

MECHANISM OF EFFECTIVE QUENCHING OF CALCEIN FLUORESCENCE BY IRON. AB INITIO STUDY

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Cell electroporation – a temporal increase of the cell membrane permeability occurring due to the action of the pulses of strong electric field (up to 300 kV/cm) – is widely used in cell biology, biotechnology, and medicine [1]. When a high-voltage pulse is applied to the electrolyte solution, a variety of electrolysis reactions occur [2]. One of the most popular materials utilized for electrodes, which are used to electroporate the cells, is stainless-steel. In such a case, iron ions (Fe^{2+} and Fe^{3+}) are released from the anode under the action of high-voltage electric pulses. When a non-inert metal electrode is used, the release of the metal ions from the electrode into the solution occurs. These ions can, for example, react with fluorescent molecules and decrease the intensity of their fluorescence. Meanwhile, fluorescence microscopy is often used for studying cell electroporation phenomenon.

The aim of this study was to study the influence of the solution treated by high-voltage pulses and iron ions on the fluorescence of calcein as well as the mechanism of quenching.

[1] Andrei G. Pakhomov, Damijan Miklavcic, Marko S. Markov. *Advanced Electroporation Techniques in Biology in Medicine*. Boca Raton, FL: CRC Press. (2010) 124.

[2] Milazzo G. *Electrochemistry: Theoretical Principles and Practical Applications*. 1963. Elsevier, Amsterdam.