Abstract:

The effects of three CA-conditions on ATP and ADP levels, fermentative metabolism, membrane permeability, and membrane lipid composition and alterations were investigated and related to the incidence of brown heart in ‘Conference’ pears during storage. ‘Conference’ pears developed flesh browning, core browning and cavities under all CA-conditions. Severity of these disorders depended on the CO_2 and O_2 concentrations and the lenght of storage. CA-stored pears showed lower ATP concentrations than in air, specially in ultra low oxygen combined with high CO_2. At these conditions, a low energy charge and an accumulation of ethanol and acetaldehyde as well as a strong decrease in total and free fatty acids was observed. In particular, the contents of C-16 and C-18 fatty acids were strongly reduced under CA-conditions. Most fatty acids of the polar lipids showed a slight increase followed by a decrease towards the end of storage. Neutral lipids declined initially and remained at a low levels thereafter. These results suggest the involvement of ATP in the development of pear browning possibly by limiting fatty acid biosynthesis. This in turn may alter membrane permeability and function resulting in breakdown and browning of tissues. The increased ethanol and acetaldehyde may also contribute to this process.