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Postharvest Technology/Biological Pest Control

INFLUENCE OF STORAGE ON SWEETPOTATO SUGAR CONTENT

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Abstract: Sweetpotato (*Ipomoea batatas*), is a tuberous root crop native to South America and cultivated by the ancient Incas in Peru. Sweetpotato is one of the ground provisions grown in the Caribbean. Consumers want their sweet potatoes to be sweet. Sweetpotatoes require a postharvest curing to set the skin prior to storage. The objective of this study was to determine the influence of time and temperature on the postharvest sugar content of ten sweetpotato varieties. Soluble sugar content was determined at harvest using a garlic press and refractometer. The tuberous roots were cured at room temperature for five days then place at 40^{o}F, 60^{o}F and room temperature (~80^{o}F). Nine varieties had a soluble sugar content of 4-6% Brix while 'VIP' was at 8.5% brix at harvest. The soluble sugar content more than doubled after two weeks of storage. There was only a small change in sugar content between the second and fourth weeks. While all three temperatures resulted in increased sugar content the room temperature and 60^{o}F resulted in higher soluble sugars than 40^{o}F. Postharvest storage of sweetpotato results in a significant increase in sugar content within two weeks. This research was supported by USDA-NIFA-Regional Hatch.

Keywords: *Ipomoea batatas*, Curing, Storage Temperature, Soluble Sugars

INTRODUCTION

Sweetpotato is a very important crop in the United States and the Caribbean. Where sweetpotatoes are produced in the USA, freshly harvested roots are referred to as "green" and are usually not as sweet as cured sweetpotatoes. Most roots are cured immediately after harvest to improve flavor and storage life. Curing is holding sweetpotatoes at warm temperatures for a week to heal cuts and reduce decay and shrinkage in storage. Curing also converts some starches to sugars and enhances flavor. The University of Virgin Islands at the Agricultural Experiment Station has selected nine sweetpotato varieties with weevil resistance. These varieties have early production with harvest between 90 – 120 days. However, the sugar content is low at harvest. The objective was to study the effect of curing and postharvest storage temperature on the soluble sugar content in sweetpotato over time.

MATERIALS AND METHODS

Nine sweetpotato varieties obtained from the USDA germplasm repository, Louisiana State University and local sources were grown and harvested under normal conditions. The nine sweetpotato varieties were 'Beauregard-14' (B-14), 'Liberty', 'Virgin Island Purple' (VIP), 'Francia', 'Toquecita', 'Murasaki', 'Mojave', 'Saint Kitts' (StK) and 'Pujol' were stored for 5 – 7

days at ambient temperature followed by storage at 40, 60 and 80°F for 28 days. Sugar content data were taken weekly from the center of three sweet potatoes weekly. The 2 cm^3 tissue section was placed in a garlic press and squeezed to extract a few drops of juice. The squeezed juice was collected on the surface of a refractometer to determine the soluble sugar content (%Brix). Data was collected weekly from harvest to 35 days.

RESULTS AND DISCUSSION

Eight sweetpotato varieties had a low sugar content at harvest that range between 4.5 to 7% Brix (Fig. 1 - 3) except for 'VIP' which started at 11% Brix (Fig. 4). 'VIP' is a new sweetpotato with both purple skin and flesh indicating that it is high in bioflavonoids and antioxidants. 'B-14' is a variety with tan skin and orange flesh most often grown in the USA. 'Liberty' is a new red skin cream flesh variety developed for drought tolerance and weevil resistance. 'St Kitts' source is indicated in its name has irregular tuberous roots that with pink skin and light orange flesh.

CONCLUSIONS

Sweetpotatoes require a postharvest curing to allow the skin to set but also to allow the after-ripening of the development of higher sugar content. All postharvest storage regimes resulted in an increase in soluble sugar content over time. Therefore, one doesn't need refrigeration to obtain a sweeter sweetpotato following harvest. However, storing sweetpotatoes at 60°F resulted in the greatest increase in soluble sugar content over time for all varieties examined. Sweetpotato, being a tropical plant, may be susceptible to chilling injury at temperatures near 40°F. The storage temperature at 60° F is an excellent post-harvest technique that farmers and backyard gardeners of the US Virgin Islands can produce early weevil-free sweetpotatoes and get the sugar content required for commercial sales that consumers expect.

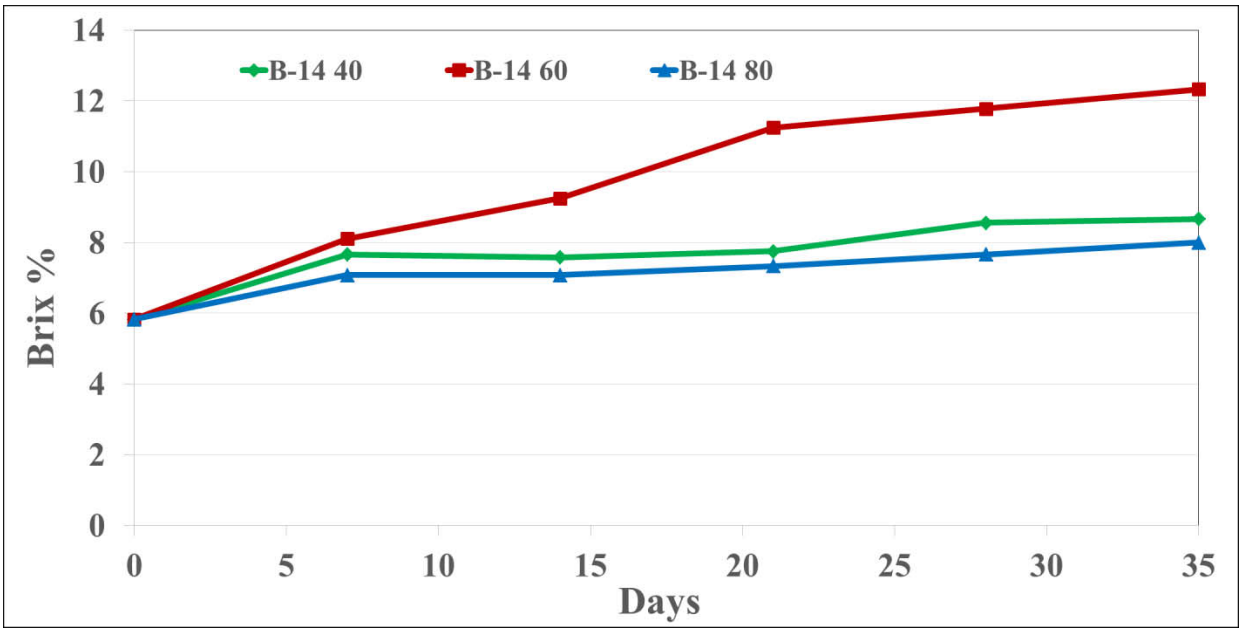

Fig. 1. Postharvest changes in 'Beauregard-14' sugar content over time.

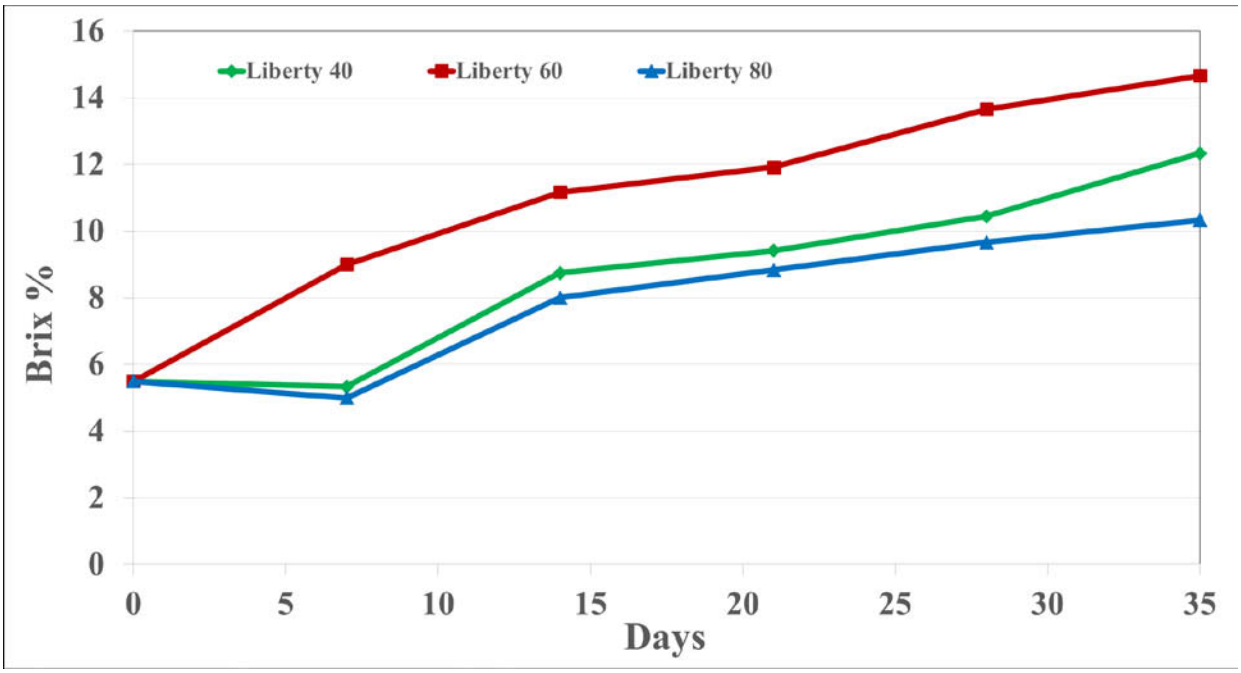

Fig. 2. Postharvest changes in ‘Liberty’ sugar content over time.

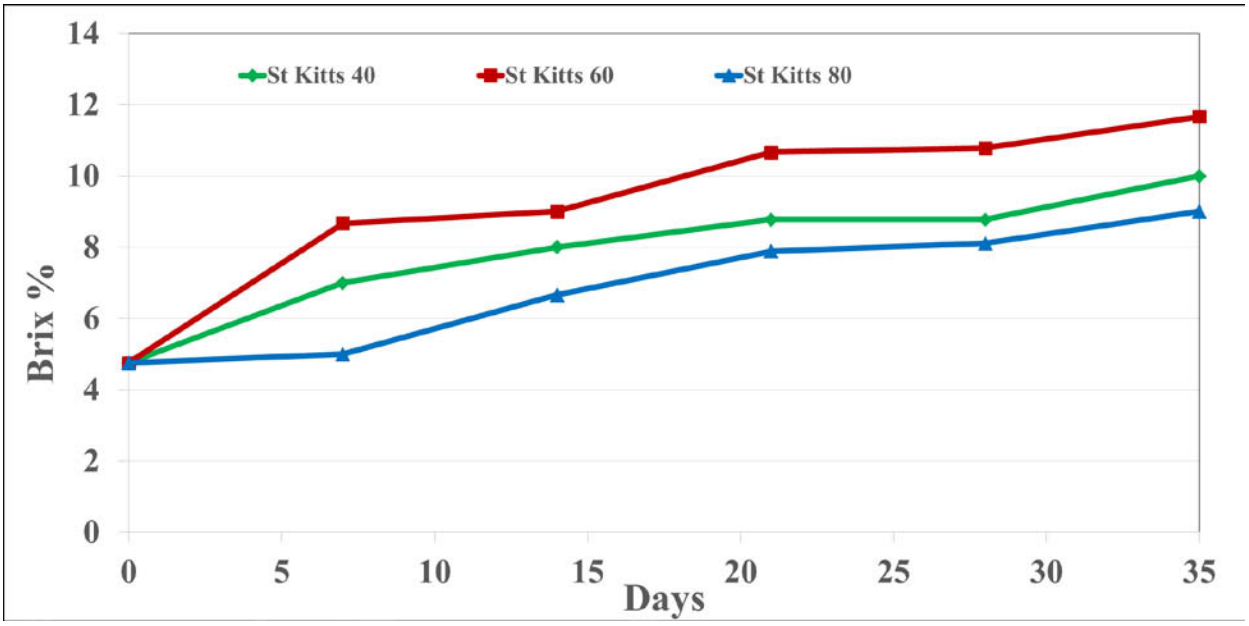

Fig. 3. Postharvest changes in ‘St Kitts’ sugar content over time.

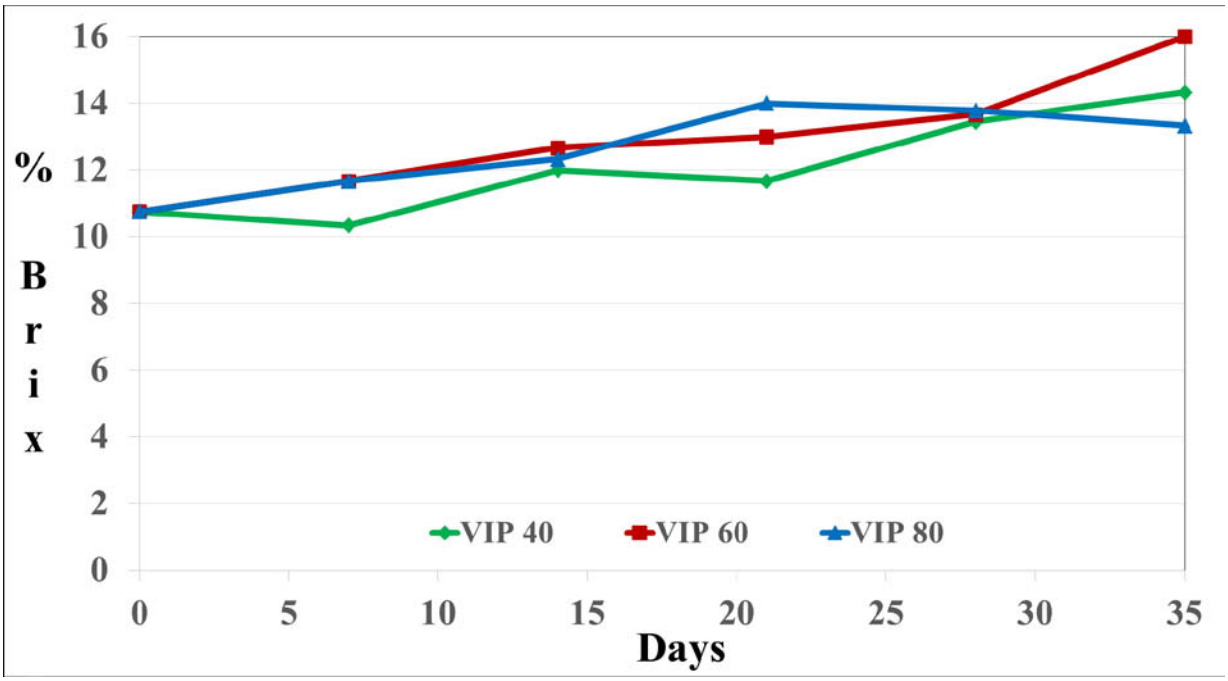

Fig. 4. Postharvest changes in ‘VIP’ sugar content over time.