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Composite carbon materials from winery composted waste for the treatment of effluents contaminated with ketoprofen and 2-nitrophenol (Article)

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Abstract

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The present work consisted of preparing and characterizing composite carbon materials (WRCC) from raw winery residues (WR) activated with zinc chloride to produce a carbon adsorbent. The WRCC was used for the adsorption of emerging contaminants in aqueous media. The WRCC presented a morphology with favorable characteristics for the adsorption process, giving an abundant porous structure with pores of different sizes. The results show the WRCC's effectiveness, presenting surface area values (227 m² g⁻¹) and total pore volume (0.175 cm³ g⁻¹). The general order kinetic model predicted the experimental curves sufficiently. The Sips model better described the two adsorbates' equilibrium data, with maximum adsorption capacities of 376.0 and 119.6 mg g⁻¹ for 2-nitrophenol and ketoprofen, respectively. The WRCC carbon material was also highly efficient, with maximum removal of 81.4% and 94% in 1000 mg L⁻¹ of the compounds 2-nitrophenol and ketoprofen. Finally, the prepared material has essential characteristics that make it an efficient adsorbent in treating effluents with emerging contaminants. © 2021 Elsevier Ltd.

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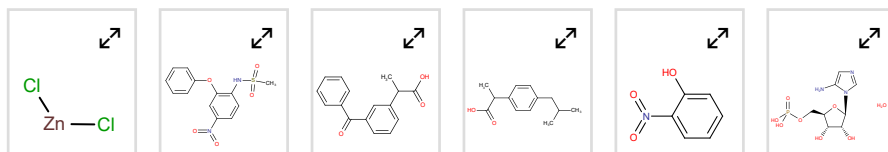
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