

#### Abstract:

We hypothesized that higher electron partitioning to the alternative respiratory pathway in apple fruit could lead to resistance against development of superficial scald in apples during low temperature storage. As a first step in understanding the role of the alternative oxidase (AOX) in apple, a putative AOX gene was cloned and sequenced from the skin tissue of apple fruit. The cDNA clone (AOX1) contained an open reading frame of 1020 nucleotides encoding a putative protein of 340 amino acid residues. In comparison with AOX proteins found in other higher plants, the predicted amino acid sequence of apple AOX showed its highest degree of identity with proteins from *Vigna unguiculata* (71%), *Mangifera indica* (70%), and *Glycine max* (67%). The amino-terminal of the putative AOX1 protein from apple was highly divergent in length and amino acid composition when compared to the other higher plant AOX proteins but the carboxy-terminal was highly conserved. A potential mitochondrial-targeting signal sequence was found in the amino-terminal of apple AOX1. Two cysteine residues were found at positions 113 and 163, which are conserved in the sequences of higher plants and probably are involved in the regulation of the AOX enzyme activity. Antibodies raised against the *Sauromatum guttatum* AOX enzyme recognized two bands of approximately 32 and 34 kDa from the mitochondrial protein fraction of apple skin tissue. Evaluation of the expression of AOX1 in relation to superficial scald development in apple is in progress.