SIMULTANEOUS ELECTROCHEMICAL DETERMINATION OF ORTHO-DIPHENOLS, MONOPHENOLS AND TOCOPHEROLS IN OLIVE OIL SAMPLES IN ORGANIC MEDIUM

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Extra-virgin olive oil (EVOO) is characterized by the presence of a considerable amount of molecules that show antioxidant activity. These are both semipolar, such as polyphenols and apolar, such as tocopherols. The antioxidants of EVOO are responsible for important features of the product both at nutritional and technological levels. Their determination is usually performed by HPLC: reverse phase columns are used for polyphenols detection, requiring an extraction step (either SPE or LLE) while normal phase columns are employed for tocopherols. The class of polyphenols can also be determined by colorimetric method. However, among polyphenols, ortho-diphenols and monophenolsexhibit a different antioxidant activity and are involved in different sensory characteristics;therefore, their determination as separate classes is highly desirable. In this communication we present the development of an electrochemical assay combined to chemometric data analysis for the simultaneous determination of ortho-diphenols, monophenolsand tocopherols using glassy carbon working electrode and differential pulse voltammetry (DPV) as the electrochemical technique. The main feature of the developed protocol is that the analysis does not require extraction steps: the sample is simply diluted in a mixture of hexane and ethanol, using tetrabutylammonium acetate as supporting electrolyte. Three consecutive scans were performed in the range from 0.0 to +0.8 V vs Ag/AgCl, in order to obtain information from the evolution of the voltammetric pattern. The corresponding signals were then used as descriptor variables to build multivariate calibration modelsbyPartial Least Squares (PLS). Different signal preprocessing methods were tested, allowing to predict the actual concentration values (measured via HPLC) of ortho-diphenols, monophenols, and tocopherols with acceptable accuracy. The results obtained in prediction of an external test set, combined with the easy sample handling and measurement protocol, makes this approach an interesting measuring strategy of the total antioxidant profile of EVOO samples.