

Environmental geological studies of thorium and other radioactive elements in the Narigan Area (Central Iran) Islamic Republic of Iran

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The study area is located in the Yazd Province, the Bafq-Saqand metallogenic zone in Central Iran structural zone. Lithologically, the stratigraphic units of the Narigan area include the Rizzo limestone formations, Narigan granite, quartz-porphyry and metasomatic granites. The study area has higher concentrations of radioactive elements and some elements of exceeding health standards. These elements are potentially mobile and may migrate from the soil into plant tissues via root absorption and thence to animals. The emitted radiation can also put animals at risk. Environmental studies were undertaken in this research area in order to determine the biodiversity of plants and animals in the Narigan area. Soil and plant root samples were also taken. The amounts of radioactive elements were analyzed by gamma-ray spectrometry with hyper-purity germanium detectors (HPGe). Data obtained from analysis of these plants shows that most samples had elevated concentrations of the radioactive elements ^{226}Ra , ^{137}Cs , ^{40}K , ^{238}U and ^{232}Th , and can be considered as an environmental risk. The radionuclide study of plant and laboratory XRF studies of soil samples show that the roots of the plant *Astragalus* can be a geobotanical reference material for the two elements U and Th in the Narigan region.

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