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THE THEORETICAL DESCRIPTION FOR SOTOLONE ELECTROCHEMICAL DETERMINATION IN BASIC MEDIA OVER AN UNDOPED CONDUCTING POLYMER

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Sotolone (Fig. 1) is a natural aromatizer [1], present in Portuguese wine (Douro, Porto and Madeira wine), fenugreek, curry, maple syrup, caramel and burnt sugar. It 8is also present in rum, flor sherry and roast tobacco. Moreover, it may be produced in humans with specific genetic disorder called maple syrup urine disease, indicating the proper disease. Taking into account sotolone influence to organoleptic properties of different food and drink items, like also its importance for diagnostic purposes, the development of the efficient and precise methods for its determination is really actual.

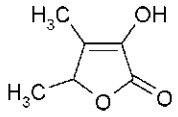

Fig. 1. Sotolone

Possessing electroactive groups, sotolone may be detected electrochemically. Nevertheless, in order to facilitate the electrochemical determination, chemical modified electrodes may be used, and the conducting polymers are of the most used electrode modifiers.

The goal of this work is the mechanistic theoretic analysis of the sotolone electrochemical determination over an undoped conducting polymer in alkaline media. The mechanism of the electroanalytical process may be described on the Fig. 2:

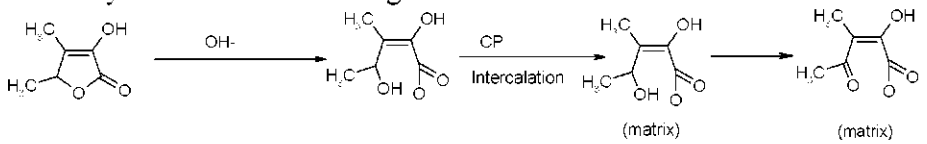

Fig. 2. The scheme of the electroanalytical process

The alkaline hydrolysis, breaking the furonic ring, leads to the appearance of an acid ion, entering the polymer matrix as a dopant. The stability analysis of the system, made by development and investigation of the correspondent mathematical model, shows that the sotolon electrochemical determination is made efficiently. As for the oscillatory behavior, it is also probable, being caused by double electric layer cyclic influences on both chemical and electrochemical stages.

References:

[1] J. Milheiro, R. Vilamarim, L. F. Ribeiro *et al.*, Food Chem., 350(2021), 129268