

Title Glycoalkaloid concentrations of California-grown potatoes in relation to cultivar and simulated retail handling conditions

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Abstract

Due to increased use of plastic packaging for special potato cultivars, greening of tubers under retail conditions can be a significant problem. Chlorophyll synthesis in the skin is associated with, but biochemically independent of, changes in glycoalkaloid concentrations. Greening is apparent in white and yellow skin potatoes, but obscured in red skin potatoes. Potatoes of different cultivars were analyzed within a few days of harvest for % dry weight and glycoalkaloid concentrations. For the simulated retail study, red and white skin potatoes (cv Cal Red, Cal White, Durango, VC1015, Yukon Gold, Latona, A94381, and Satina) were harvested from 3 locations in California, washed, sorted, and held at 20C in the dark or exposed to light (90 cm below cool-white) fluorescent GE Watt-Miser 34W bulbs, -1300 lux). Tubers were evaluated for external color (L*a*b* color values), skin chlorophyll concentration, % dry weight, and glycoalkaloid concentrations after 0, 3, 6 and 9 days. Glycoalkaloids were extracted from freeze-dried potato slices with periderm and analyzed by colorimetry and/or by HPLC. Initial glycoalkaloid concentrations varied greatly among the 25 cultivars tested (1 to 15 mg/100g fresh weight), with cv Cal Red consistently having some of the highest concentrations. Tubers of most cultivars stored in the dark had no or a slight increase in glycoalkaloid concentrations. Light exposure resulted in increased glycoalkaloid concentrations in all cultivars, but some varieties had negligible changes (e.g. Yukon Gold) while in others concentrations increased as much as eightfold (e.g. cv. Cal White). Although discarding potatoes with green skins is still a wise recommendation, our results show that substantial increases in these toxic compounds can occur even in the dark in some cultivars. Conversely, some varieties (e.g. Yukon Gold, Satina) show severe greening without a notable increase in glycoalkaloids.