



---

## BIOSORPTION OF HEXAVALENT CHROMIUM BASED ON MODIFIED Y ZEOLITES OBTAINED BY ALKALI-TREATMENT

Hugo Figueiredo<sup>1</sup>, Bruna Silva<sup>1</sup>, Cristina Quintelas<sup>1</sup>, Manuel F.R. Pereira<sup>3</sup>,  
Isabel C. Neves<sup>2\*</sup>, Teresa Tavares<sup>1\*</sup>

<sup>1</sup>IBB-Institute for Biotechnology and Bioengineering, Centre of Biological Engineering, University of Minho,  
Campus de Gualtar, 4710-057 Braga, Portugal.

<sup>2</sup>Departamento de Química, Centro de Química, Universidade do Minho, Campus de Gualtar, 4710-057 Braga, Portugal

<sup>3</sup>Laboratório de Catálise e Materiais (LCM), Laboratório Associado LSRE/LCM, Departamento de Engenharia Química,  
Faculdade de Engenharia, Universidade do Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

---

### Abstract

The structural modification of external surface of NaY was investigated in order to enhance efficient biosorption systems consisting of a bacterial biofilm, *Arthrobacter viscosus*, supported on that zeolite, for removing hexavalent chromium from aqueous solutions. The supported bacterial biofilm reduces Cr(VI) to Cr(III) and this cation is then retained in the zeolite by ion exchange. NaY zeolite was modified by alkali-treatments using NaOH 2.0 M, with two different contact periods of time between the zeolite and the alkaline solutions, resulting in NaY<sub>A</sub> and in NaY<sub>B</sub>. The biosorbents supported on the modified NaY zeolite were tested in solutions with low concentration of chromium. The results showed that the modification of external surface of NaY zeolite allows an efficient Cr removal, and the maximum removal efficiency was observed for NaY<sub>A</sub> sample that was submitted to a smoother chemical treatment.

*Key words:* alkali-treatment, *Arthrobacter viscosus*, biosorbent, Cr(VI), NaY Zeolite

---

---

\* Author to whom all correspondence should be addressed: e-mail: [ttavares@deb.uminho.pt](mailto:ttavares@deb.uminho.pt); [ineves@quimica.uminho.pt](mailto:ineves@quimica.uminho.pt) - phone: ++351/253604410; ++351/253604057; fax: ++351/253678986.