

# Senescent sweetening in potato (*Solanum tuberosum*) tubers is associated with a reduction in plastidial glucose-6-phosphate/phosphate translocator transcripts

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## Abstract

Senescent sweetening results in the accumulation of reducing sugars in potato tubers following extended periods of storage at moderate temperatures used to avoid the separate condition of cold-induced sweetening. It represents a significant problem for the potato processing industry due to the development of dark fry colour and the accumulation of acrylamide in processed products. Previous studies have implicated oxidative stress in the accumulation of reducing sugars in potato tubers over long term storage. However, in the present analysis we found no evidence for a correlation between oxidative stress as estimated from quantification of hydrogen peroxide, lipid peroxidation or activity of redox enzymes and the accumulation of reducing sugars. On the contrary, transcriptional profiling indicated changes in carbohydrate metabolism were associated with the onset of senescent sweetening and qRT-PCR indicated that reduced abundance of transcripts encoding a plastidial glucose-6-phosphate/phosphate translocator was widely observed during sweetening onset in multiple genotypes. Our data suggest that reduction in the capacity of plastids to import glucose-6-phosphate reduces the capacity for starch resynthesis in the stored tuber thereby shifting the metabolic balance towards starch turnover resulting in reducing sugar accumulation.