Title Wounding increases glycolytic but not soluble sucrolytic activities in stored sugarbeet root

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Abstract

The wounding of sugarbeet (*Beta vulgaris* L.) roots by harvesting and piling operations increases the demand for sucrolytic and glycolytic products for wound-healing processes. To determine if sucrolytic and glycolytic enzyme activities increase to meet this demand and to identify those activities that may be induced, the activities of the major sucrolytic enzymes and the major regulatory enzymes of the glycolytic pathway were determined in wounded and unwounded sugarbeet roots during 13 days of storage at 10 °C. Activities of the enzymes responsible for catalysis of the first two reactions of the glycolytic pathway, hexokinase, fructokinase and phosphofructokinase, were elevated in wounded roots. Activities of the sucrolytic enzymes, sucrose synthase, alkaline invertase, and soluble acid invertase, and the glycolytic enzyme, pyruvate kinase, did not increase in wounded roots. The activities of the early glycolytic enzymes peaked 24–48 h after wounding when the demand for substrates for wound-healing processes was expected to be maximal. Fructokinase exhibited the greatest and most persistent increase in activity, increasing by 150%, 24 h after wounding and remaining elevated for the duration of the study. The increase in hexokinase, fructokinase, and phosphofructokinase activities suggests that expression of these early glycolytic enzymes may be up-regulated to meet the demand for glycolytic intermediates and products for wound-healing processes. The lack of an increase in any sucrolytic activities in response to wounding suggests that sucrolytic flux is not determined by the quantity of active protein present in the root, but by some undetermined mechanism.