

Exploring the advantages of the ex-situ electrochemical determination compared to the in-situ: the case of catechin

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Abstract

Electrochemical determination methods play a crucial role in multiple fields like analytical chemistry, pharmaceuticals, and food science. The focus of this research is to compare the benefits of ex-situ electrochemical determination with in-situ techniques, specifically regarding the analysis of catechin in wine. Catechin is a natural polyphenolic compound found widely in plants and beverages, known for its health benefits and antioxidant properties.

Conventional in-situ electrochemical measurements involve directly analyzing samples at the electrode surface, providing real-time information. However, this approach presents challenges such as electrode fouling and interference from complex sample matrices. On the other hand, ex-situ electrochemical determination indirectly measures an analyte in a solution that does not contain it. This method offers several advantages, including improved sensitivity, selectivity, and reduced matrix effects. Our findings indicate that ex-situ electrochemical determination exhibits higher sensitivity and selectivity for detecting catechin, enabling accurate quantification even in complex sample matrices.

In summary, this study demonstrates the advantages of ex-situ electrochemical determination compared to in-situ techniques for analyzing catechin in wine. These findings emphasize the potential of ex-situ approaches in enhancing the accuracy and reliability of electrochemical analysis for catechin and similar compounds in various applications.