

Electron beam radiation delayed the disassembly of cell wall polysaccharides in harvested mangoes

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Abstract

Fruit softening, accompanied by cell wall polysaccharides degradation, is a common phenomenon in harvested mango (*Mangifera indica* L.) fruit. To reduce fruit's firmness loss and maintain cell wall polysaccharides of mangoes, the effect of electron beam (E-beam) radiation on firmness, cell wall degrading enzyme activities, contents of cell wall polysaccharides, reactive oxygen species (ROS), and the expression of genes involved with fruit softening were studied in harvested mangoes stored at 13 °C. As compared with untreated fruit, E-beam treated fruit at a dose of 0.5 kGy exhibited higher firmness, higher contents of cell wall polysaccharides, such as sodium carbonate-soluble pectin, hemicellulose and cellulose, as well as a lower content of water-soluble pectin, a lower activity of cell wall degrading enzymes, such as pectin esterase (PE), β -galactosidase (BG), pectate lyase (PEL) and cellulase (CEL), except polygalacturonase (PG), and lower contents of hydrogen peroxide (H_2O_2) and superoxide radical ($O_2^{\cdot-}$) during the storage period. In addition, E-beam radiation also suppressed the expression of *MIPE*, *MIPEL*, and *MiBG* genes. These results suggest that E-beam radiation retards the softening process by reducing the production of H_2O_2 and $O_2^{\cdot-}$, and that they are caused to alternate plant cell wall polysaccharides and retard the transcript level of genes involved in fruit softening in harvested mangoes.