The sugars content of parental and new perspective descendant strawberry genotypes – potential approach for the future selection process

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Introduction

Besides being one of the most commercially grown berry fruits, strawberries (*Fragaria x annanassa* Duch.) are known for their nutritional value, richness in polyphenols, and antioxidant capacity. New directions of strawberry breeding and selection are set towards premium fruit quality, high sugars content, and desirable sugars/total acids ratio (sweet index, SI), which represent some of the main prerequisites for selecting new breeding materials.

Methods

High-performance anion-exchange liquid chromatography system with pulsed amperometric detection was used to analyze sugars and sugar alcohols. Chromatographic measurement was performed using Dionex ICS 3000 DP LC system equipped with a quaternary gradient pump and electrochemical detector, which consisted of Au as the working electrode and Ag/AgCl as reference electrode, autosampler (AS-DV) and Chromeleon software.

Conclusion

Total of eleven sugars were quantified using HPAEC-PAD. Glucose and sucrose were higher in parental varieties, whereas higher sorbitol and melibiose content was observed in descendant varieties. These sugars could potentially be used for differing between parental and descendant strawberry genotypes. Moreover, this research shows importance of the sugar profile for improving the potential approach in genotypes selection process.

Results and Discussion

Set of 24 strawberry genotypes was cultivated, including 12 parental varieties and 12 of their descendants - perspective candidates obtained by crossing the parental varieties mentioned above. Results implied that glucose, sorbitol, sucrose, and melibiose content were the most important sugars in separating the fruits of parental varieties and their progeny. Results showed that old, parental varieties had a significantly higher content of glucose and sucrose, while new perspective genotypes had higher sorbitol and melibiose content (Fig.2). PCA analysis confirmed that parental (samples 1-12) and descendant genotypes (samples 13-24), could be discriminated according to sugars profile i.e. that these four sugars have an effect on their differentiation (Fig.1). This was in accordance with Mann-Whitney U test results (Fig.2).

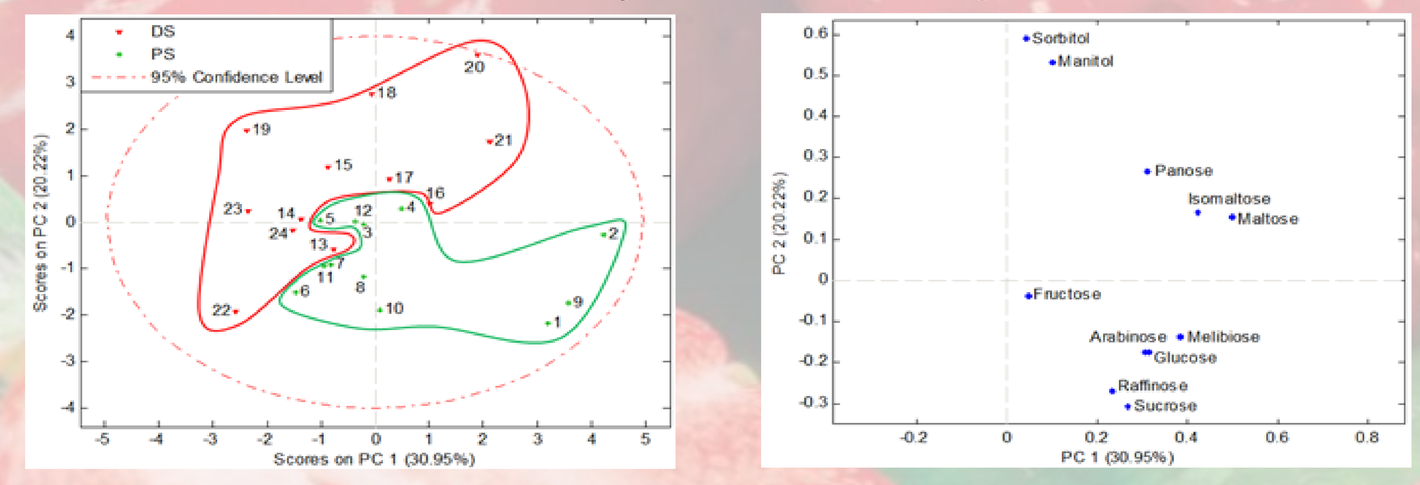

Fig.1. Principal Component Analysis - The difference between parental and descendant genotypes; score plot (A) – parental samples (PS) 1-12, descendant (DS) samples 13-24, and loading plot (B) – sugar components

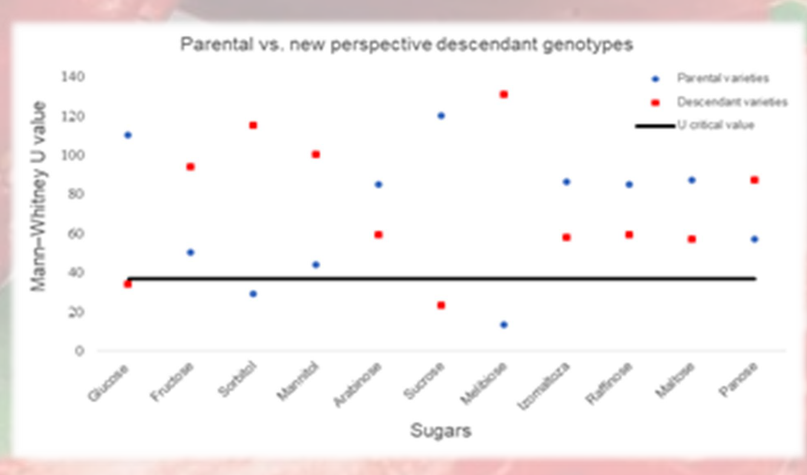

Fig. 2. Mann-Whitney U-test sugar content results - comparison between genotypes

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