**Behavior and distribution of 210Po in brackish aquatic ecosystem of Uruguay**

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The study of the presence, distribution, and transfer of natural radionuclides in the environment is becoming increasingly important. Specifically, the uranium-238 (238U), uranium-235 (235U), and thorium-232 (232Th) decay chains provide a set of radionuclides with a wide range of half-lives, whose evolution in different natural compartments provides information about the behavior of an ecosystem.

Polonium-210 (210Po) is a natural radionuclide belonging to the 238U series, characterized by its high radiotoxicity and its ability to bioaccumulate in certain tissues, transferring through the food chain and contributing to the dose received by both marine biota and humans through the consumption of marine products. Various studies conducted in the marine environment show that 210Po concentrations in organisms vary widely among different phylogenetic groups as well as among different tissues of the same species. However, freshwater and brackish aquatic systems have been poorly evaluated.

To partially address this deficiency, a study of 210Po was conducted in Castillos Lagoon, a brackish lagoon on the eastern coast of the Rocha department with intermittent connection to the ocean, to determine 210Po activity concentrations in different compartments and understand activity flows between them. Seasonal sampling was conducted at 5 selected points in the lagoon, where 210Po activity concentrations were determined in water, sediment, different species of fish, freshwater razor clam, blue crab, shrimp, phytoplankton, and zooplankton. 210Po was determined using alpha spectrometry, with radiochemical separation and self-deposition on silver disk.

In this study, the average values of 210Po concentration in water and sediments for the various seasonal samplings conducted will be presented, along with the ranges of the calculated distribution coefficients, Kd (L/kg), between sediment and water. Transfer coefficients between biota and water or sediment were also calculated, ranging from 102 to 105 depending on the aquatic organism and the tissue considered.

The results show that 210Po present in water is concentrated by phytoplankton and transferred to the next trophic level along marine food chains, with the main absorption route through ingested food, while the absorption of dissolved forms of 210Po in water provides only a minor contribution. The great variability of the results obtained in different species may correlate with the feeding habits of the organisms analyzed. Species that feed on phytoplankton and zooplankton tend to have high 210Po activity concentrations. However, species located at higher levels of the food web, such as top predators (piscivores), tend to have lower activity concentrations of this radionuclide.