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## Study of the Textural Properties of Bovine Bones Char under Different Conditions

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### Author(s)

Juan C. Moreno-Piraján, Liliانا Giraldo, Vanessa S. Garcia-Cuello

### ABSTRACT

Environmental pollution is today a very important issue and the development of low cost materials and different sources need to be investigated. Our research group for several years she has been the development of adsorbent materials for industrial wastewater treatment and rivers. In this research compares the porosity developed by two different treatments using bovine bones to adsorb metal ions. Using bovine bones as raw material, two carbonized samples were obtained under different conditions. One of the carbonized samples was obtained in an oxidizing atmosphere at up to 600°C for 2 hours. The other was obtained in an inert atmosphere at up to 800°C, during 2 hours. Different textural characteristics were obtained in each of the carbonized samples according to the conditions of synthesis. The carbonized sample obtained in the oxidizing atmosphere, CHUOX, produces a great pore distribution, with a significant mesopore volume, reflected in the hysteresis loop, while in carbonized bone obtained in an inert atmosphere, CHUN, a formation of micropores and mesopores smaller than that obtained in the other carbonized sample is observed. The surface area obtained is 130 m<sup>2</sup> g<sup>-1</sup> for CHUOX and 170 m<sup>2</sup> g<sup>-1</sup> for CHUN. Furthermore, the adsorption capacity of Ni<sup>2+</sup> and Cu<sup>2+</sup> ions from solution was measured for these two carbonized samples, and a higher retention of both ions in the carbonized sample obtained in the inert atmosphere was found, with values between 28.57 and 67.56 mg g<sup>-1</sup>. The immersion enthalpies of carbonized samples in ion solutions are determined with an exothermic effect for the solution-solid interaction.

### KEYWORDS

Adsorption, Heavy Metals, Water, Immersion Calorimetry, Bovine Bone

### Cite this paper

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### References

- [1] S. Al-Asheh, N. Abdel-Jabar and F. Banat, "Packed-Bed Sorption of Copper Using Spent Animal Bones: Factorial Experimental Design, Desorption and Columnregeneration," *Advances in Environmental Research*, Vol. 6, 2002, pp. 221-227. doi:10.1016/S1093-0191(01)00053-3
- [2] M. Rao, A. V. Parwate and A. G. Bhole, "Removal of Cr<sup>6+</sup> and Ni<sup>2+</sup> from Aqueous Solution Using Bagasse and Fly Ash," *Waste Manag.*, Vol. 22, 2002, pp. 821-830. doi:10.1016/S0956-053X(02)00011-9
- [3] K. H. Keith and G. McKay, "Study of Arsenic (V) Adsorption on Bone Char from Aqueous Solution," *Journal Hazard Mater.*, Vol. 160, No. 1, 2008, pp. 845-854.
- [4] K. Chojnacka, "Equilibrium and Kinetic Modelling of Chromium (III) Sorption by Animal Bones," *Chemosphere*, Vol. 59, No. 3, 2005, pp. 315-320. doi:10.1016/j.chemosphere.2004.10.052
- [5] M. Sitting, "Handbook of Toxic and Hazardous Chemicals," Noyes Publications, Park Ridge, New Jersey, 1981, pp. 876-932.

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- [6] M. C. Van der Leeden; F. L. Troise and D. K. Todd, "The Water Encyclopedia," 2nd Edition, Lewis Publisbas, Michigan, 1990, pp. 876-998.
- [7] D. Lima; C. Airoidi and K. K. Sousa, "Adsorption and Thermodynamic Studies of Cu(II) and Zn(II) on Organo Functionalized-Kaolinite," *Applied Surface Science*, Vol. 254, 2008, pp. 5157-5163. doi:10.1016/j.apsusc.2008.02.017
- [8] Y. Ladino-Ospina; L. Giraldo and J. C. Moreno-Piraján, "Calorimetric Study of the Immersion Heats of Lead (II) and Chromium (VI) from Aqueous Solutions of Colombian Coffee Husk," *Journal of Thermal Analysis and Calorimetry*, Vol. 81, No. 2, 2005, pp. 435-440. doi:10.1007/s10973-005-0803-6
- [9] L. Giraldo and J. C. Moreno, "Calorimetric Determination of Activated Carbons in Aqueous Solutions," *Journal of Thermal Analysis and Calorimetry*, Vol. 89, No. 2, 2007, pp. 589-594. doi:10.1007/s10973-006-7524-3
- [10] J. C. Moreno and L. Giraldo, "Determination of the Immersion Enthalpy of Activated Carbon by Microcalorimetry of the Heat Conduction," *Instrumentacion Science Technology*, Vol. 28, No. 2, 2000, pp. 171-178. doi:10.1081/CI-100100970