

Title           Modelling RGB colour aspects and translucency of fresh-cut tomatoes  
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Citation       Postharvest Biology and Technology Volume 40, Issue 1, April 2006, Pages 15-25  
Keyword       *Lycopersicum esculentum*; Water-soaking; Video image analysis; Minimally processed

### **Abstract**

Translucency is one of the major problems in fresh-cut fruit. This phenomenon seriously limits the use of fruit by the fresh-cut industries. Techniques for measuring translucency in this kind of product are not readily available. As a consequence, the processes that are important in the development of translucency are little understood, let alone described in detail.

Based on techniques used in the industry of paint, paper and textiles, a measuring technique using video image analysis (VIA) involving light reflected from a sample placed in a double white and black background was used to assess the development of translucency and its interference with colour measurement in fresh-cut tomatoes. The effects of stage of maturity at the time of processing as well as the effect of storage temperature were studied in two separate experiments. The data were expressed as the average intensities per pixel of red (R), green (G) and blue (B) for the white and for the black background separately. A model was developed and presented that describes the change in the RGB values of tomatoes after cutting and during storage. In the model, the observed effects were considered to be the result of two processes namely changes in colour due to the production or degradation of pigments and development of translucency (i.e. physical water-soaking). Both processes resulted in changes in each one of the colour aspects R, G and B. Each colour aspect 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. The data obtained on both experiments were used to estimate the model parameters by multiple non-linear regression analysis using R, G and B as response variables and time, temperature, stage of maturity and background simultaneously as explaining variables.

The change from opacity to translucency in the pericarp was the main change in appearance of tomato slices during refrigerated storage, for all stages of maturity and storage temperatures. Changes in colour were much less pronounced and related to a small increase in redness for all stages. The susceptibility to develop translucency was very much dependent on the maturity stage of the fruit at harvest and rather independent of temperature.