

An assessment of the air quality in apple warehouses: new records of *Aspergillus europaeus*, *Aspergillus pulverulentus*, *Penicillium allii* and *Penicillium sumatraense* as decay agents

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Abstract

Excessive softening of fruits during the ripening process leads to rapid deterioration. N-glycan processing enzymes are reported to play important roles during fruit ripening associated softening. Efforts have been made to identify and purify β -D-N-acetyl hexosaminidase (β -Hex) from strawberry fruit and also to investigate its function during ripening. More than that, the postharvest treatment effect of alginate oligosaccharides (AOS) at a concentration of 0.1 g L^{-1} on fruit firmness and the activity of N-glycan processing enzymes were also investigated during the storage of strawberry. Results demonstrated that the full-length of β -Hex₁ and β -Hex₂ genes were 2186 and 2013 bp, including an ORF of 1598 and 1724 bp and encoding 532 and 574 amino acids with a predicted molecular weight of 60 and 71 kDa, respectively. Moreover, β -hex enzyme activity and the expression of their encoding genes increased during the ripening of strawberry. In addition, postharvest application of AOS delayed the loss of firmness and suppressed the activity of N-glycan processing enzymes (α -Man and β -Hex) along with N-glycan processing enzymes associated genes expression resulting in delayed fruit softening. Therefore, our study suggests that N-glycan processing enzymes may play roles in strawberry softening and AOS treatment suppressed enzymes activity and preserve firmness of the fruit.