

Title Metabolic profiling of the response of tomato cells to oxygen stress
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Abstract

To cope with postharvest storage under controlled atmosphere (CA) conditions, plant metabolism must be able to adapt to varying levels of oxygen, carbon dioxide and temperature. To further improve CA storage it is essential to understand the control and the dynamics of plant metabolism under the different storage conditions at the cellular level. To study the fast response of the metabolome to CA conditions tomato cells (*Lycopersicon esculentum*) were exposed to low levels of dissolved oxygen. Gas Chromatography-Mass Spectrometry (GC-MS) based metabolic profiling was performed to monitor the changes in soluble metabolites and ¹³C label within a 12 h time period. Limiting oxygen levels had an impact on primary metabolism with a decrease in anabolic pathways and amino acids linked to downstream glycolytic intermediates and the TCA cycle. On the other hand catabolic and antioxidant metabolism was up-regulated. ¹³C label measurement showed that metabolites which were directly involved or closely linked to the central pathway were more labeled under the different conditions.