

RADON LEVELS IN BUILDING BASEMENTS AND ABOVE-GROUND FLOORS AT SÃO PAULO, BRAZIL

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Radon-222, a decay product of Ra-226, is a natural radioactive noble gas that can be found in soil, water and air. Radon and its short-lived decay products in the atmosphere are the most important contributors to human exposure from natural sources [1]. Radon is recognized as the second most significant risk for lung cancer after tobacco smoking. The World Health Organization recommends an average concentration of 100 Bq m^{-3} [2] for radon in air, in order to limit its hazards due to indoor exposure.

The main source of radon exposition indoors comes from Ra-226, a decay product of the U-238 natural series, present in rocks and soils underneath the building and, to a lesser extent, in the building materials. The dynamics of radon production in rocks and soil and its subsequent indoors emanation is quite complex. It is controlled by factors such as soil permeability and water content, meteorological variability, building foundation characteristics and the usual positive differential pressure between the soil and the indoor environment. This is normally sufficient to bring soil gas from the ground into the building. Radon gas can enter a building by several mechanisms, but the most significant ones are diffusion and pressure-driven flow from the ground. Usually, cracks and holes in the floor and walls and gaps around service pipes are the main entrance for the radon gas. Studies indicate that indoor radon concentration present significant variation on the basement, ground floor and upper floors [3].

The aim of this study is to determine the radon levels in building basements and above-ground floors in São Paulo, Brazil. Radon measurements were carried out through the passive method with solid-state nuclear-track detectors (CR-39), because of their simplicity and long-term integrated read-out. The exposure period was, at least, three months, covering one year minimum, in order to determine the seasonal variation of indoor radon concentration.

Ref.

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- [2] World Health Organization. WHO handbook on indoor radon: a public health perspective, WHO Press (2009).
- [3] Sánchez A. M., Pérez, J. de la, Sánchez, A.B.R., Correa F.L., Radon in workplaces in Extremadura (Spain), *Journal of Environmental Radioactivity* 107(2012), pp. 86-91.