The theoretical modeling for sucralose amavadin-assisted electrochemical determination in the presence of its genotoxic ester

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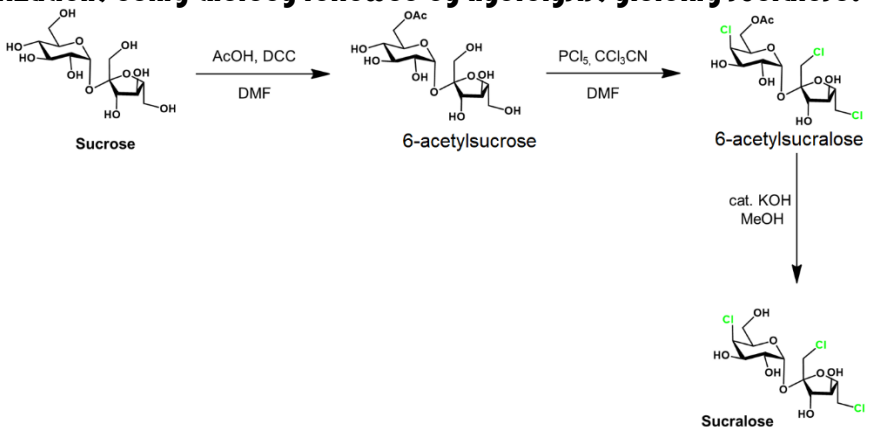
6-acetylsucralose is one of the sucralose precursors in its industrial synthesis from sucrose. Its synthesis is given by PCl_5 interaction with 6-acetylsucrose and involves the C4-epimerization, being thereby followed by hydrolysis, yielding sucralose.



Sucralose ester is more active in the organism than the sucralose, as it affects more intensively the gut microbiota and is more mutagenic and genotoxic, due to the more expressed activity of secondary organic chlorine. Its remaining quantities, present in the industrial sucralose, exceed the maximal permitted concentrations, reason why the quantification of sucralose in the presence of its 6-acetylderivative is really up to date.

In this work, for the first time the anodic electrochemical determination and elimination of sucralose in the presence of its genotoxic ester has been described theoretically. The electrochemical process is given on an amavadin-doped conducting polymer, leading to the efficient electroanalytical process, driven by the oxidation of sucralose and its ester by pentavalent amavadin form.

From its theoretical analysis it is possible to conclude that the conducting polymer, doped by amavadin ion, may be used as an efficient tool for the quantification of both sucralose and its ester .