

ELECTROCHEMICAL QUALITATIVE DETECTION OF STRESS BIOMARKERS IN SIMULATED AND REAL SWEAT SAMPLES

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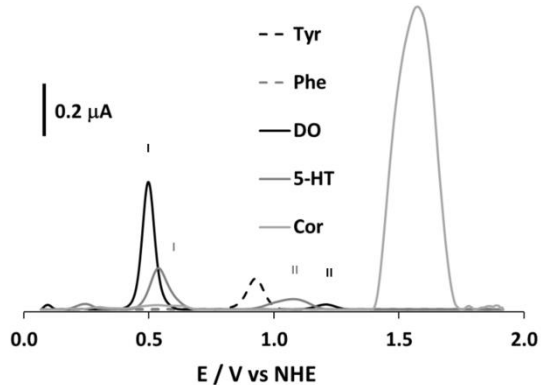
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Goals

- Stress related biomarkers electrochemical detection on different screen-printed carbon-based electrodes in artificial and real samples
- Patterns detection and selection of most promising SPE carbon-based electrodes

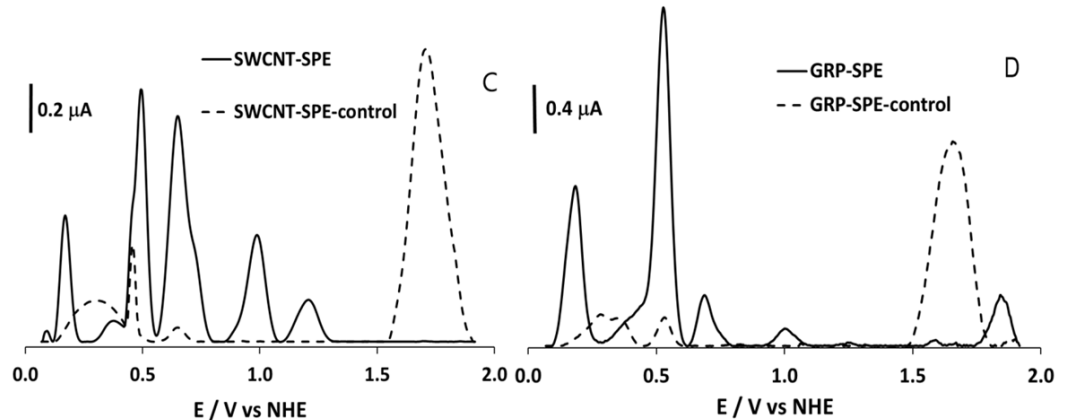
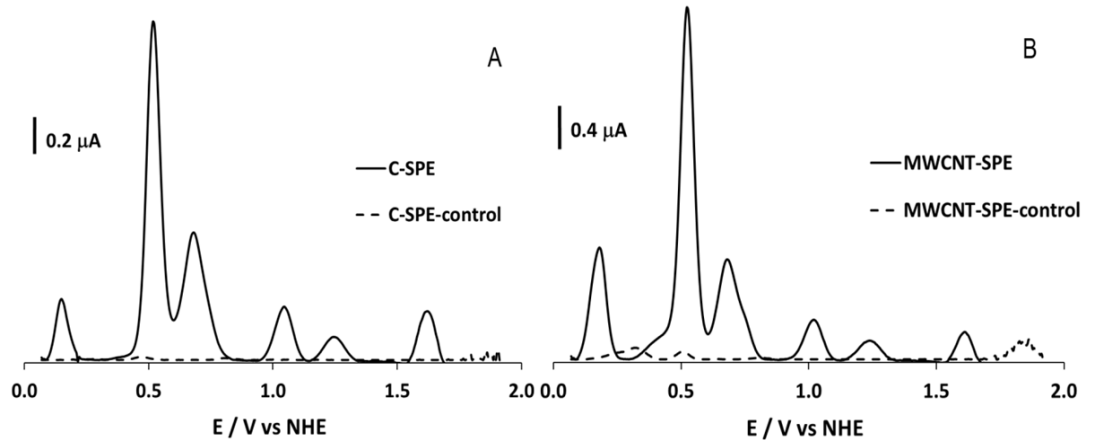
Biomarkers electrochemical behaviour



DPV of different pre-selected biomarkers at carbon screen-printed electrodes (C-SPE);

biomarkers concentration is 10^{-5} M,

86 mM phosphate buffer/18 mM NaCl, pH 7

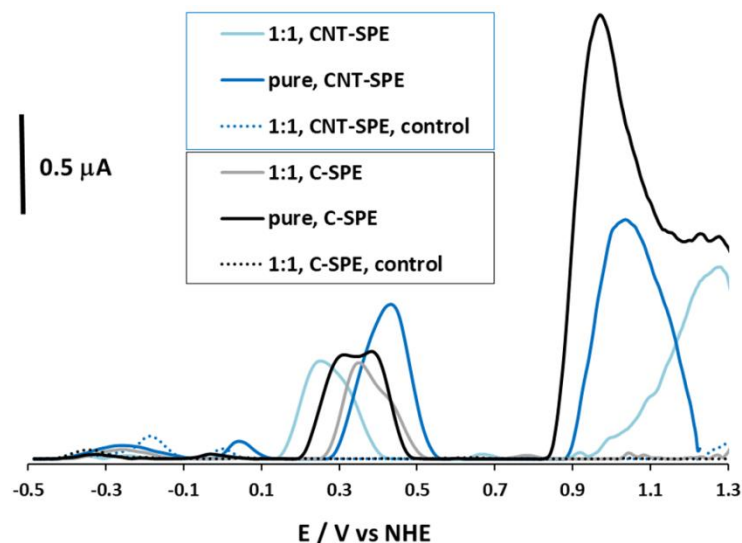


Biomarkers responses in sweat simulated solutions on

A) C-SPE, B) MWCNT-SPE, C) SWCNT-SPE, D); Graphene

Simulated sweat solution (lactate, ascorbate/ascorbic ac., creatinine, glucose, dopamine, tryptophan, serotonin, tyrosine, phenylalanine, histidine, cortisol)

Real sweat samples



Electrochemical fingerprints (DPV) of real sweat samples at different dilutions and SPE electrodes, namely, C-SPE and MWCNT-SPE; same experimental conditions for the dilutions, experimental and technical parameters as in previous figures.

Examples of biomarkers identified in real sweat samples in the present work

LC-MSMS	Lactate, Ascorbic ac., Arg, Creatinine, Glucose, DO, Trp, 5-HT, Tyr, Phe, His, Cortisol, Glu, Ile, Lys, Gln, Epinephrine, Adenosine
EQ	DO, Tyr, Phe, 5-HT, cortisol

Final remarks

- Possible to detect EQ patterns in real sweat samples
- Carbon and MWCNT seem the best electrode materials

Ethics

The sweat samples studied were obtained through volunteers in compliance with the ethical standards defined by the World Medical Association (WMA) Declaration of Helsinki (DoH). The participants were informed and an informed consent was obtained. The attained data was codified and is completely anonymous and confidential. The present study was performed under the scope of Stressense project which was approved by the Ethical Committee of the Universidade Nova de Lisboa.

Acknowledgements

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