

Title Effects of storage temperature and stage of ripening on RGB colour aspects of fresh-cut tomato pericarp using video image analysis

Author M.M. Lana, L.M.M. Tijskens and O. van Kooten

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Abstract

Tomato fruit (*Lycopersicon esculentum* cv. Belissimo) were harvested at three different stages of ripening, sliced and stored at five different temperatures. Red–green–blue (RGB) images of the slices were taken regularly during storage, using a image processing system. For constructing a model, each of these colour aspects was considered to be built up by a variable part that changes according to a first order reaction mechanism and a fixed part that is invariable under the circumstances under study. All three colour aspects of the tomato slices (R, G and B) decreased exponentially during storage. The parameters of the model were estimated using multiple-response multiple-variate non-linear regression analysis using R, G and B simultaneously as response variables and time, temperature and ripening stage of the fruit at harvest simultaneously as explaining variables. To combine the information on the behaviour of the colour aspects during the preharvest and the postharvest period at different temperatures, it was assumed that the process of change during ripening was the same whether the fruit ripened on the plant or off-vine. So, the initial value for all three colour aspects ($Col_{0,R}$, $Col_{0,G}$ and $Col_{0,B}$) during the postharvest experiments depended on the time the tomatoes were allowed to ripen on the plant. By using this fundamental approach to build the model and using all available data and information it became possible to describe and simulate the behaviour of the colour aspects of tomato slices as a function of the ripening stage and the applied storage temperature.

Although the variance between replicates was high, the statistical analysis on the mean values of colour aspects over the replicates provided a percentage variance accounted for of 95%. The same model was validated with data of another experiment with another tomato cultivar (Durinta) over a larger range of maturity stages.