

Title Time-resolved Reflectance Spectroscopy as a management tool in the fruit supply chain: an export trial with nectarines

Author P. Eccher Zerbini, M. Vanoli, A. Rizzolo, S. Jacob, A. Torricelli, L. Spinelli and R.E. Schouten

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Abstract

At harvest, fruit shows variation in maturity stage. With Time-resolved Reflectance Spectroscopy (TRS), the maturity of nectarines at harvest can be assessed by measuring the absorption coefficient at 670 nm (μ_a), near the chlorophyll peak, in the fruit flesh. A kinetic model has been developed linking the absorption coefficient, expressed as the biological shift factor (Δt^*), to firmness decrease during ripening. As the decrease in μ_a in nectarines is linked with softening, shelf life for individual fruit can be predicted. In order to verify the applicability of this methodology in the supply chain, about 1000 nectarines were measured at harvest by TRS, graded into six classes of usability based on the prediction of their individual softening ('will never ripe', 'dangerously hard', 'transportable', 'ready to eat-firm', 'ready to eat-ripe', 'overripe') and transported from Italy to the Netherlands by a regular temperature-controlled truck. On arrival, fruit was kept at 20 °C and tested for sensory softness (finger feeling) after 5 and 13 days of shelf life. The classes 'will never ripe', 'dangerously hard' and 'overripe' were correctly predicted, as the first two did not soften and the last one was too soft and subject to rot. The intermediate classes showed sufficient firmness to be transported and sufficient ripening potential to satisfy consumers.