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Profiling and quantification method for flavanoids using High Performance Liquid Chromatography (HPLC)–Diode Array Detector (DAD)–Mass Spectrometry (MS)

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Flavonoids and phenolic acids are the most common and widely distributed of the plant secondary metabolites. Quantitation of these compounds is very challenging primarily due to the tremendous variety of phenolic compounds (some estimates are as high as 8000 different structures for flavonoids) and lack of standards (less than 3% are available commercially). Even with the availability of standards, maintaining an appropriate collection in any laboratory would be a logistical and financial impossibility. Currently three kinds of methods are generally used for flavonoids quantitation: 1. Wet chemistry and spectrometric methods; 2. HPLC with UV or mass spectrometry detectors total flavanoids: Measure aglycones hydrolyzed from flavonoids and 3. HPLC with UV or mass spectrometry detectors for individual flavanoids: Limited to the availability of the reference standards. None of the three methods are adequate for quantification of total flavonoids in foods. The Food Composition and Method Development Laboratory of USA have developed a revolutionary approach for flavonoids profiling and quantitation in foods. First, profiling of the flavonoids in foods is performed, then the flavonoids existed are categorized into the following groups: Flavonol 3-O- or 3,7-O-Glycosides, Hydroxy cinnamic Acid Derivatives and Flavones can be quantified at λ max 354 nm using one single standard, such as rutin, Benzoic Acids and Hydrolyzable Tannins can be quantified at λ max 260 nm using one single standard, such as gallic acid, Catechin and Derivatives (Flavanols, Catechins, and Proanthocyanidins) can be quantified at λ max 278 nm using one single standard such as catechin or epicatechin, Isoflavones can be quantified at λ max 260 nm using one single standard such as genistein or genistin, Flavanoids can be quantified at λ max 260 nm using one single standard, such as hesperitin, Flavvolnol Aglycones and 7-O, e-O, and 8-O glycosides can be quantified at λ max 260 nm using one single standard, such as quercertin. The methods can provide both the profile and quantification information. It is the most comprehensive analytical method for flavonoids determination available.

Biography

Pei Chen is currently a research chemist in food composition and methods development lab at USDA, USA.

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