Global
Separation Techniques
Conferences, Meetings, Exhibitions, Symposiums and Workshops

IRON REMOVAL BY BIOSORPTION

Santulla L. B. V. Carvalho*, Dayse M. S. da Silva, Terezinha C. A. de Miranda, Ana Maria R. B. da Silva, Léa Elias M. C. Zaidan, Marilda do N. Carvalho, Maurício. A. da Motta

INTRODUCTION

Focusing on the reduction of environmental impacts and greater availability of water resources, this study evaluated the removal of iron ion present in solution in order to apply to a secondary treatment adsorption of metals by aquatic macrophyte popularly known as Baroness (Eichhornia crassipes), in particular the stem and leaf in the sugar industry.

MATERIALS AND METHODS

The experimental procedure was initiated by pre-treatment by dehydration of the stem and leaf of baron and subsequently crushing and classification sieves Taylor. It was performed to characterize the material by evaluating the surface area and pore volume (BET), which also allows to obtain the adsorption isotherm. Then set up to process optimization through the factorial design technique. Was then performed in duplicate 23 factorial design, in which we evaluated the variables mass, grain size and speed of agitation in the process, with the response variables removal efficiency and adsorption capacity.

RESULTS

The results indicated that for the stem of baron, the dough was the most influential variable, both in efficiency and in adsorption capacity. As for the dough sheet was for the main adsorption capacity and mass efficiency was interaction with the particle size (Figures 1-4). The iron ion removal efficiency of the stems was approximately 92%, as compared to the sheet removal efficiency was 85%. The Langmuir model presented the best linear correlations for both adsorbents, 0.995 to 0.997 for the stem and leaf. The maximum capacity of the adsorption sheet had a higher value (qm = 8.16 mg.g-1) that the stem adsorption capacity (qm = 3.14 mg.g-1).

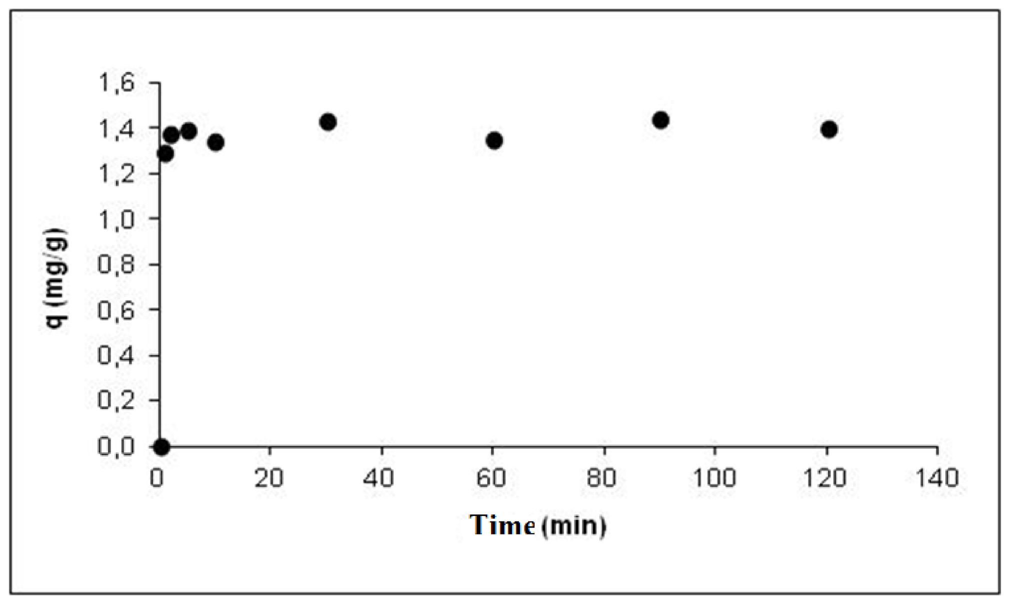

Figure 1: experimental kinetic curve stem the baroness.

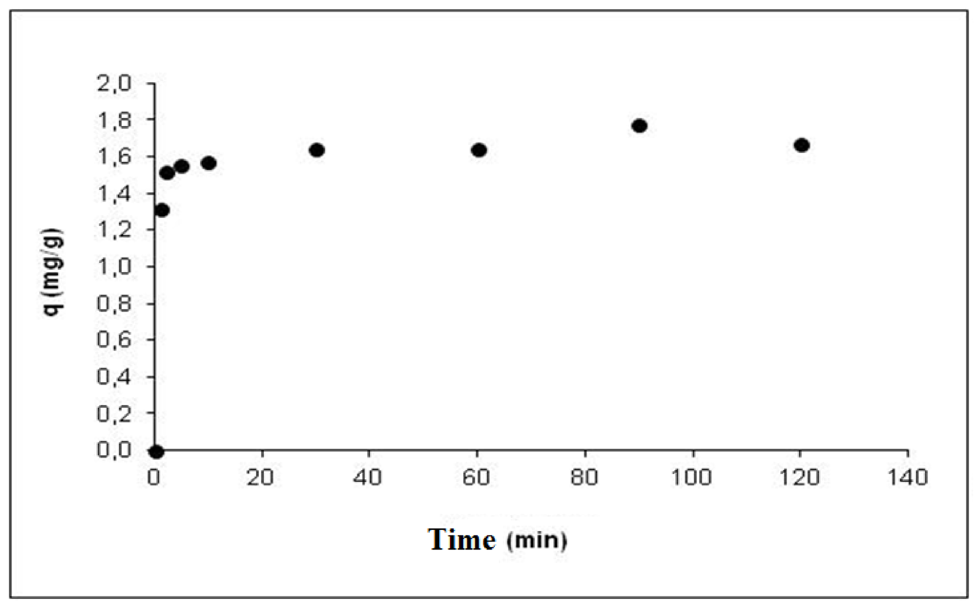

Figure 2: experimental kinetic curve of the baroness sheet.

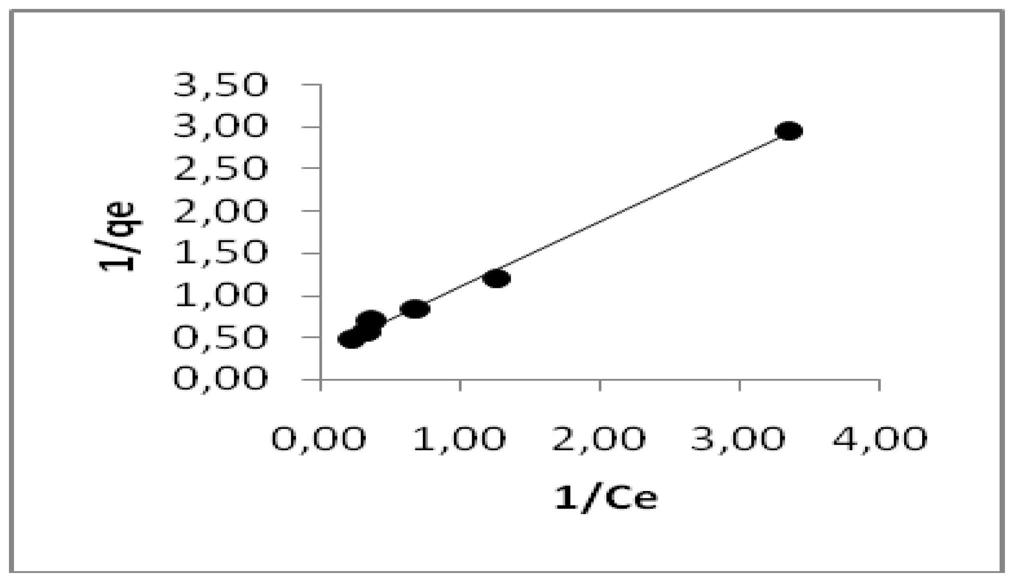

Figure 3. Adsorption isotherms of iron ion by the stem of the baroness on the model of Langmuir

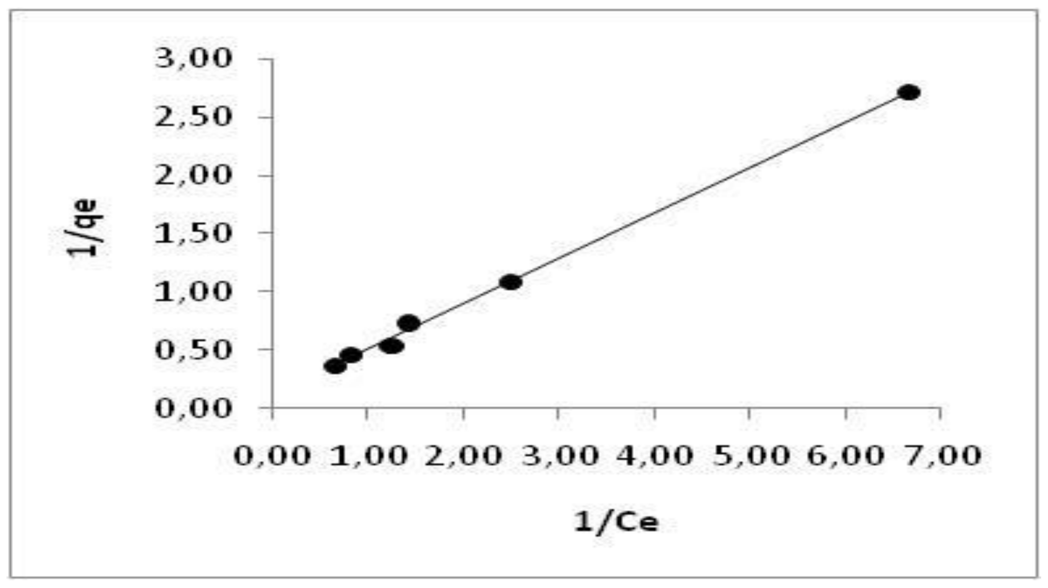

Figure 4 isotherms of iron ion adsorption by Baroness leaf on the model of Langmuir.

CONCLUSION

The Langmuir model presented the best linear correlations for both adsorbents, 0.995 to 0.997 for the stem and leaf. The maximum capacity of the adsorption sheet had a higher value (qm = 8.16 mg g-1) than the stem adsorption capacity (qm = 3.14 mg g-1).