

Isolation of five carotenoids from tangerine tomatoes using preparatory HPLC-PDA for use as analytical standards

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Tomatoes are widely consumed in the American diet, and epidemiological data suggest health benefits from consumption. It is hypothesized that these observed health benefits may be caused by carotenoids, a class of pigments widely found in fruits and vegetables. Well-known carotenoids include beta-carotene and lycopene. The tangerine tomato is an orange colored tomato; its color difference can be attributed to a different combination of carotenoids compared to red tomatoes. Some carotenoids present in tangerine tomatoes are suggested to be more bioavailable. The goal of this project was to isolate five carotenoids from tangerine tomatoes to use as authentic standards, as these compounds are not readily available for purchase. To be able to assess bioavailability or bioefficacy, these carotenoids must be quantified in animal and/or human blood and tissues after ingestion of tangerine tomatoes. Authentic standards of each carotenoid must be available in order to determine the amount present in the samples. Phytoene, phytofluene, ζ -carotene, neurosporene, and tetra-*cis* lycopene were extracted from tangerine tomatoes using nonpolar solvents. These compounds were separated and fractionated using preparatory high performance liquid chromatography with photodiode array detection (HPLC-PDA). The fractions from the column were then analyzed using HPLC-PDA to assess purity. These five purified carotenoid standards will be used to assess bioavailability differences between red and tangerine tomatoes in humans. Additionally, these standards will be used to quantify carotenoids in serum and tissues from other pre-clinical and clinical studies involving red and tangerine tomato diets. Isolating carotenoid standards will allow continued research on the effects of tangerine tomato consumption on health.