

RADIOLOGICAL IMPACT OF EL HIERRO SUBMARINE VOLCANO ON THE BROWN ALGAE *Lobophora variegata*

N. Miquel-Armengol*¹, A. Tejera¹, F. Tuya², H. Alonso¹, A.C. Arriola-Velásquez¹,
J.G. Rubiano¹ and P. Martel¹

¹ Department of Physics, Instituto Universitario de Investigación en Estudios Ambientales y Recursos Naturales i-UNAT, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, SPAIN.

neus.miquel101@alu.ulpgc.es

² Department of Biology, Grupo en Biodiversidad y Conservación, IU-ECOQUA, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, SPAIN.

In this work, we present the radiological impact in the surroundings of the Tagoro submarine volcano several years after its eruptive analysing marine environmental samples. For this purpose, besides collecting coastal water, brown algae *Lobophora variegata* were collected along the coastal perimeter of El Hierro island, with the aim of using them as an environmental dosimeter due to their high accumulation power. Radionuclides analysed by alpha and gamma spectrometry were ²³⁸U, ²³⁴Th, ²³⁴U, ²²⁶Ra, ²¹⁰Pb, ²¹⁰Po, ²³⁵U, ²²⁸Th, and ⁴⁰K. The activity concentrations, concentration factors (CF) and ratios were calculated for all the samples considering the area affected by the volcano and the unaffected area. In the latter case, *L. variegata* algae collected on Las Canteras beach were also analysed. Lower values of activity concentrations for ²³⁴Th and ²³⁴U were measured in La Restinga zone (1310 ± 50 Bq/Kg; 5.8 ± 0.6 Bq/Kg) than ones obtained in the other areas non affected by the volcano (1660 ± 70 Bq/Kg; 7.5 ± 0.6 Bq/Kg); however, they were higher in El Hierro (1570 ± 60 Bq/Kg; 94 ± 8 Bq/Kg) than in Las Canteras (600 ± 30 Bq/Kg; 77 ± 8 Bq/Kg). Respect to coastal water samples, activity concentrations for ²¹⁰Po measured in El Hierro island were considerably higher both in volcano zone and in Las Canteras beach. The calculated CF in algae from both islands do not seem to show any noticeable difference. For the ratios among the radionuclides, those close to equilibrium were associated to conservative radionuclides (²³⁴U and ²³⁸U) and those in not equilibrium to reactive particle (²³⁴Th, ²¹⁰Po and ²¹⁰Pb). Finally, two-way ANOVAs tested for differences in the radionuclides' activity concentrations and the activity concentration ratios, between the two areas (affected and non-affected) and sites within each area were performed. Significant differences between El Hierro and Las Canteras, mainly for ⁴⁰K and ²³⁴Th were found.

Key words: Submarine volcano, Brown algae, Environmental dosimeter, Natural radionuclides