Title Molecular basis of modified and controlled atmospheres storage

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Abstract

In general, plants respond to hypoxic and/or anoxic environment by an adaptive mechanism that enables survival in low oxygen stress for several days. This adaptive mechanism has been utilized by postharvest physiologists to prolong the storage life of fruit and vegetables under modified and controlled atmospheres storage. It is known that oxygen levels below those in air and/or high CO_2 prevent and/or retard the rate of ripening of climacteric fruit. The mode of action of low oxygen in preventing/delaying fruit ripening has not unequivocally understood. Studies on avocado, tomato and citrus fruit indicate that the action of low oxygen on fruit ripening is complex, involving gene suppression, induction and constitutive expression. Application of transcriptome analysis approaches laid to the isolation of novel low oxygen responsive transcripts from citrus flavedo and tomato tissues treated with low oxygen levels. A number of these genes were similar to molecules of the following functions: C-compound and carbohydrate utilization, plant development, amino acid metabolism and biosynthesis of brasinosteroids. Collectively, these data have shed new insight into functions and processes that were not previously connected with low oxygen environment and support the notion that the effects of low oxygen of fruit tissues cannot be explained only by the repression of respiration and/or by the concomitant inhibition of ethylene biosynthesis and action. Lastly, the results will be discussed in the context of the molecular basis of modified and controlled atmospheres storage. (This work was supported by FAIR95-0225 and FAJR-CT98-4096 to A.K.K.)