

**Title** Metabolic profiling of 'Conference' pears under low oxygen stress

**Author** Romina Pedreschi, Christine Franck, Jeroen Lammertyn, Alexander Erban, Joachim Kopka, Maarten Hertog, Bert Verlinden and Bart Nicolai

**Citation** Postharvest Biology and Technology, Volume 51, Issue 2, February 2009, Pages 123-130

**Keywords** Core breakdown; GC-MS; Metabolic profiling; Metabolomics; Oxidative stress; *Pyrus communis* L

### **Abstract**

Pears (*Pyrus communis* L. cv. Conference) may develop core breakdown when stored under low oxygen or elevated carbon dioxide conditions. This physiological disorder is characterized by the development of brown spots due to oxidation of phenolic compounds, and eventually, cavities in the center of the fruit. Based on metabolic profiling of brown and sound tissue using GC-EI-TOF-MS, the hypothesis that this disorder is due to an imbalance between oxidative and reductive processes at the cellular level was investigated. Brown tissue was clearly characterized by a distinctive pattern in changes which included a decrease of malic acid and an increase in fumaric acid and gamma aminobutyric acid (GABA), which indicated a reduced metabolic activity at the level of the Krebs cycle and a putative block of the GABA shunt pathway. Increased gluconic acid concentration might be related to ascorbic acid degradation due to insufficient reducing equivalents or to an impaired pentose phosphate pathway. For the first time, GABA and gluconic acid have been shown to be metabolic markers for core breakdown. The concentrations of other compounds which are believed to be related to hypoxic stress response such as trehalose and putrescine were also considerably higher in brown tissue than in sound tissue. The concentration of some sugars which are typically found in xyloglucans also increased during brown development, possibly indicating cell wall breakdown due to enzymatic processes or chemical reactions of hydroxyl radicals.