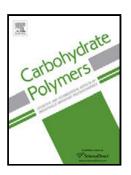
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Title: Ion exchange kinetics of magnetic alginate ferrogel beads produced by external gelation

Author: Vânea Ferreira Torres Teixeira Nádia Rosa Pereira Walter Ruggeri Waldman Ana Luiza Cassiano Dias Ávila Victor Haber Pérez Rubén Jesus Sánchez Rodríguez



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2	gelation										

- 3 Vânea Ferreira Torres Teixeira¹, Nádia Rosa Pereira^{1*}, Walter Ruggeri Waldman², Ana
- 4 Luiza Cassiano Dias Ávila¹, Victor Haber Pérez¹ and Rubén Jesus Sánchez Rodríguez³
- ¹Laboratory of Food Technology, Agricultural Science and Technology Center, Northern Rio de
- 6 Janeiro State University (UENF), Campos dos Goytacazes, Rio de Janeiro, Brazil.
- 7 ² Department of physics, chemistry and mathematics, Federal University of São Carlos (UFSCar),
- 8 Sorocaba, São Paulo, Brazil
- 9 ³Laboratory of Advanced Materials, Science and Technology Center, Northern Rio de Janeiro
- 10 State University (UENF), Campos dos Goytacazes, Rio de Janeiro, Brazil.
- 11 *corresponding author, ph: +55 22 27486515, fax: +55 22 27397194, nadiar@uenf.br

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Abstract

This paper reports on a study of the influence of sodium alginate concentration and iron addition on the ion exchange kinetics of calcium alginate ferrogel beads produced by external gelation. The calcium absorption and sodium release of the beads were fitted to Fick's second law for unsteady state diffusion in order to obtain the effective diffusion coefficients of Na⁺ and Ca²⁺. The dried beads were characterized concerning their thermal stability, particle size distribution and morphology. The gelation kinetics showed that an increase in alginate concentration from 1% to 2% increased the Ca²⁺ equilibrium concentration, but presented no effect on Ca²⁺ effective diffusion coefficient. Alginate concentration higher than 2% promoted saturation of binding sites at the bead surfaces. The addition of iron promoted faster diffusion of Ca²⁺ inside the gel beads and reduced the Ca²⁺ equilibrium concentration. Also, iron particles entrapped in the alginate gel beads promoted greater absorption of water compared to pure alginate gel and lower thermal stability of the beads. The main diffusion of Ca²⁺ into and Na⁺ out from the bead took place during the first 60

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