

# Author's Accepted Manuscript

Evaluation of two sterically directed attachments of biomolecules on a coaxial nanofibre membrane to improve the development of optical biosensors

Teresa Ramon-Marquez, Antonio L. Medina-Castillo, Alberto Fernandez-Gutierrez, Jorge F. Fernandez-Sanchez



PII: S0039-9140(18)30466-1  
DOI: <https://doi.org/10.1016/j.talanta.2018.05.004>  
Reference: TAL18644

To appear in: *Talanta*

Received date: 2 March 2018  
Revised date: 25 April 2018  
Accepted date: 1 May 2018

Cite this article as: Teresa Ramon-Marquez, Antonio L. Medina-Castillo, Alberto Fernandez-Gutierrez and Jorge F. Fernandez-Sanchez, Evaluation of two sterically directed attachments of biomolecules on a coaxial nanofibre membrane to improve the development of optical biosensors, *Talanta*, <https://doi.org/10.1016/j.talanta.2018.05.004>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Evaluation of two sterically directed attachments of biomolecules on a coaxial nanofibre membrane to improve the development of optical biosensors

Teresa Ramon-Marquez<sup>1</sup>, Antonio L. Medina-Castillo<sup>2</sup>, Alberto Fernandez-Gutierrez<sup>1</sup>, Jorge F. Fernandez-Sanchez<sup>1,\*</sup>

<sup>1</sup>Department of Analytical Chemistry, University of Granada, Avd. Fuentenueva s/n, 18071 Granada, Spain.

<sup>2</sup>NanoMyP<sup>®</sup>, Nanomateriales y Polimeros S.L., Spin-Off company of the UGR, BIC Building, Avd. Innovacion 1, E-18016, Granada, Spain.

\*Corresponding author: jffernan@ugr.es

## ABSTRACT

In this study, we have optimised the sterically directed attachment of biomolecules on the surface of coaxial membranes prepared by co-electrospinning which have been proved to be a material with very high performance for the development of biosensors with optical oxygen transduction. Uricase has been used as model enzyme.

Two sterically directed strategies: a) covalent attachment via maleimide, and b) affinity bonding via biotin-streptavidin interaction, have been tested in order to preserve the enzymatic activity of uricase and to improve the analytical figures of merits on the determination of uric acid. The best results were obtained with biotin-streptavidin affinity interaction and using a biotinylation reagent containing a polyethylene glycol chain. The developed biosensor showed high sensitivity towards uric acid with a detection limit of 0.5  $\mu\text{M}$ , a quantification limit of 1.8  $\mu\text{M}$  and linear range from 1.8 to 250  $\mu\text{M}$ . The applicability of the membrane as biosensor with optical oxygen transduction was proved by determining uric acid in serum samples. The obtained results showed a good correlation (0.999) with those obtained by an external reference laboratory.

Graphical abstract

Download English Version:

<https://daneshyari.com/en/article/7675630>

Download Persian Version:

<https://daneshyari.com/article/7675630>

[Daneshyari.com](https://daneshyari.com)