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Development of a new support platform for glyphosate biosensor

Luis A. Zambrano-Intriago[a,b], Célia G. Amorim[a], Alberto N. Araújo[a], Joan M. Rodríguez-Díaz[b], Maria C.B.S.M. Montenegro[a]

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a) Departamento de Ciências Químicas, LAQV-REQUIMTE, Faculdade de Farmácia da Universidade do Porto, Rua de Jorge Viterbo Ferreira, 228, 4050-313 Porto, Portugal; b) Instituto de Investigación, Laboratorio de Análisis Químicos y Biotecnológicos, Universidad Técnica de Manabí, Av. Urbina y Che Guevara, Portoviejo, Ecuador.

Email: luiszamint@gmail.com, camorim@ff.up.pt, anaraujo@ff.up.pt, joanrd9@yahoo.com, mcbranco@ff.up.pt

Glyphosate (N- (phosphonomethyl) glycine) is a non-selective broad-spectrum herbicide for weed control. It is used in more than 750 products for agricultural, forestry, urban and domestic use. It is estimated that 6.1 billion kilograms of this product were used worldwide in the last decade. Glyphosate when applied to plants acts by specifically inhibiting the 5-enolpyruvyl shikimate 3-phosphate synthase (EPSPS), an enzyme involved in the production of aromatic amino acids such as tryptophan, phenylalanine and thyroxine. Studies have shown the presence of glyphosate in human blood and urine. However, the World Health Organization considered it a toxicologically harmless compound for humans. This controversy triggered research where they found that this compound has carcinogenic, mutagenic, reprotoxic and disruptive effects of endocrine function[1]. Therefore, the importance of the detection of glyphosate in various environmental matrices arises. Thus, it becomes a challenge for the scientific community to determine it, because it is a molecule with low solubility in organic solvents, it does not have chromophores or fluorophores and needs to use derivatization agents, if the detection is by optical processes[2]. Therefore, traditional photometric and fluorometric detection methods have limitations that can be overcome by electrochemical processes, in particular by the use of biosensors. The objective of this work is to develop an enzymatic biosensor for the detection of glyphosate with high sensitivity, reduced response time, easy construction and operation to determine this contaminant in environmental samples.

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