

Method development for the simultaneous extraction and quantification of B-group hydrosoluble vitamins in foods using HPLC-MS²

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Abstract

Vitamins are essential for health but most of them are not synthesized by humans. Thus, vitamins have to be introduced through diet. Vitamins are an added value for food products. Their labeling requires identification and quantification. For that purpose, HPLC with UV or fluorimetric detections has been intensively used in the last years. These methods usually require specific chromatographic conditions for each vitamin, which is time consuming and expensive. Despite the democratization of analytical approaches such as mass spectrometry, the simultaneous determination of B-group vitamins remains challenging due to several reasons: i) their different structures and chemical properties; ii) their low stability; iii) their presence at trace levels in foods; iv) the complexity of food matrices. These features make it difficult to develop a single method for the simultaneous extraction, separation and quantification of B vitamins in foods. This work aims at combining a single enzymatic extraction step, with a single chromatographic run using ESI-MS² (MRM mode) to evaluate B vitamin content in foodstuffs. The design of experiments was used to determine the optimal pH and temperature conditions for the simultaneous extraction of B1, B2, B3 (nicotinic acid, nicotinamide), B5 (pantothenic acid), B6 (pyridoxine, pyridoxal, pyridoxamine) and B8 (biotin, biocytin) from food matrices. The efficiency of the procedure was investigated on four matrices (liver, yeast, powder milk, peas) and results were compared to the individual protocols. Results were conclusive and prefigured a good chance to develop an efficient multivitaminic protocol.

Biography

Julie Le Grandois has completed her PhD in Analytical Chemistry in 2009 from University of Strasbourg (France). She is now Research Scientist in charge of the development of analytical methods at Aérial. She has published 11 papers in peer-reviewed journals.

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