Abstract

Carotenoids have diverse biological function and actions in plants and animals. Carrots are one of the most important sources for dietary intake of vitamin A for human. Common carrots mainly contain betacarotene and alpha-carotene. Concentration of these pigments can be determined by HPLC but this takes time and is expensive. We have developed a simple and inexpensive method for estimating concentration of alpha-and beta-carotene in acetone extract of carrot. The principle of this method is similar to that of the chlorophyll determination written in the Official Methods of Analysis by AOAC. The two pigments, alpha-carotene and beta-carotene have specific absorption spectra having maximum absorption at 444 nm and 453 nm respectively and each having the same absorption coefficient at 475 nm. Assuming that a solution contains only alpha-carotene and beta-carotene, the absorption at a specific wavelength can be expressed as the sum of each pigment. The relationship between concentrations and absorption's at the specific wavelength are integrated into equations. Solutions of these equations are tested and modified in order to obtain a good correlation with the values determined by HPLC, using acetone extracts of carrots (n=53). Total carotenoid concentrationcan be expressed as a first-degree equation of absorbance at 475 nm. A high correlation coefficient (r=0.978) is found between calculation and analysis by HPLC. Concentration of beta-carotene can be expressed as a first degree polynomial equation of absorbances at 444 and 453 nm (r=0.929). Alpha-carotene concentration can be expressed as an equation of absorbances at 444, 453, and 475 nm (r=0.939). The application and efficiency of this technique will be discussed in detail.