Title Non-destructive Estimation of Mandarin Maturity Status Through Portable VIS-NIR Spectrophotometer

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Abstract

Sugar content is one of the most important quality attributes of citrus fruit, either for fresh or for processing market. Since sugars in citrus juice are highly correlated with total soluble solids (TSS) content, which can be determined easily even by the means of a hand refractometer, TSS is one of the most frequently used quality index. Since TSS can be measured only destructively, the results are representative only if carried out on large samples and do not allow classifying marketable fruit one by one according to their specific sugar content. Objective of this experiment was to assess possibility and limits of a non-destructive estimation of citrus fruits internal quality parameters (TSS and titratable acidity) presenting thick peel by the use of a spectrophotometric portable VIS-NIR system. Four hundred fruit of "Miho" satsuma and 150 fruit of "Page" tangelo were used. Each fruit was first subjected to spectrophotometric acquisition and soon after was juiced and TSS and titratable acidity (TA) determined. Partial least squares (PLS) regression analysis was applied for constructing a predictive model based on the spectral normalized response, constructing the model on a sub-sample and verifying the model (prediction test) on independent ones. The TA relative to Page mandarin was predicted in the test with an $r = 0.88$ and a standard error of prevision (SEP) coefficient of variability of 3.8% while the TSS scored an $r = 0.85$ and a SEP coefficient of variability equal to 4%. The TA of Miho mandarin was predicted in the test with an $r = 0.81$ and a SEP coefficient of Variability of 8.3% while the TSS scored an $r = 0.84$ and a SEP coefficient of variability equal to 5.6%.

http://www.springerlink.com/content/32015m1401691813/fulltext.pdf