

Proceedings

Electrochemical Detection of Doxorubicin and Simvastatin for Their Combined use in the Treatment of Cancer [†]

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Doxorubicin is an antitumor drug widely used in the treatment of cancer. It can be found on the market in different forms, alone or in combination with other molecules. Simvastatin is an inhibitor of HMG-CoA reductase, the most important enzyme from the process of cholesterol biosynthesis, and it is used in the treatment of hypercholesterolemia.

There are several studies in the literature which demonstrated the decrease of cellular proliferation in the presence of high dose simvastatin and that this molecule potentiates the cytotoxic activity of antitumor drugs. Therefore, various types of drug delivery systems containing both antitumor drug and statin started to be investigated for the improvement of cancer therapy.

The aim of this study was to develop a disposable, simple, fast and sensitive sensor for the simultaneous electrochemical detection of doxorubicin and simvastatin. Firstly, the electrochemical behavior of each molecule was analyzed regarding the influence of electrode material, electrolyte solution and scan rate. After each of these parameters was chosen, a LSV (Linear Sweep Voltammetry) procedure was optimized for their simultaneous detection. In the same time, two chronoamperometry procedures were tested, one for the detection of doxorubicin in the presence of simvastatin and the other one for the detection of doxorubicin and simvastatin together. Finally, calibration curves for doxorubicin and simvastatin in the presence of each other were obtained using both electrochemical methods and the results obtained were compared.

This detection strategy represents a promising tool in the development of new pharmaceutical forms or drug delivery systems containing both drugs whose association was proved to bring benefits in the treatment of cancer.

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