

# Harvest maturity affects the browning of fresh-cut potatoes by influencing contents of amino acids

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## Abstract

Browning is the major issue affecting the quality and shelf-life of fresh-cut potatoes. In this paper, in order to study the influences of maturity on browning and its mechanism, potatoes were harvested at three different stages, and the browning degrees, related physiological and biochemical properties of potatoes were evaluated. The results showed that with the increased maturity, potatoes are more prone to browning. However, polyphenol oxidase (PPO) activities of late harvested potatoes were lower than early and middle harvested ones, and main PPO genes expressed significantly higher in early harvested potatoes than in middle and late harvested ones. Generally, the antioxidant capacity was enhanced with the increase of maturity, which was not in line with more browning of late harvested potato. The content of total free amino acids (FAAs) increased significantly in late harvested potatoes, and adding the differential contents of total FAAs aggravated the mash browning of early harvested potato. Accumulation of each FAA also increased significantly with the development stage from middle to late harvest date. Addition of differential amino acids showed that isoleucine and other eleven amino acids can inhibit the browning of potato mash, but serine, lysine and tyrosine, especially tyrosine, promoted the browning degree significantly. Results demonstrated that harvest maturity affects the browning of fresh-cut potatoes by influencing the accumulation of FAAs especially tyrosine, not by PPO activity and antioxidant capacity. This research comprehensively elucidated why the potatoes with different maturities have different browning degrees.