



Predicting Mango quality via NIR-measurement

Sorting mangos based on desired attributes can be achieved via non-destructive Near-InfraRed (NIR) spectroscopy, where NIR spectra of incoming batches are calibrated using batches with known firmness/BRIX/Dry Matter scores. Currently, due to the large variation in quality and maturity of mangos, a substantial amount of fruits arriving at the wholesaler have internal defects or are misclassified after sorting. Models allowing proper sorting based on non-destructive measurements, would increase the value in the whole mango chain and decrease post-harvest losses. This is the outcome of a research project, by Wageningen Food & Biobased Research, carried out within the GreenCHAINge project.

In GreenCHAINge, an innovative “smart chain” was developed, with the goal of predicting fruit and vegetable quality without causing product damage, and improving on-shelf quality. Work Package 1 focused on quality prediction for mangos using non-destructive Near-Infrared Spectroscopy (NIRS). In industry, mango NIR spectra are measured high throughput, and mangos are sorted using standard linear regression models, with approximately 50% efficacy. We propose to classify mangos using a “learning by comparison” model. Therefore, NIR spectra were correlated with quality traits like firmness, BRIX score and percentage of Dry Matter (DM).

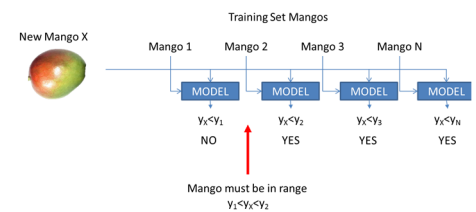
High accuracy

The scientists measured NIR spectra of over 1,500 mangos at different moments in time between harvest (in Brazil), transport to the Netherlands and at several moments during controlled ripening. A “regression by comparison” model enabled them to compare each measurement with existing data. This resulted in the prediction of BRIX scores, DM percentages and firmness with 89%, 84% and 70% accuracy respectively.

Prediction tool

Instead of a regular linear regression model to predict mango quality, we developed a classification system based on a “learning by comparison model”. In industry, a substantial amount of mangos have internal defects or are misclassified. Therefore reliable classification models are crucial to allow effective classification of mangos for ripeness and internal defects. Optimal decision making in the mango supply chain improves uniformity and decreases post-harvest losses. This would finally increase the value in the whole mango chain.

“Classification of mangos based on NIR spectra is possible using a “learning by comparison model”



In a “regression by comparison” model to predict ‘firmness’, each NIR spectrum is compared to NIR data of mangos with known firmness.

For detailed information about this project result please visit www.wur.eu/greenchainge.

GreenCHAINge



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