

**Área: ANA**

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## Study of Cd extraction from environmental water samples using soy derived magnetic biochar

**Krystopher B. Krammer (PG),<sup>1\*</sup> Leticia C. Rios (PG),<sup>1</sup> Bianca Santos (IC),<sup>1</sup> Isadora Munhoz (IC),<sup>1</sup> Juliana Maciel (PQ),<sup>1</sup> Daiane Dias (PQ),<sup>1</sup> Eliézer Oreste (PQ).<sup>1</sup>**

**[kbkrammer@gmail.com](mailto:kbkrammer@gmail.com)**

<sup>1</sup>Laboratório de EletroEspectro Analítica – LEEA, FURG.

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### Highlights

- A soy BCM based method was successfully validated for Cd extraction from environmental water samples;
- The method showed high accuracy (97.2%) and precision (RSD 12.4%).

### Abstract

There is a growing demand for cost-effective and efficient alternatives for the removal of potentially toxic metals such as cadmium (Cd), due to the risks they pose to aquatic ecosystems [1]. In marine organisms such as green sea turtles (*Chelonia mydas*), Cd has been detected in blood samples at concerning levels, indicating bioaccumulation through the food chain and potential impairment of physiological functions [1]. The use of magnetic biochar (MBC) has proven promising, as it allows easy magnetic separation and good adsorption capacity [2]. The proposed analytical method, consisting of 5 ppm Cd with an adsorption time of 14 minutes, [HNO<sub>3</sub>] of 0.0005 mol L<sup>-1</sup>, and a desorption time of 10 seconds, was validated through recovery and spiking assays performed in triplicate using environmental samples from Patos Lagoon, along with blank and fortified sample analyses, ensuring consistency and robustness. The evaluated parameters being limits of detection (LOD) and quantification (LOQ), precision, and accuracy were determined by GF AAS and met the requirements of the INMETRO guideline DOQ-CGCRE-008 [3] ( $R^2 \geq 0.99$ ), demonstrating the reliability of the procedure.

The obtained LOD (0,4245 ppb) and LOQ (1,274 ppb) values were below the maximum Cd limit established for drinking water (3 ppb) by Ordinance GM/MS No. 888/2021, indicating the suitability of the method for environmental monitoring. Precision and accuracy were within the acceptable ranges (10–15% and 80–120%, respectively), with a recovery of 97.2% and an RSD of 12.4% for spiked samples, confirming the efficiency of MBC in metal extraction. These results demonstrate that the validated method is sensitive, and suitable for application in environmental aqueous matrices such as Patos Lagoon waters.

[1] PÉREZ et al. **Marine Pollution Bulletin**, [s. l.], v. 190, p. 114879, 2023.

[2] MATOS et al. **Journal of the Brazilian Chemical Society**, [s. l.], 2017

[3] INMETRO. **DOQ-CGCRE-002: Orientação sobre validação de métodos analíticos**. Rio de Janeiro: Instituto Nacional de Metrologia, Qualidade e Tecnologia, 2020.

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