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Development of Mediator-Free Acetylcholine Biosensor Based on Acetylcholine Oxidase Immobilized Micro-Chips

By: [Rahman, MM](#) (Rahman, Mohammed Muzibur)^[1,2]

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Abstract

Acetylcholine (ACh) biosensor is developed based on mediator-free acetylcholine oxidase (AChOx) by self-assembled monolayer (SAM) onto lab-made micro-chip. The simple cyclic voltammetry (CV) method is utilized in mediator-free system in phosphate buffer solution (PBS, 0.1M) at room conditions. The analytical parameters of AChOx fabricated electrode employed a lower detection limit (DL, 0.136 nM), a wide linear dynamic range (LDR, 1.0 nM to 1.0 mM), good linearity (R= 0.9991), and higher sensitivity (2.7329 μ A mM⁻¹ cm⁻²) where a tiny sample volume (70.0 μ L) is required. The micro-chip system executes a simple and efficient approach to immobilize the enzymes onto SAM modified surface, which can improve the biosensor performances for a large group of biomolecules in broad scale of biomedical applications in health-care fields.

Keywords

Author Keywords: [Acetylcholine oxidase](#); [acetylcholine](#); [cyclic voltammetry](#); [detection limit](#); [immobilization](#); [linear dynamic range](#); [mediator-free system](#); [micro-chips](#); [phosphate buffer solution](#); [selectivity](#); [self-assembled monolayer](#); [sensitivity](#); [stability](#); [thioglycolic acid](#)

KeyWords Plus: [CARBON-FIBER MICROELECTRODES](#); [CHARGE-TRANSFER TECHNIQUE](#); [SENSOR](#); [ELECTRODES](#); [PENICILLIN](#); [RELEASE](#); [CHOLINE](#); [PASTE](#); [MODULATION](#); [DETECTORS](#)

Author Information

Reprint Address: Rahman, MM (reprint author)

King Abdulaziz Univ, Ctr Excellence Adv Mat Res, POB 80203, Jeddah 21589, Saudi Arabia.

Organization-Enhanced Name(s)

King Abdulaziz University

Addresses:

[1] King Abdulaziz Univ, Ctr Excellence Adv Mat Res, Jeddah 21589, Saudi Arabia

Organization-Enhanced Name(s)

King Abdulaziz University

[2] King Abdulaziz Univ, Dept Chem, Fac Sci, Jeddah 21589, Saudi Arabia

Organization-Enhanced Name(s)

King Abdulaziz University

E-mail Addresses: mmrahman@kau.edu.sa

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