

Abstract

Printed and Flexible Electrochemical Lactate Sensors for Wearable Applications †

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The development and production of bendable, electrochemical biosensors on PET foil for the detection and analysis of lactate are described. Moreover, the electrochemical measurement of biomolecules concentration in fluids by these sensors is presented. Measurements rely on redox cycling for signal amplification, in this case using 300 mV for oxidation and −250 mV for reduction. The electrodes to be functionalized of the latter have been manufactured either by wet etching of an evaporated gold layer or by screen printing of gold (counter electrode). Silver/silver chloride (reference electrode) and carbon (working electrode) have also been screen printed. It is shown that there are only minor deviations between values measured by conventional silicon-based and in-house-manufactured sensors compared with those produced on flexible foils. Since the sensors have also been proven to withstand rough environments, such as limited time in sweat, the potential now exists for sensor integration into filled textiles and sports garments for non-invasive lactate monitoring in sweat, which is correlated to blood lactate concentration.

Conflicts of Interest: The authors declare no conflict of interest.



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