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A new approach for the determination of nitenpyram and pyraclostrobin in food samples through a sensitive photochemically induced fluorescence sensor

J Jiménez-López, E J Llorent-Martínez, P Ortega-Barrales and A Ruiz-Medina
Jean University, Spain

Pesticides, one of the major classes of environmental pollutants, are widely used throughout the world. Due to their toxicity, it is important to develop analytical methods for the accurate determination of pesticides in a wide range of samples, specially in food samples. Although most methods make use of chromatographic techniques, other alternatives may provide interesting advantages, such as low-cost or simplicity. In this sense, the aim of the work here presented is to use automated luminescent sensors for the analysis of specific analytes. Two widely used pesticides, nitenpyram (NTP) and pyraclostrobin (PRCL), have been selected as target compounds. The system was automatized, making use of Multicommutated Flow Injection Analysis (MCFIA). Photochemically Induced Fluorescence (PIF) was used as detection technique. Hence, the first step consisted in the on-line UV irradiation of sample or standard solutions to generate the corresponding fluorophores. Then, the on-line separation and pre-concentration of the analytes was carried out on the surface of C₁₈ silica gel beads placed inside the flow-cell, recording the analytical signal with the analytes sorbed on the C18 microbeads. The use of 3-way solenoid valves in the system allowed an easy handling of solutions, requiring minimum volumes for each analysis, hence minimizing wastes generation. The proposed analytical method presents detection limits of 9 and 5 µg L⁻¹ for NTP and PRCL, respectively. Recovery experiments were carried out in different kinds of food samples: wine, table grapes and wine grapes, obtaining satisfactory results in all cases. Spiking levels were selected according to the legislated maximum residue limit (MRL). The simplicity, low-cost, high sensitivity and high selectivity of the proposed method makes it an interesting alternative for the analysis of these two pesticides, as the method complies with the current MRLs in these samples.

Biography

J Jiménez-López is developing her PhD since 2014 at University of Jaén (Spain). She has published seven papers in reputed journals. E.J. Llorent-Martínez completed his PhD in the University of Jaén and is developing postdoctoral studies at IRICA; he has published more than 60 papers in reputed journals and has been serving as an editorial board member in different international journals. P. Ortega-Barrales and A. Ruiz-Medina, both full professors at University of Jaén, have published more than 70 and 90 papers cited in the JCR, respectively, and more than 20 book or book chapters. Moreover, they hold different positions in university management.

ellorent@ujaen.es

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