



## Improved liquid chromatographic method for determination of carotenoids in carrot

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Carotenoids are a large class of plant metabolites with a function of either essential nutrients or health promoting compounds for humans. Carrot root is a well-known and significant source of dietary carotenoids, mainly:  $\alpha$ - and  $\beta$ -carotene, lutein and lycopene. These pigments are the main carotenoids separated and quantified routinely by HPLC analysis. However, little is known about minor carotenoids, carotenoid esters and the carotenoids present in leaves despite their potential interest in metabolic and physiological studies. Previous works used C-18 columns but these stationary phases provide a poor resolution of structurally similar compounds and geometrical isomers. In recent years, C-30 columns have been developed and successfully applied at the separation of carotenoids from various plant materials, the number of resolved carotenoids being significantly improved. Based on literature procedures, we have developed a HPLC-DAD method with a C-30 column, adapted to the quantification of carotenoid compounds from carrot roots and leaves. A simple and rapid extraction method was optimized for both these types of samples on a panel of 5 genotypes displaying distinct root colours (different carotenoid composition and contents). Carotenoids from roots were separated in 23 minutes while carotenoids and chlorophylls from leaves were separated in 42 minutes. Compounds were identified according to their retention time and UV-visible spectrum in comparison with authentic standards (analysed individually and in combination, in the same conditions), or with data from literature, when standards were unavailable. Results showed that carrot root exhibited a simple profile with only 1 to 3 main carotenoids whereas a more complex composition was noticed in leaves, containing both identified and unidentified carotenoids and chlorophylls. Moreover, the composition was quite conservative for leaves but depended on the genotype for roots.

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