



Lead contaminates soil and inhabitants in the region of Alto Vale do Ribeira

DATE

22/11/2011

DISTRICT

-

LATITUDE

-

LONGITUDE

-

SUMMARY

In recent years, some research works have shown the existence of sources of contamination by lead in most of the municipalities in the region of Alto Vale do Ribeira, located between the States of Paraná and São Paulo. The main cause of the contamination is attributed to industrial mining, which was installed in some of the cities along the valley throughout the 20th century.

fell by half. As a result, the economic base of the municipality started to revolve around civil service, agriculture, livestock and the trade and services sector (IPARDES apud DI GIULIO; PEREIRA; FIGUEIREDO, 2008).



CASE DESCRIPTION

Mining and metallurgical activities performed in Alto Vale do Ribeira, located between the States of Paraná and São Paulo, have generated environmental liabilities, such as the contamination of rivers and soils in several areas of the region (CUNHA et al., 2006). In addition, they have subjected the population to health issues arising, especially, from arsenic contamination, whose main source is arsenopyrite, which occurs geologically in lead ore (SAKUMA et al., 2010).

Vale do Ribeira was once one of Brazil's largest lead metallogenic provinces. In the region, there is an important reservoir of fresh water, as well as a large area of remnant Atlantic Forest (LOPES Jr. et al., 2006). Throughout the 20th century, several mines of lead, zinc and silver were exploited in Alto Vale (CUNHA et al., 2006).

During the peak years of mining, the local population experienced a relatively prosperous standard of living. With soil exhaustion and the closing of mines and refineries, there was a strong decline in economic and social indices. Today, Adrianópolis (PR), as well as other municipalities that had strong mining activity in the past, is among the poorest in the region (CUNHA et al., 2006). Due to the shortage of jobs and the precarious living conditions, the population of Adrianópolis

The city is located in the metropolitan region of Curitiba (MAPA DA INJUSTIÇA AMBIENTAL E SAÚDE NO BRASIL, 2009). With 1,349,335 km² and 6,376 inhabitants (IBGE, 2010), Adrianópolis was the target of lead extraction and refinement activities by Plumbum do Brasil Ltda. for more than 50 years (CUNHA et al., 2006), belonging to the Trevo Group, which settled in Vila Mota, in the rural area of the municipality (DI GIULIO; PEREIRA; FIGUEIREDO, 2008). Plumbum began exploring lead and silver in the municipality in 1954. As the deposits depleted, the company closed in 1995 leaving big environmental liabilities. Through water and air pollution, its activities also reached other municipalities of Paraná, such as Cerro Azul, Bocaiúva do Sul, Doutor Ulysses, Tunas do Paraná and Colombo, as well as Apiaí, Ribeira, Iporanga and Itaóca, in the State of São Paulo (MAPA DA INJUSTIÇA AMBIENTAL E SAÚDE NO BRASIL, 2009).

During its 50 years of operations, Plumbum released into the

atmosphere huge amounts of particulate matter rich in lead, which was deposited in soils in nearby areas. Even after a decade of closure of the plant and the last lead mines, the environmental liability remains, as well as the risk of contamination of local populations (FIGUEIREDO, 2005 apud DI GIULIO; PEREIRA; FIGUEIREDO, 2008).

In areas close to the company's disabled refinery, the accumulation of waste from the industrial process - deposited for years in the open - led to soil contamination by lead (CUNHA et al., 2006). Tailings from the Panelas mine, another former property of the company in Adrianópolis, reached the Ribeira do Iguape River, because as the company processed the ore (predominantly galena), the waste and effluents were disposed of directly into the river bed. In addition, the tailings and slag were piled next to the riverbanks (LOPES Jr. et al., 2006).



Part of the tailings improperly stored by the company was also used by the locals in the pavement of the streets in Vila Mota and Vila Capelinha, working-class villages in the vicinity of the former refinery in Adrianópolis. In an area close to Panelas, high concentrations of lead were found in waste dumped in a location where children used to play daily (LOPES Jr. et al., 2006).

Lead can be absorbed by ingestion of food and water or through inhalation of contaminated dust, a common form mostly among young children. Contamination may cause various harmful effects to health, including: irreversible disorders in the central nervous system, anaemia and renal changes (CUNHA et al., 2006).

Studies have diagnosed high lead levels in the blood of children from Adrianópolis and its vicinity (CUNHA et al., 2006; SAKUMA et al., 2010). The survey collected blood samples of 335 children aged between 7 and 14 years old and 350 adults, between 15 and 70 years old, living in Adrianópolis and in the municipalities of Cerro Azul, Ribeira and Iporanga. Samples of soil and water of the region studied were also collected (CUNHA et al., 2006; LAMMOGLIA et al., 2010).

Except for the population in the town of Cerro Azul, where there was no mining activity, the arithmetic average of the

percentage of lead found in the blood of the individuals analyzed was considered high and dangerous to human health. The indices recorded in Ribeira and Iporanga also raised concern. Among adults, the highest rates were found in former employees of Plumbum's refinery, residents of Vila Mota and Vila Capelinha, in Adrianópolis. Among the children living in the villages, blood lead values were above 10 grams per deciliter (g/dL), value considered alarming by the researchers (CUNHA et al., 2006; LAMMOGLIA et al., 2010).

Regarding contamination by arsenic, researchers from the Adolfo Lutz Institute (São Paulo), the Poison Control Center at the State University of Campinas (Campinas-SP), the Institute of Geosciences from the State University of Campinas (Campinas-SP), the Center for Health Sciences from the State University of Londrina (Londrina-PR) and the Research Company for Mineral Resources (Rio de Janeiro-RJ) verified the presence of the substance in urine samples of children between 7 and 14 years old from the towns of Cerro Azul, Adrianópolis, Ribeira and Iporanga. According to the results, the difference between the amount of arsenic found in the Cerro Azul residents - not exposed to mining activities - and the others - who lived closest to the mining areas - was quite big (SAKUMA et al., 2010).

Chronic exposure to arsenic compounds can cause several health damages, such as peripheral vascular disorders, hyperpigmentation, hyperkeratosis, as well as different types of cancer: skin, bladder, lung, liver, and other organs (SAKUMA et al., 2010).

Several studies are still being conducted in an attempt to scale the extent of lead contamination in Alto Vale do Ribeira. The Public Prosecutor's Office of Paraná has been working together with an inter-institutional committee to discuss and try to offer solutions to the problems that plague residents from Adrianópolis and other municipalities (MP-PR, 2009).



In 2011, an injunction was granted against Plumbum, the National Department of Mineral Production (DNPM), the municipality of Adrianópolis and the Sanitation Company of Paraná (Sanepar) for the environmental contamination and damage to the health of the populations of Vila Mota and Vila

Capelinha. The defendants are expected to adopt several measures to remediate the damage caused to the environment and offer treatment to all people impacted by the mining activities in the region (PARANÁ.EXTRA.COM.BR., 2011).

GEOGRAPHIC LOCATION

BIBLIOGRAPHIC REFERENCES

- CUNHA, Fernanda Gonçalves; FIGUEIREDO, Bernardino Ribeiro; PAOLIELLO, Mônica Maria Bastos; CAPITANI, Eduardo Mello. Diagnóstico ambiental e de saúde humana: contaminação por chumbo em Adrianópolis, no estado do Paraná, Brasil. In: SILVA, Cássio Roberto; FIGUEIREDO, Bernardino Ribeiro; CAPITANI, Eduardo Mello; CUNHA, Fernanda Gonçalves. Geologia Médica no Brasil. Rio de Janeiro: CPRM – Serviço Geológico do Brasil, 2006.
- DI GIULIO, Gabriela Marques; PEREIRA, Newton Müller; FIGUEIREDO, Bernardino Ribeiro. O papel da mídia na construção do risco: o caso Adrianópolis, no Vale do Ribeira. In: História, Ciências, Saúde-Manguinhos, v. 15, p. 293-311, 2008. Disponível em: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-59702008000200004. Acesso em: 22 nov. 2011.
- IBGE, Instituto Brasileiro de Geografia e Estatística. Adrianópolis (PR). In: IBGE Cidades. Disponível em: <http://www.ibge.gov.br/cidadesat/xtras/perfil.php?codmun=410020&r=2>. Acesso em: 21 nov. 2011.
- LAMMOGLIA, Talita; FIGUEIREDO, Bernardino R.; SAKUMA, Alice M; BUZZO, M.L.; OKADA, Isaura A.; KIRA, C. S. Lead and other trace elements in edibles and in topsoil as a pathway for human contamination in a mining area in Brazil. Terra e (Campinas. Impresso), v. 7(1-2), p. 3-13, 2010.
- LOPES Jr, Idio; FIGUEIREDO, Bernardino Ribeiro; ENZWEILER, Jacinta; VENDEMIATTO, Maria Aparecida. Chumbo e arsênio nos sedimentos do rio Ribeira e de Iguape, SP/PR. In: SILVA, Cássio Roberto; FIGUEIREDO, Bernardino Ribeiro; CAPITANI, Eduardo Mello; CUNHA, Fernanda Gonçalves. Geologia Médica no Brasil. Rio de Janeiro: CPRM – Serviço Geológico do Brasil, 2006.
- MP-PR. Ministério Público do Estado do Paraná. Técnicos discutem contaminação de chumbo no Vale do Ribeira. Relatório. Paraná, 12 ago. 2009. Disponível em: <http://www.mp.pr.gov.br/modules/noticias/makepdf.php?storyid=298>. Acesso em: 4 mar. 2010.
- MAPA DA INJUSTIÇA AMBIENTAL E SAÚDE NO BRASIL. Após "prosperidade", exploração do chumbo e prata em Adrianópolis e adjacências gera passivo ambiental e contaminação, 06 dez. 2009. Disponível em: <http://www.conflictoambiental.iciet.fiocruz.br/index.php?pag=ficha&cod=166>. Acesso em: 21 nov. 2011.
- PARANÁ.EXTRA.COM.BR. MP anuncia liminar contra danos por chumbo: Adrianópolis, 06 jun. 2011. Disponível em: <http://paranaextra.com.br/2011/06/06/mp-anuncia-liminar-contra-danos-por-chumbo-adrianopolis/>. Acesso em: 22 nov. 2011.
- SAKUMA, Alice Momoyo; CAPITANI, Eduardo Mello de; FIGUEIREDO, Bernardino Ribeiro; MAIO, Franca Durante de; PAOLIELLO, Monica Maria Bastos; CUNHA, Fernanda Gonçalves da; DURAN, Maria Cristina. Avaliação da exposição de crianças ao arsênio em área de mineração de chumbo na Região Sudeste do Brasil. Cad. Saúde Pública [online]. 2010, v.26, n.2, p. 391-398.