

Abstract:

Initial low oxygen stress (ILOS, 0.5% O₂ for 3 weeks) followed by controlled atmosphere (CA) storage at 1.5 - 3% O₂ has been shown to successfully control superficial scald (scald) in apples during long term storage. Preclimacteric 'Law Rome' apples were stored in either air, CA, or ILOS / CA regime. During the first few months of storage, internal ethanol, acetaldehyde, ethylene, and peel alcohol dehydrogenase (ADH) activity were measured to investigate the possible role of ADH in scald development. ADH catalyses the interversion of ethanol and acetaldehyde and is commonly induced under stress such as hypoxia. In this study both ILOS / CA and CA inhibited ripening and suppressed the development of scald. In addition, fruit subject to ILOS / CA produced significantly higher levels of ethanol and acetaldehyde during storage. High levels of internal ethanol were detected within one week of ILOS treatment and continued for several months after removal from ILOS into CA. ADH activity was also induced within one week in both CA treatments, and remained high throughout the storage period. Further investigations are currently underway to determine the role of ADH in scald development.