

Floor Dust PAHs inside University Lecture Rooms, Offices and Workshop

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People spend about one third of their time at work/school, where a vast range of equipment is used such as printers, photocopiers, computers and etc. These equipments are considered a considerable source of air pollutants that settle down into floor dust (Ren et al., 2006; He et al., 2007; Koivisto et al., 2010; Hussein, 2014). Regarding the content of office floor dust, the most frequent and hazardous compounds are polycyclic aromatic hydrocarbons (PAHs). PAHs are products of the incomplete combustion of organic matters and they could be either natural or anthropogenic (Kameda et al., 2005).

According to our knowledge, PAHs analysis in floor dust have been given little attention in Middle East. Therefore, in this study we reported the concentrations of 13 priority PAHs in indoor floor dust collected in lecture rooms, offices and workshop areas at the University of Jordan, Amman, Jordan. The floor dust samples were collected on the 6th of April 2015. The building itself is naturally ventilated.

GC-MS analysis indicated that the dominant PAHs from the collected dust in the Department of Physics were in descending order, fluoranthene (16.16%), pyrene (13.61%), chrysene (12.66%), phenanthrene (12.21%), benzo[b]fluoranthene (11.61%) and benz[a]anthracene (7.82%). The least abundant PAHs were dibenz[a,h]anthracene, anthracene and indeno[1,2,3-cd]pyrene with 0.43%, 3.08% and 3.74% of the total PAHs, respectively.

Results of analysis indicated that both offices 300 and 200, in addition to 1st floor corridor, contained the highest PAHs concentrations measured at the Physics building for fluoranthene, and phenanthrene, respectively (Figure 1). In particular, the maxim PAHs concentrations for the office 300 were equal to 969.35 ng/g (total PAHs concentrations = 5246.23 ng/g), and for the office 200, the maxim PAHs concentrations reached up to 809.77 ng/g (total PAHs concentrations = 5152.65 ng/g) (Figure 1). 1st floor corridor showed maxim PAHs concentrations equal to 709.96 ng/g (total PAHs concentrations = 4363.94 ng/g). These high concentrations (maxim and total) were documented mainly due to students' frequent entry and activities, smoking occurring inside and outside those areas, as well as the constant operation of office equipment (copy machine, computers, etc.).

Moreover, regarding I/O ratios, the majority of the I/O ratios (almost 58.12%) were less than 1, implying that outdoor emissions contributed to the total PAHs concentrations levels, as well as lowering the indoor air quality.

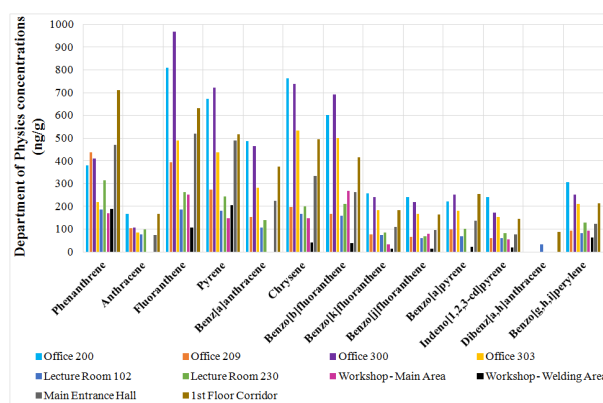


Figure 1. Individual PAHs concentrations.

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