



## Removal of phenolic compounds from olive mill wastewater by adsorption onto wheat bran

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Received 25 January 2012; Accepted 27 May 2013

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### ABSTRACT

The use of wheat bran for the removal of phenolic compounds from olive mill wastewater (OMW) at different adsorbent doses (10–60 g/L), pH (3–11), and contact time (0.25–24 h) was investigated. Our findings demonstrate that wheat bran, an inexpensive and easily available biomaterial, can be an alternative for the more costly adsorbents used for the removal of phenolic compounds from OMW. Increase in the wheat bran dosage from 10 to 50 g/L significantly increased the phenolic compounds adsorption rate from 45 to 67%. Increase in pH to high alkalinity resulted in an increase in the phenolic compounds' adsorption capacity. The adsorption process was found to be relatively fast, and it reached equilibrium in 4 h of contact time. The Freundlich and Langmuir adsorption models were used for the mathematical description of the adsorption equilibrium and it was found that the experimental data fitted very well in the Freundlich model. Batch adsorption models based on the assumption of the pseudo-first-order, pseudo-second-order, and intraparticle diffusion mechanism were applied to examine the kinetics of the adsorption. The results showed that kinetic data followed more closely the pseudo-second-order model, than the pseudo-first-order and intraparticle diffusion. Desorption studies showed that at low pH value, the desorption of phenolic compounds was efficient.

*Keywords:* Wheat bran; Adsorption; Phenolic compounds; Olive mill wastewaters; Desorption

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*Presented at Water and Environment International Conference (WATEIC 2011), Marrakech, Morocco, 26–29 October 2011*