DIFFERENCE ANALYSIS OF RESISTANT STARCH ACCUMULATION IN BANANA FRUITS

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ABSTRACT

Bananas are well known as good sources of starch. Resistant starch (RS) is a functional component having health care function. 'Cavendish' and plantain bananas were used to investigate the influences of hydrolases and granule structure on starch degradation. The levels of RS, non-resistant starch (non-RS), total starch, and amylose content during the fruit-ripening process were determined. For starch-synthesis, yeast one-hybrid assay, Real Time q-PCR, double luciferase experiment, banana genetic transformation were used to screen and verify the transcription factors regulating the synthesis of RS in developing banana fruit. For banana starch processing, the physicochemical properties of starch were analyzed from 3 banana cultivars and potato as comparison. Compared to 'Cavendish', plantain had a higher content of total starch and RS, a faster starch-degradation rate, and a lower decrease in the ratio of RS/total starch. Two a-amylases, one starch phosphorylase, and one starch debranching enzyme were specifically upregulated in plantain, which might hydrolyze more non-RS compared with Cavendish; *MaGBE4* was specifically upregulated during banana fruit developing, 5 transcription factors were selected, which might regulate starch synthesis by binding *MaGBE4*; Banana starch had higher gelatinization temperature than potato starch, which corresponded to the rich resistant starch in banana and in conclusion there are differences in the synthesis and degradation of resistant starch among different banana varieties. Transcription factors can regulate the synthesis of resistant starch by regulating the activity of *MaGBE4*. The resistant starch in banana has great potential for processing.

Keywords: banana; resistant starch; transcription factors; processing