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A NEW VOLTAMMETRIC TOOL FOR PROPOLIS ORIGIN DISCRIMINATION

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The study of botanical extracts used in traditional medicinal have always captured researchers attention. Propolis (bee glue) is a sticky dark-colored material that honeybees collected from parts of plants, buds and exudates, mix it with wax and other secretions and use it as construction and defense material in the hive. Because its biological and pharmacological properties, is extensively used in foods and beverages with the purpose of maintain or improve human health.[1]

This resinous substance is a rich source of phenolic compounds (50%) being flavonoids, phenolic acids and their esters the main constituents. The geographical origin strongly influences the composition of the bee glue. Propolis from different regions display different chemical composition, depending on the local flora at the site of collection.[2]

This research outlines the discrimination and characterization of the Portuguese propolis origin by its electrochemical behavior. The voltammetric evaluation was performed using cyclic and pulse voltammetry of propolis and plant samples reported as potential sources of the resin. For that, several propolis samples from different country regions and samples of *Populus x canadensis* and *Cistus lanadifer* were extracted with ethanol/water 80:20 at 70°C for 1h, according to previous work.[3] Voltammetry measurements were performed using an Autolab PGSTAT 302 potentiostat with a typical three-electrode cell incorporating Ag/AgCl (3M KCl) as the reference electrode, a Pt wire as counter electrode and a glassy carbon disk as the working electrode. The study was performed in EtOH/ Britton-Robinson buffer /TBAP (78:28:2) at pH 4 and 7. The voltammograms were acquired between -0.5 V to 2 V. The cyclic voltammetry allowed the evaluation of the redox profile of propolis phenolic extracts from different regions of Portugal, while the pulse voltammetry (differential and square wave), allowed the quantification of electroactive species present in the different extracts of propolis. The quantification of the electroactive species was obtained in terms of equivalents of quercetin. The voltammograms present irreversible oxidation processes at different potentials depending on the geographical origin of the samples. At pH 4 propolis samples with origin in poplar buds present a high intensity anodic wave around 0.8 V while propolis from other sources present common anodic waves around 0.7, 1 and 1.3 V. The electrochemical variability of the propolis samples is in accordance with the differences found in the phenolic profiles studied by chromatographic techniques (unpublished results).

References

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- [2] Park YK et al. (2002) J. Agric. Food Chem. 50:2502-2506.
- [3] Falcão, Si et al. (2010). Anal. Bioanal. Chem., 396, 887-897.

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