



Mobilization and transport of pollutants in an abandoned dump in tropical conditions

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The valuation and treatment techniques of municipal solid waste (MSW) in developing countries are not sufficiently developed, and therefore, the volume of waste destined for disposal still presents significant amounts. In Brazil, the more common practice of final destination is the deposition on the soil, due to its simple operation and low cost compared to other techniques. One of the most serious negative environmental impacts in the irregular disposal of solid waste is the contamination of soil and groundwater by waste leachates. The final disposal in dumps is forbidden by Brazilian law since 2010, nevertheless, the public administration is not prepared to monitor waste disposal areas and the risk of contamination of water. In this sense, a research has been developed in an abandoned dump installed over an outcrop of the Botucatu Formation, which is part of the Guarani Aquifer System (SAG) and therefore, is an area of high water vulnerability. In this dump, an old gully was used as a final waste disposal area for urban, construction and demolition, medical and industrial waste from 1980 to 1996. Since the end of the deposition, the waste body is kept with inefficient hydraulic control. The water infiltration due to rainfall promotes the mobility of contaminant in the deposit. The present water quality in the dump has been monitored through physical and chemical analysis of samples collected in the unsaturated zone (inside the waste mass using vacuum lysimeters) and in the saturated zone (monitoring wells). The rainfall variation observed in the years 2014 (dry year) and 2015 (wet year) contributed significantly to evaluate the mobilization of pollutants within the dump. The reduction of the water volume that infiltrates the waste mass affected the quality of the leachate collected in the lysimeters. The groundwater collected in monitoring wells outside the dump area presents low turbidity values (<1.50 NTU) in relation to wells located downstream of the dump showed values greater than 10, a similar behavior was observed for the conductivity ($>1000 \mu\text{S}\cdot\text{cm}^{-1}$ in leachate) and chlorides values ($>800 \text{mg}\cdot\text{L}^{-1}$). Contaminated water flows through the bottom of the dump. In addition, this research also indicates amendments of surface water downstream of the dump area.