Title Potential use of NIR-AOTF to monitor the postharvest life of *Zantedeschia aethiopica* flowers by correlation with MRI acquisition

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Abstract

Zantedeschia flowers were picked at the Floratoscana warehouse and stored in water or dried at 4 or 20°C for 10 days. Samplings were carried out at time 0, 3, and 10 days by cutting the basal part of the stem and the other portion half way (middle).

MRI measurements were performed on a Broker AVANCE 300 MHz spectrometer operating at a ^{1}H frequency of 300.13 MHz and equipped with cylindrical birdcage single-tuned nucleus (^{1}H) coil probehead with an inner diameter of 20.0 mm. The water signal was monitored and used for image reconstruction. Gradient-echo (GEFI) and multi-slice-multi-echo (MSME) experiments were acquired, in the first case the signal intensity is directly proportional only to the water amount, while for MSME the signal is modulated for the local transverse relaxation time, i.e. T_2, which accounts for the capability of rotating. In the case of MSME images, dark areas indicate the presence of strongly bound water molecules, while brighter zones account for weaker interactions between cellular substrate and water. NIR-AOTF Luminar by Brimrose was used on the same portion used with MRI. Dry matter was measured and correlated with the values of MRI and NIR.

The results showed that at 4°C, the middle part of the stem had always higher content in dry matter compared to the basal one without difference between water-immersed and dry flowers. At 20°C a great decrease of dry matter was observed in the basal portion during 10 days in water and MRI revealed a great tissue degradation, probably due to bacteria. The use of a special software permitted to discriminate, at 4°C, the water samples which resulted more injured than the dry ones while at 20°C all the samples showed the same level of injury. The application of NIR-AOTF gave different stem response depending on the samples and we are studying the possibility to correlate few transmittance peaks with the MRI data.