

Actividades divulgación Proyecto AGROALNEXT_2024

Lugar	Artículo científico en revista internacional
Localidad	
Provincia	
Fecha	31/5/2024
Proyecto:	Sensor económico y eficiente para el control del amoniaco en explotaciones ganaderas: NH3ControlFarm
Código proyecto	AGROALNEXT_2022/19
Grupo de investigación	 

INFORME DE LA ACTIVIDAD: Difusion del proyecto. Artículo científico sobre la aplicación del sensor para el análisis de amoníaco en saliva como ensayo de punto de necesidad y control de niveles en operarios en granjas.

Monforte-Gómez, B.; Mallorca-Cebriá, S.; Molins-Legua, C.; Campíns-Falcó, P. Combining PDMS Composite and Plasmonic Solid Chemosensors: Dual Determination of Ammonium and Hydrogen Sulfide as Biomarkers in a Saliva Single Test. Chemosensors 12 (2024) 94. <https://doi.org/10.3390/chemosensors12060094S> . Open access

FOTOS DE LA ACTIVIDAD:

Article

Combining PDMS Composite and Plasmonic Solid Chemosensors: Dual Determination of Ammonium and Hydrogen Sulfide as Biomarkers in a Saliva Single Test

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Abstract: In recent years, in the field of bioanalysis, the use of saliva as a biological fluid for the determination of biomarkers has been proposed. Saliva analysis stands out for its simplicity and non-invasive sampling. This paper proposes a method for the dual determination of ammonium and hydrogen sulfur in saliva using two colorimetric chemosensors. The ammonia reacts with 1,2-Naftoquinone 4 sulphonic acid (NQS) entrapped in polydimethylsiloxane (PDMS) and the hydrogen sulfide with AgNPs retained in a nylon membrane. The color changed from orange to brown in the case of ammonia chemosensors and from yellow to brown in the H₂S. The experimental conditions to be tested have been established. Both analytes have been determined from their gaseous form; these are ammonia from ammonium and hydrogen sulfur from hydrogen sulfur. Good figures of merit have been obtained by using both measuring strategies (reflectance diffuse and digitalized images). The acquired results show that both sensors can be used and provide good selectivity and sensitivity for the determination of these biomarkers in saliva. Both measurement strategies have provided satisfactory results for the real saliva samples (n = 15). Recoveries on spiked samples were between 70% and 100%. This methodology can lead to possible in situ diagnosis and monitoring of certain diseases and pathologies related with NH₄⁺ and/or H₂S, in a fast, simple, cheap and non-invasive way.

Keywords: colorimetric chemosensors; saliva; ammonium; hydrogen sulfide; diffuse reflectance; RGB coordinates; smartphone



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1. Introduction

Saliva is an aqueous fluid found in the oral cavity that plays a vital role in preserving and maintaining oral health [1]. Approximately 93% of the saliva's volume originates from major salivary glands, while the remaining 7% is produced by minor glands [2]. While saliva is sterile when released from the salivary glands, it loses its sterility upon coming into contact with crevicular fluid, food residues, microorganisms, and other substances present in the oral cavity [3]. Saliva typically has a pH ranging from 6.5 to 7.5 and is primarily composed of water (about 99%), along with a smaller concentration of inorganic

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