

GEOLOGICAL RISK ASSESSMENT OF EXPOSURE TO CHEMICAL ELEMENTS FOR ENVIRONMENTAL HEALTH IN THE ARAÇUAÍ PEGMATITE DISTRICT OF ITINGA MINAS GERAIS, BRAZIL

CASSIO ROBERTO DA SILVA^{1*}, EDSON FARIAS MELLO², CÍCERA NEYSI DE ALMEIDA², ANDRÉ LUIZ SOUZA³, ANTONIA LUCIA DOS SANTOS⁴, FERNANDO BARBOSA JUNIOR⁵

¹Federal Univ Rio de Janeiro (UFRJ) – Res. Comp. Mineral Resources/Geol. Survey of Brazil (CPRM/SGB), Rio de Janeiro, Brazil

²Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil

³Iguaçu University – Fundação Oswaldo Cruz (FIOCRUZ), Rio de Janeiro, Brazil

⁴Fundação Oswaldo Cruz (FIOCRUZ), Rio de Janeiro, Brazil

⁵Fac. of Pharmac Science of Ribeirão Preto – Univ São Paulo (USP), Ribeirão Preto, SP, Brazil
cassio.silva@cprm.gov.br

The research was performed in a mineral district where there are several lithium ferrous pegmatites. The geological and geochemical studies of the area and toxicological results in three risk groups as follows: Metasediments of Macaúbas Group and Salinas Formation occur in the area, as well as aluminous granites (Teixeirinha and Quati) mainly formed by quartz, feldspars, muscovite, biotite, sillimanite, andalusite, cordierite and tourmaline; The 51 drainage and untreated water supply samples, from approximately 80% of the area, were analyzed and results showed Al values from 0.200 to 0.928 ppm, exceeding the Health Ministry and CONAMA recommended levels; The 3.1% Al average content in 46 soil samples is also high as compared with the 1.7% Al in soils from 08 Minas Gerais drainage basins and the 0.96% Al average value in 39 stream sediment samples show results relatively close to the 0.88% Al found in stream sediments of the cited basins; Analyses of 12 samples of vegetables (cucumber, mustard, onions, cabbage and bell pepper) showed an average of 1059 mg/kg Al; The Igrejinha and Fazenda Velha communities (Araçuaí Municipality), where 133 people were subjected to plasma analyses, revealed 68% are with Al values above 03 g/L, up to this value is considered normal by the ATSDR (2008), 49% of the people have >10µg/L, 10% of the population >60µg/L, 4% >100µg/L and 2% >200µg/L. And in a group of 16 people receiving dialysis, 94% of this population is above 03µg/L of Al, 75% >10µg/L, 44% >60µg/L, 25% >100µg/L and 19% >200µg/L. The results show that the Al absorbed by the Igrejinha and Fazenda Velha populations is of natural origin, with the exposure path: rock-soil-water-food. It is estimated that in the study area 3200 people living on the river banks of the Jequitinhonha tributaries, especially the Piauí Creek, are exposed to Al, which can cause adverse health effects such as neurological diseases, osteoporosis and renal, pulmonary and liver failure. Clinical and epidemiological studies related to Al exposure are recommended for this region and medical geology studies for areas where enterprises, such as mining, are proposed, which can cause impacts to human health and the environment. It is important to carry out this work before establishing the new development, during its operation and following deactivation.

Keywords: geological risks, environmental, health