

Title Increase in electrolyte leakage as a function of chilling stress and ripening of tomato
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Abstract

An increased rate of electrolyte leakage has been used as an indicator of physical damage to cell membranes during low temperature storage of tomato fruit. Some reports are confounded by ripening-related increases of electrolyte leakage. The objective of this study was to determine if an increase in electrolyte leakage during exposure to low temperature chilling could be independently isolated from that caused by postharvest ripening. Electrolyte leakage of three tomato cultivars ('Bloody Butcher', 'Money Maker' and a high lycopene line) was studied. The study included a comparison between stored discs and freshly-isolated discs from stored fruit. Pericarp discs that were excised from mature-green tomatoes and stored at 6°C showed no changes in electrolyte leakage, whereas discs stored at 20°C exhibited increased electrolyte leakage during the first 7 days of storage. When colour was used as indicator of ripening, the increase in electrolyte leakage during non-chilling (20°C) storage could be attributed to ripening. When fruit was harvested at the pink stage, ripening related increases in electrolyte leakage were more severe than in mature-green tomatoes. Fresh cut discs from stored tomatoes had lower electrolyte leakage than stored discs with same colour score suggesting "ageing" of discs could also contribute to the increased electrolyte leakage. Significant increases in electrolyte leakage were observed in both the stored discs and freshly excised discs from stored fruit at 2.5°C without significant ripening (colour change) if stored for longer than 7 days. Electrolyte leakage of freshly-isolated discs from longer-term stored fruit increased further during a post chilling period at 20°C. Results indicate that electrolyte leakage in mature-green tomatoes increased with chilling independently of ripening during long term storage.