Electrochemical and Spectrophotometric Characterization of the Propolis Antioxidants Properties

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In this work, ethanol extracts of propolis from Europe, before and after 10 years of storage, were prepared and investigated by electrochemical methods, FTIR, and UV-Vis spectrometry assays. A combination of electrochemistry (cyclic and differential pulse voltammetry) and spectrometry allowed for the establishment of chemical correlation between the composition and the activities of bioactive polyphenols. Based on the content of the individual components and their content groups, the antioxidant properties of propolis precursors were characterized. Extracts of propolis before (ExI) and after 10 years (ExII) of storage were irreversibly oxidized in at least two electrode stages. ExII was oxidized more difficultly than ExI, and revealed better antioxidant properties. The antiradical and overall antioxidant potentials of the substances present in the extract of propolis after 10 years of storage, have been demonstrated in this paper. The storage time (10 years) did not significantly alter the properties of propolis, as evidenced by the high potential for free radical scavenging (ABTS, DPPH) and reduction of metal ions. Some of the materials present in propolis have been oxidized, and as confirmed by the FTIR analysis, this facilitates the passage of polyphenols from the propolis into the anhydrous (ethanol or acetonitrile) environment. Thus, propolis, as a rich source of natural phytochemicals, may be used in the prevention of various free radical-related ailments.

Keywords: propolis; antioxidant; electrochemistry; spectroscopy; phytochemistry

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