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Green analytical strategies for selenium determination using both chromatographic and spectrometric methods

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Selenium is an essential trace element in animals and humans. Compared to other micronutrients, there is a much narrower range between the normal concentration and the toxic amount of selenium in living organisms. The inorganic forms of selenium (selenate, selenite) present up to 40 times higher toxicity than the organic species (*e.g.* selenocysteine, selenomethionine). Due to these considerations, a sensitive method is required for detection of selenium compounds in biological samples.

Development of greener, more sustainable, and ecofriendly methods for sample decomposition coupled with advanced miniaturised analytical techniques are future promising scientific activities for analytical chemistry. Although less explored recently, methods based on combustion with oxygen are excellent alternatives with potential great superiority over classical strong acids and oxidants-based sample digestion methods due to its high greenness degree, simplicity, speed, sample size and safety. Since the combustion takes place in a completely closed system, no analyte is lost, even the most volatile ones and the interference of organic matter is completely inexistent because the combustion takes place at very high temperatures.

In the present work, a simple and green version for oxygen rich combustion sample dissolution method using an oxygen flask prefilled with oxygen and a platinum-based catalyst is used for the decomposition of food type certified reference samples. Following this step, the samples are analysed using a small-sized electrothermal vaporization capacitively coupled microplasma optical emission spectrometry. For the validation of this method, other previously known methods—fluoresence spectrometry and high performance liquid chromatography—that have been employed as well.

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