

**Title** Influence of cold storage time on the softening prediction in spring bright nectarines

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### **Abstract**

With Time-resolved Reflectance Spectroscopy (TRS) the maturity of nectarines at harvest can be assessed by measuring the absorption coefficient at 670 nm ( $\mu_a670$ ) in the fruit flesh. A kinetic model has been developed linking the optical properties as measured by TRS with the models of  $\mu_a670$  and firmness decay in shelf-life at 20°C, making the prediction of the softening time for individual fruit possible. In order to study the influence of cold storage time prior to shelf life on the softening prediction, 540 (year 2003) and 870 (year 2004) Spring Bright nectarines were measured at harvest with TRS; then fruit were put in shelf life after 3, 10 (both years) and ) 7 days (year 2004) of cold storage at 0°C. During the 5-day period of shelf life at 20°C, fruit were analysed for firmness by pressure test after 30, 48, 54, 72, 78, 96, 102 and 120 h in 2003 and after 36, 43, 62, 87, 108 and 135 h in 2004. For each year and cold storage time, the parameters of the logistic model of softening as a function of  $\mu_a670$  at harvest were computed. The cold storage up to 10 days did not significantly influence the estimates of the softening rate constant ( $k_f$ ), of the maximum firmness at minus infinite time ( $F_{max}$ ) and of parameter alpha ( $\alpha$ ) in both years, whereas parameter beta ( $\beta$ ) in 2003 significantly decreased from -1.867 at day 3 to -2.237 at day 10. The further 7 days of cold storage in 2004 significantly affected  $k_f$ , which decreased from 0.00084 at days 3 and 10 to 0.00069 at day 17, and  $\beta$  which increased from -2.395 at day 3 to 2.053 at day 17. Our results indicate that the cold storage time significantly influences the softening prediction of nectarines as the longer the cold storage, the lower the softening rate.