

Title Effects of *Aphanomyces* root rot on carbohydrate impurities and sucrose extractability in postharvest sugar beet

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Abstract

Sugar beet (*Beta vulgaris*) roots with rot caused by *Aphanomyces cochlioides* often are incorporated into storage piles even though effects of disease on processing properties are unknown. Roots with *Aphanomyces* root rot were harvested from six fields over 2 years. For each field, roots with similar disease symptoms were combined and assigned a root rot index (RRI) value (0 to 100; 0, no rot symptoms; 100, all roots severely rotted). After 20 or 120 days storage at 4°C and 95% relative humidity, concentrations of the major carbohydrate impurities that accumulate during storage and sucrose extractability were determined. Root rot affected carbohydrate impurity concentrations and sucrose extractability in direct relation to disease severity symptoms. Generally, roots with active and severe infection (RRI \geq 85) exhibited elevated glucose and fructose concentrations 20 and 120 days after harvest (DAH), elevated raffinose concentration 120 DAH, and reduced sucrose extractability 20 and 120 DAH. Roots with minor or moderate disease symptoms (RRI 20 to 69), or damaged roots with no signs of active infection, had similar carbohydrate impurity concentrations and sucrose extractability after 20 and 120 days storage. Processing properties declined when RRIs exceeded 43, as determined by regression analysis, or when storage duration increased from 20 to 120 days. Results indicate that both disease severity and anticipated duration of storage be considered before *Aphanomyces*-infected roots are incorporated into storage piles.