# Evaluation of radical scavenging activity of antioxidants by means of electrogenerated HO radical

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Hydroxyl radical is one of the most reactive radicals. The electrochemical generation of hydroxyl radical by oxidation of water can be achieved using different anode materials. The adsorption of HO radicals at the anode surface has a significant effect on their reactivity. Using materials such as BDD, electrogenerated hydroxyl radicals are weekly adsorbed whereas strongly adsorbed radicals are formed at Pt.
Although most of the available studies deal with high oxidation power anodes for the degradation of pollutants, the use of anodes with low oxidation power can have important applications particularly when a certain degree of selectivity is required for oxidation.
In this context electrochemically-generated hydroxyl radical was applied for the evaluation of antioxidant scavenging activity. A set of species with antioxidant activity was oxidized by galvanostatic electrolyses using a fairly oxidized Pt anode in conditions of $O_2$ evolution. In such conditions the consumption of species was not limited by mass transport but by the oxidation kinetics of both charge transfer and reaction with HO radicals. Information regarding the rate constant of the reaction of antioxidants with electrogenerated HO radicals was obtained by means of the apparent rate constant variation with electrolysis current density. Scavenger activity of the analysed antioxidants estimated by the kinetic parameter $k_{R,HO}/k_{O_2}$ was ordered as follows: gallic acid, trolox > ascorbic acid > caffeic acid. The method was applied successfully in synthetic solutions and in a green tea based beverage.

**Keywords:** Antioxidants, scavenging activity, HO radical generation, ascorbic acid, phenolic compounds