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Oxidation products of apple phenolic compounds issuing from enzymatic and electrochemical processes. Study by spectroelectrochemistry and LC- UV/Visible- Mass spectrometry.

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The oxidation of (-)-epicatechin, phloridzin and caffeoylquinic acid, considered as model molecules representative of three main polyphenol classes found in apple and apple based products (juices and ciders) has been studied in aqueous media by both enzymatic and electrochemical pathways. In apple, oxidation is catalysed by polyphenoloxidase (PPO), leading in the first step to highly reactive *o*-quinones. In this study, enzymatic oxidation was carried out in aqueous buffer using a crude PPO extract obtained from a cider apple variety (1). Electrochemical oxidation was monitored by UV/Visible spectroelectrochemistry. Profiling and characterization of the final products in both oxidation media were mainly performed by LC-UV/Visible-MS used in the negative mode, and NMR for some of the compounds.

An interest of this study is to examine how the oxidation mode can affect the nature and proportions of the main products formed. Another interest is to get more insights in the oxidative pathways of phenolic compounds which are extensively studied for their antioxidant properties (2).

Results indicated that each mode of oxidation produce a set of oxidized products, although significant differences were observed revealing some specific products found following the oxidation mode. As a whole, hydroxylated monomers, dehydrodimers and trimers are formed but no extensive polymerisation was observed.

References

- (1) Guyot, S.; Bernillon, S.; Poupard, P.; Renard, C., *In Recent Advances in Polyphenol Research*, Eds. Wiley-Blackwell: Oxford, **2008**, 1, 278.
- (2) Halliwell, B. *Arch Biochem Biophys.* **2008**, 476, 107.

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