THE APPLICATION OF SCANNING ELECTROCHEMICAL MICROSCOPY FOR THE EVALUATION OF ALCOHOL BIOSENSOR BASED ON YEAST CELLS

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Baker's yeast (*Saccharomyces cerevisiae*) is one of the simplest single-cell fungal organisms. *S. cerevisiae* is cheap, widely used in the industry and in the household. Moreover, it is used as a cell model system by researchers because of its similarities to plant and eucaryotic cell catalytic pathways [1]. In order to develop accessible and low-cost tools for monitoring environmental issues a biosensor with living *S. cerevisiae* cells can be used [2]. In the current paper the toxicological effects of alcohols on living yeast cells are investigated by electrochemical methods. Alcohols are used in everyday life as a base in pharmaceutical tinctures and for cleaning products or sanitizers. For this study ethanol and isopropanol as extensively used alcohols were chosen for evaluating the influence to the viability of *S. cerevisiae* cells.

Scanning electrochemical microscopy (SECM) is a device, which measures electrochemical characteristics locally [3]. It was used in this research due to its possibility to work in the microscale and quickly observe steady-state current. SECM consisted of a three-electrode system where the ultramicroelectrode (UME) is connected to a positioner that can move in three axes. The electrochemical signal is measured by scanning the surface of the sample. In previous our research, the toxicity of 9,10-phenantrenequinone was investigated [4]. It was found that toxic materials can be used for the development of biosensors if they are applied in low concentrations. Good results were obtained by using toxic materials in biofuel cells, especially if they are immobilized on the electrode rather than adding them to the solution. In the current research, the yeast were used for the detection of ethanol and isopropanol in electrochemical cell. It was found that SECM can be used for the detection of ethanol/isopropanol concentrations up to 4 mM.

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