

## Removal of Methyl Red, a cationic dye, Acid Blue 113, an anionic dye, from wastewaters using chitin and chitosan: influence of copper ions

Yeşim Sağ Açıkel\*, Başak Göze

*Hacettepe University, Department of Chemical Engineering, 06800, Beytepe, Ankara, Turkey, Tel. +90 3122977444, Fax +90 3122992124, email: yesims@hacettepe.edu.tr (Y.S. Açıkel); basak\_goze@hotmail.com (B. Göze)*

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### ABSTRACT

Chitin and chitosan were employed as biosorbent for removal of methyl red (MR), a cationic dye and azo dye, and acid blue (AB113), an anionic dye in single-component systems and in the presence of Cu(II) ions. Kinetic studies indicate that AB113 adsorption on chitin and chitosan in a single-component system follows pseudo-first order kinetics while the pseudo-second order rate model provided the best correlation of the kinetic data for MR adsorption on both chitin and chitosan. For the single system, AB113 adsorption isotherm follows the Langmuir model while MR adsorption follows the Freundlich isotherm. Among the tested models, the multi-component three-parameter Redlich–Peterson model showed the best fit for both the Cu(II)-AB113 and Cu(II)-MR adsorption equilibrium data both on chitin and chitosan. In the single-dye and binary metal-dye systems, chitosan exhibits relatively higher affinity and capacity than chitin.

*Keywords:* Industrial wastewaters; Chitin; Chitosan; Acid Blue 113; Methyl Red; Adsorption; Multi-component adsorption

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\*Corresponding author.

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