Electrochemical diversity of italian white wines

Analysis of phenolic compounds typically involve spectrophotometric methods as well as liquid chromatography combined with DAD, fluorimetric, or MS detection. However, the complexity of wine phenolic composition generated, in recent years, attention towards other analytical approaches, including those allowing rapid and inexpensive operations. Voltametric AIM Oxidation of white wine phenolics occurs at different stages during winemaking and storage and can have important implications for wine sensory quality. Phenolic compounds, in particular those with a ortho-diphenol moiety, are main target of oxidation in wine. Strategies for the methods are particularly suited for the analysis of oxidizable compounds such as phenolics. The redox-active species can be oxidized and reduced at the electrode, therefore, applications of electrochemistry have been developed both to quantify such species, and to probe wine maturation processes.3 The project on the diversity of Italian wines aims at collecting and analysing large-scale compositional dataset related to Italian white wines. METHODS The electrochemical properties of wine phenolics, and relative reducing strengths, have been examined using Cyclic Voltammetry (CV). Methods based upon disposable electrodes have been used, including carbon paste electrodes with undiluted wines.4 Cyclic voltammograms of more than 50 Italian white wines belonging to different appellations were collected and their features were analysed in conjunction with other parameters such as total phenolics, free and total SO2, acetaldehyde, and ascorbic acid. The wines were collected in the framework of the activities of the D-Wines (Diversity of Italian wines) project.RESULTS The results obtained indicated a great diversity of voltametric responses, although the ability to identify electrochemical features that were typical of wine types was rather limited with raw data. To obtain a higher number of discriminant features, derivative voltammograms were built and studied by multivariate statistical analysis. The region of the voltammograms comprised between 0-700 mV was found to contain several highly discriminating features across the entire dataset. Some of key features were identified and wines were classified accordingly. CONCLUSIONS It is expected that these results will help developing rapid novel tools for phenolics analysis in the wine industry, where results from chemistry methods, or chromatographic procedures, take some time to obtain. Further research using electrochemical tools to probe ageing processes also has considerable prospects for shedding light on how to enhance quality characteristics in wine.

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