Abstract

Potatoes Can't Take the Heat: Effects of Cultivar and Processing on Global Metabolite/Nutritional Profiles

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Color-fleshed potato consumption increased in the last decade due to their putative health benefits. Our previous work suggests cultivar and processing alter potato anti-cancer bioactivity, but the effect of cultivar vs. processing on potato nutritional quality is largely unexplored. We hypothesized that interaction between cultivar and processing would determine the metabolite/nutrient composition of potato products. To test this, we compared metabolite profiles (UPLC-QTOF-MS[E]) and determined vitamin C levels (HPLC-PDA) in 6 potato cultivars (2 white, 2 red, 2 purple) processed via 6 methods (raw, baked, steamed, microwaved, chipped, fried). Clear separation of samples by processing method in principal component analysis demonstrated processing had a more pronounced effect than cultivar on global metabolite profiles. Differences for the majority of metabolites (766 of 1,151 total identified metabolites) were due to a combination of cultivar, processing, and their interaction. Cultivar/processing type was predicted with > 90 % accuracy via a regression analysis based on decision trees, demonstrating substantial differences between the groups. Vitamin C results followed a similar trend as major differences were due to processing over cultivar (raw > baked = steamed = microwaved > chips > fries at $P \leq 0.02$).

Our findings suggest understanding of interaction between cultivar and processing will help to develop food products with predictable health benefits. (Oral Graduate Student Competition, Utilization and Marketing, PAA Membership # 1516)