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Post Harvest Compositional Changes of Yacon Roots (*Smallanthus sonchifolius* Poepp & Endl.) as Affected by Storage Conditions and Cultivar

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Abstract

Yacon (*Smallanthus sonchifolius* POEPP. & ENDL.) is an under-exploited native root crop of the Andes, growing mainly in warm temperate valleys at altitudes up to 3200 m. It has sweet roots, which are low in calories as they contain oligofractans as the main component of dry matter, a carbohydrate the human body has no enzyme to hydrolyse. Rural farmer communities are beginning to extend the cultivation and processing of yacon roots into syrup, which is a source of alternative sweetener for the booming health food market. As oligofractans in Yacon tend to depolymerize into reducing sugars fairly quickly during storage, post harvest compositional changes of the root are a concern to producers and processors.

To gain more knowledge about the physiological processes during storage, two experiments with three local Peruvian varieties were conducted. The first experiment aimed at determining the influence of temperature under farmers' conditions between harvest and processing. Therefore the effect of short-term storage at different altitudes with the traditional exposure to sunlight to increase sweetness of roots was examined. The second experiment under controlled conditions addressed the long-term storability of yacon roots for potential export. Carbohydrate composition of different treatments has been determined through enzymatic analysis.

Results indicate that partial hydrolysis of oligofractans takes place shortly after harvest, leading to larger amounts of reducing sugars (fructose, glucose, sucrose). The greatest sugar conversion was reached under high temperatures and strong solar radiation, resulting in sweet, dried fruit like roots. At constant low temperatures on the other hand, a good storability and decelerated oligofractan turnover took place. To obtain a fructan rich syrup roots should be processed as soon as possible after harvest. This requires adequate community-based processing facilities in rural areas, allowing farmers to add value to agricultural output. Ecological cultivation and processing of yacon has a promising potential to increase farmers' income in low input small-scale Andean cropping systems in the near future.

Keywords: Alternative sweetener, marginal Andean root crop, oligofractans, sugars, Yacon