

ABSTRACT

ELECTROCHEMICAL METHODS FOR DETECTION OF ANTIOXIDANT CAPACITY AND COMPARISON WITH CLASSICAL METHODS

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The most of the antioxidants that act against oxidative stress are electrochemically active components. The polyphenols group is the largest group among them.

In this study, electrochemical behavior of 5 phenolic acids and 3 synthetic antioxidant are examined by cyclic voltammetry, and the differential pulse voltammetry is executed at the optimal conditions determined. Antioxidant capacities are calculated with the use of potential, intensity and charge parameters of a peak (or peaks) observed in the first scan; a value of 100 is assigned to the highest capacity and the other capacities are valued relatively.

Capacities are also determined by reducing power, TEAC and DPPH of classical-spectrophotometric methods and for each method capacities are relatively valued assigning a value of 100 to the highest capacity. Measured/calculated capacities obtained with electrochemical and classical-spectrophotometrics methods are compared to see if a correlation exists between and among the methods. Existence or degree of correlation is sought with multiple regression and Spearman rank correlation coefficient methods.

Among classical-spectrophotometric methods DPPH showed highest correlation with the electrochemical method. On the other hand, when spectrophotometric methods are compared among themselves correlation between reducing power with TEAC and DPPH were remarkable while the correlation between DPPH and TEAC is very low.

Keywords: Antioxidant capacity, voltammetry, DPPH, TEAC, reducing power, correlation.