

**Title** Tomato quality grading and sorting using nuclear magnetic resonance  
**Author** Y.J. CHOI, M.J. McCarthy  
**Citation** Book of Abstracts, 2004 IFT (Institute of Food Technologists) Annual Meeting and Food Expo, 13-16 July 2004, Las Vegas, Nevada, USA. 321 pages.  
**Keywords** NMR; tomato; nuclear magnetic resonance

### **Abstract**

A food plant for tomato may have several processing lines for canning, dice, paste, and juice. To maximize the product quality and the processing efficiency, tomato sorting is essential for different processing uses. Normally, tomatoes are sorted by their external appearance and maturity with electrical and mechanical devices or by hand. Although this sorting method succeeds to a certain point, it is time- and labor consuming and limited by its lack of ability to detect internal defects. Therefore, a rapid and reliable sorting method would be useful for the production. Our objective was to determine if nuclear magnetic resonance (NMR) could be used as a quality sorting or grading method for tomatoes. Three varieties of Roma type tomatoes (H8892, Halley 3155 and La Rossa) at different maturities were harvested from experimental fields located around Yolo and Colusa counties, Calif. To evaluate the maturity of tomatoes, compression tests were performed to evaluate the firmness of tomatoes using a Texture Analyzer. NMR experiments have been performed on 0.1 TMRRS spectrometer. Spin-spin relaxation time ( $T^2$ ) was measured using a CPMG pulse sequence. Generally firm tomatoes showed faster signal decay than soft tomatoes.  $T^2$  for whole tomato had a range from 900 ms to 1450 ms. A reasonable correlation has been found between  $T^2$  and the firmness of tomatoes showing  $R^2$  values of more than 0.75 for all varieties. NMR may be used for sorting tomatoes based on firmness.