AN INVESTIGATION ON ENVIRONMENTAL AIR LEVELS OF VOCs IN AN INDUSTRIAL TOWN

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Volatile organic compounds (VOC) can be found in non-industrial indoor and outdoor air as well as industrial workplace environments and in various materials used in daily life. The important effects of VOCs can be listed as stratospheric ozone depletion, ground level photochemical ozone formation, toxic and carcinogenic health effects, and global greenhouse effects. Toxic and carcinogenic health effects of VOCs can be caused by a direct mechanism and there is a growing concern for VOCs which could induce cancer in the human population. The most widely used analytical method for the study of VOCs is sampling onto adsorbents like active carbon and Tenax by active or passive sampling and then subsequent thermal desorption (TD) or solvent desorption of trapped compounds in a capillary gas chromatography (GC) column and detection using generally GC-Flame Ionization Detector (FID) / Mass Spectrometer (MS) (Parra et al. 2009).

Benzene, Toluene, Ethylbenzene and Xylene (BTEX) are the group of VOCs widely used as representative of VOC pollution. In this, BTEX measurements were made in Dilovasi at two selected points. One was at the center of the town (DLV) and the other was GYTE campus which can be considered as a background area. Dilovasi is a coastal town in the Marmara region known for its deteriorated environmental conditions. Cancer is the primary death cause for Dilovasi residents with a ratio three times higher than Turkey’s general average. Active and passive tube sampling methods were used to collect the air samples and BTEX levels were determined by thermal desorption GC-FID analytical system. In the preparatory step long term passive sampling results for 2, 3, and 4 weeks sampling times were compared and 2-week sampling was chosen due to observed lowest back diffusion. BTEX concentration ratios were calculated as (5.4;9.1;1.0;3.1) at DLV and (6.1;7.5;1.0;2.2) at GYTE using passive sampling results. Active samples taken in the morning at DLV showed significant correlation among BTEX compounds suggesting the effect of traffic related VOC pollution at the site while GYTE is not under direct effect of VOC sources but having polluted aged air masses. BTEX levels from active tube sampling exhibit up to 4 times of the concentration values obtained from passive sampling. The study revealed that ambient air of Dilovasi does not have critically high BTEX levels which eliminates BTEX as primary VOC pollution concern in the region.

References