

**Title** Use of NIR-AOTF spectroscopy and MRI for quality detection of whole hazelnuts  
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#### **Abstract**

In this work, the application of non-destructive technologies for quality determination on hazelnuts during their storage has been tested. Hazelnuts of different cultivars were stored at different conditions and tested by non destructive techniques such as AOTF-NIR (portable instrument) and MRI (batch instrument). NIR analyses were performed in order to discriminate between different levels of quality, oxidized, and fresh and stored hazelnuts. The instrument was able to efficiently discriminate the high quality hazelnuts from the stored ones even directly from the spectra observation. MRI was mainly used to discriminate 'Tonda Gentile Romana' and 'Akakocha' hazelnuts during storage under N<sub>2</sub>, CO<sub>2</sub> or air (CK) at low temperature. MRI was able to discriminate in terms of T1 and T2 the various samples in accord with destructive analyses performed for measurement of water and oil status. MRI was able to discriminate fresh and stored dried hazelnuts.