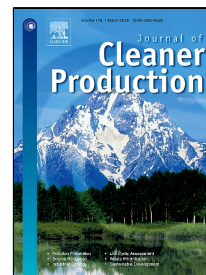


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Diclofenac removal from water by adsorption using activated carbon in batch mode and fixed-bed column: isotherms, thermodynamic study and breakthrough curves modeling



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4

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## 14 1. INTRODUCTION

15

16 Several publications have been enhanced the concern about the  
17 detection of pharmaceuticals and personal care products (PPCPs) in the  
18 aquatic environment (Gabarrón et al., 2016; Huang et al., 2017; Michael et al.,  
19 2013). These groups of substances are known as emerging contaminants (ECs)  
20 and include a diverse collection of organic substances, such as human and  
21 veterinary drugs, disinfectants, fragrances (e.g. lotions, body cleaning products  
22 and sun-screens) and household chemicals (Boxall et al., 2012; Bu et al.,  
23 2013).

24

25 The presence of EC in surface waters indicates that the removal  
26 efficiencies achieved in conventional water treatments are not suitable to  
27 remove this type of pollutants. Reports about the adverse impacts on the  
28 environment and human health of new chemicals are been published (Alves et  
29 al., 2016; Batt et al., 2017; Benson et al., 2017; Michael et al., 2013).

30

31 Lack of information on the fate and transport of emerging compounds  
32 and their potential toxicities to human health and aquatic systems makes it  
33 difficult for regulatory agencies to develop policies to manage their presence in  
34 the environment (Naidu et al., 2016). However, environmental protection  
agencies all over the world make changes in their legislation in order to  
encompass a greater number of ECs. The recent proposal was the inclusion of

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