

Title Effect of mechanical impact-bruising on polygalacturonase and pectinmethylesterase activity and pectic cell wall components in tomato fruit

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Abstract

Tomato bruise damage is a common postharvest disorder that substantially reduces fruit quality. Due to lack of detailed knowledge about bruising mechanisms, effective bruise prevention is difficult. Bruises show local tissue softening in parallel with normal textural changes. Accordingly, the underlying processes at the molecular level were studied. Alterations of pectic cell wall components (degree of methylesterification, pectin solubility properties (fractionation), size exclusion of pectin extracts) and the related enzymes (pectinmethylesterase and polygalacturonase activities) were examined in mature green to red ripe tomatoes impacted at high energy. Results showed no substantial changes in PME and PG activity with bruising, although PG activity increased significantly with ripening. The degree of demethoxylation was slightly reduced in wounded tissue 3 h after impact-bruising. Bruising did not lead to significant changes in pectin solubility or degree of polymerisation within 3 h of impact. The idea of an accelerated tissue breakdown paralleling normal ripening-associated tissue softening and initiated by mechanical injury of the fruit, is suggested and might become more pronounced with longer incubation times post-impact. Changes to the xyloglucan network are also likely to be involved.