objective of this study

Modelling of NIR data is challenging and often models made on one batch fail to work on a new batch. In this study, we explored **variable selection** approaches to generalise NIR models to new batches of fruit.

Results

The results from the study showed that moisture content and soluble solids content in intact pear fruit can be predicted with 0.58 % and 0.63 % error, respectively. Further, for moisture content, **743-779 nm and 879-939 nm** were found to be the most important NIR wavelengths. For soluble solids content, **709-759 nm and 789-999 nm** were found to be the most important NIR wavelengths. With wavelengths selection the error was reduced by 60 %.

Conclusion

The study concludes that variable selection can improve the generalizability of NIR models for new batches.

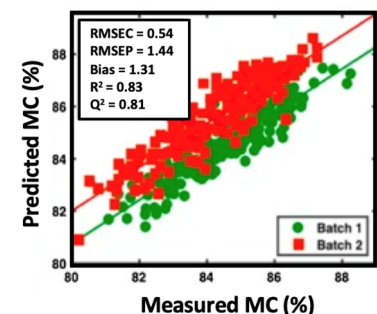
Relevant for industry

The developed models will allow industries to predict precisely moisture and soluble solids content in pears. Advanced variable selection approaches can be used to optimise industrial scale models for generalized performance.

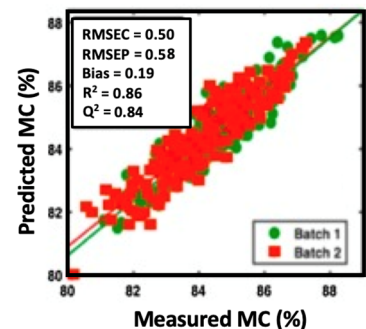
Mishra, Puneet, et al. "Improving moisture and soluble solids content prediction in pear fruit using near-infrared spectroscopy with variable selection and model updating approach." *Postharvest Biology and Technology* 171: 111348.

Variable selection improved the predictive performance of NIR models.

Before variable selection



After variable selection



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