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Development of molecularly imprinted polymeric nanofibers by electrospinning and applications to pesticides adsorption

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Novel polystyrene-based molecularly imprinted polymer nanofibers were synthesized through the electrospinning technique. The molecularly imprinted polymers were prepared using a non-covalent approach and atrazine as template. For comparison, non-imprinted polymer nanofibers were also synthesized. The morphology of the synthesized nanofibers was characterized using scanning electron microscopy. The adsorption of pesticides, atrazine, atrazine desisopropyl, atraton, carboxin, linuron and chlorpyrifos was studied under equilibrium (batch) conditions. To describe the adsorption capability of the synthesized polymers, Langmuir and Freundlich models were used. The Freundlich model provided a better mathematical approximation of the sorption characteristic for polymers nanofibers. To evaluate the adsorption capacity in the presence of interference experiments on river water samples spiked with a mixture of six pesticides were also performed. The results obtained for the highest concentration levels investigated, show a greater amount of pesticide adsorbed on molecularly imprinted polymers and non-imprinted polymers compared to those obtained using commercial stationary phases used as reference.

Biography

Roberta Mercorio is pursuing her PhD in Epigenetics, Environmental and Public Health at University of Milan. Her PhD project focuses on "Environmental air pollution and the human exposure to particulate matter, a significant portion of air pollution". During completion of her master thesis, she worked with nanotechnologies, developing the first polymer used for the water decontamination by pesticides. In this period, she learned the nanotechnology methods; she designed and built the polymer namely imprinted polymer specific for the common pesticides.

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