3.059 The Influence of BTEX Landfill Gas Emissions: A Case Study on Residents' in Roodepoort, Gauteng.

Early Career Scientist

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Abstract:

Landfills are known to produce pollutants that have a negative impact on humans and the environment. In developing countries like South Africa, land-filling is the most common form of solid waste management. People living in close proximity to landfills are particularly at risk to harmful pollutants such as the volatile organic compounds (VOC's). Although VOC's only constitute about 1% of landfill gas emissions (LFGs), they are of concern as the risk associated with these pollutants is relatively high. Of particular concern, within the VOC's, is the BTEX group (viz. benzene, toluene, ethyl-benzene and xylenes). These pollutants are wind dispersed to the surrounding residential areas, exposing residents to harmful emissions. Using Radiello Passive Samplers (analysed using a GC with built-in FID) within the residential areas surrounding the landfill, BTEX LFG emissions were quantified and spatially mapped. A 9-day sampling campaign from 27 July to 5 August 2015 was employed. The BTEX levels obtained ranged from 8.83 to 39.62 $\mu g.m^{-3}$. The effect of the slow south and south westerly wind speeds of 2.44 $m.s^{-1}$ obtained from the Davis Weather Station positioned in the residential area, the valley terrain, and the location of the landfill resulted in a BTEX 'hotspot' location within the Panorama area, north and east of the landfill site. Combined with the sampling strategy, a perception study revealed that respondents' in this 'hotspot' area had concerns regarding the landfill site and its associated pollution. It can be concluded that respondents living closer to the landfill, in the Panorama area, are at higher risk to BTEX emissions, especially during the winter season. This situation thus demands further analysis, specifically during summer, and particularly attention from decision makers. This study should furthermore be considered as a pilot study as many other, more in depth studies may come from this work.