

NATURAL ENVIRONMENTAL RADIOACTIVITY IN VALIZAS RESORT, ROCHA, URUGUAY

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The Uruguayan east coast has a very reach ecosystem and a variety of mineral resources such as black sand ores, with 7 million tons of heavy minerals evaluated in the Aguas Dulces area. These ores are composed by 50% of ilmenite, 20% of magnetite, 5% of zircon, 1% of rutile and 0.6 % of monazite. As a result of this, all the radionuclides which belonging to the 238-U and 232-Th series are present in the Uruguayan east coast. The objective of this work is to evaluate how the natural radioactive contaminants transfer from the sand to other compartments. Samples were took from Valizas Resort (34° 20' 31,42" S and 53° 47' 19,47" W). Total alpha and beta activity was measured using a Analyzing miniscaler Ratemeter model PRS-5 with a sample compartment STB-3, in sand, sea and fresh water, and plants. All samples were previously treated as follows. Sand was dried, water was evaporated and coast plant was calcinated. Background, sand, seawater and fresh water residues, vegetation ashes and a 238U standard were measured. Some representative values of the specific activity obtained are 445 + 193 (dpm/L) for sea water, 7,2 + 1,7 (dpm/L) for fresh water near the coast, 5,8 + 2,0 (dpm/L) for fresh water far from the coast 20,9 + 3,0 (dpm/g) for sand and 0,7 + 0,5 (dpm/g) for plants. The transfer coefficients are $2,1 \times 10^{-3}$ for sea water, $3,4 \times 10^{-4}$ for fresh water near the coast, $2,8 \times 10^4$ far from the coast and $3,3 \times 10^{-2}$ for plants. From the specific activity and the transfer coefficients obtained, we can conclude that natural radioactive contaminants move from the sand to other compartments. The sea water has 13 times the maximum permissible specific activity for drinking water (33 dpm/L) whereas the fresh water value is below the intervention level. The transfer coefficient from sand to plant is the highest; the value obtained is in the order of results reported in the literature. Future work will be focused on determining naturally occurring radionuclide by gamma and alpha spectroscopy, in order to identify specific radionuclide transfer coefficient.

Keywords: natural radioactivity, soil-to plant transfer, black sands