

## **Non-Destructive Measurement of Tomato Quality Using Visible and NIR Spectroscopy**

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In this study a non-destructive method for measuring characteristics of intact tomatoes (*Lycopersicon esculentum* Mill.) was developed using visible and near infrared spectroscopy. The reflectance spectra were acquired from 350 to 2500 nm with a bifurcated optical fibre. The properties of tomatoes including colour, firmness, lycopene content, total soluble solids (TSS) and titratable acidity (TA) were measured by conventional methods followed in the scientific literature. Calibration models were developed following a factorial design. Different methods for spectra preprocessing such as multiplicative scatter correction (MSC), standard normal variate (SNV) and second derivative were applied. The prediction performance of the models of colour factors (RMSEP = 0.92 and  $r^2 = 0.99$  for  $a^*$ , RMSEP = 0.80 and  $r^2 = 0.97$  for  $b^*$ , RMSEP = 0.83 and  $r^2 = 0.98$  for  $L^*$ ) and firmness (RMSEP = 1.66N,  $r^2 = 0.95$ ) were excellent. The prediction quality of the model of lycopene content (RMSEP = 2.86 mg/kg,  $r^2 = 0.92$ ) was satisfactory. The models of TA (RMSEP = 0.34 mg/ml,  $r^2 = 0.59$ ) and TSS (RMSEP = 0.15 °Brix,  $r^2 = 0.55$ ) gave the lowest reliability.