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SCANNING FOR ALDEHYDES INDOOR IN DIFFERENT ROOM TYPES IN A HIGH SCHOOL

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Introduction

A person is subjected to chemicals from air at home and in the environment in which they work. Thus, indoor air intake can be considered an important factor in human exposure to hazardous pollutants. In addition, children have a higher susceptibility to environmental pollutants than adults because they breathe larger volumes of air in relation to their body weights and their tissues and organs are still growing. Aldehydes, including formaldehyde, are among the most dangerous pollutants found in schools and kindergartens.

Materials and methods

The air samples have been collected on DSD-DNPH cartridges. This acts as an absorbent and derivatizing agent for the compounds of interest, reacting with them and transforming them into a stable form, non-volatile by derivatization and keeping them inside. The sampling was carried out in accordance with the method described in US EPA 0100. The aldehydes were extracted into acetonitrile and the samples were then analyzed over the next 10 days. The apparature consisted of a HPLC Agilent-1200 coupled with a DAD detector, at 360 nm wavelength, with isocratic mobile phase:acetonitrile/water, a flow rate of 2 ml/min and a sample injection volume 25 µl.

Results and conclusions

This study presents the results regarding the concentrations of fifteen aldehydes found in indoor air in an high school. The results presents the comparation between the concentrations found indoor and outdoor and also the concentration distribution amoung the targeted pollutants.

Table 1 presents the comparison of the concentrations obtained in the ambient air with those obtained in all the high-school halls, by realizing the Indoor / Outdoor Report. For most of the compounds of interest for this study, a supraunital value was obtained. In the case of Formaldehyde, all the concentrations determined in the indoor air were higher than those determined in ambient air, with the Indoor / Outdoor ratio being over-unitary. Exceptions to the above mentioned are: Acetaldehyde, Benzaldehyde and Isovaleraldehyde.

Table 1. Indoor/Outdoor Ratio

I/O Ratio	Gym	Teacher's Room	Computers Lab	Biology Lab
Formaldehyde	>1	>1	>1	>1
Acetaldehyde	<1	<1	<1	<1
Acrolein+Acetone	>1	>1	>1	>1
Propionaldehyde	>1	>1	>1	>1
Crotoaldehyde	<1	<1	<1	<1
Butilaldehyde	<1	<1	<1	<1
Benzaldehyde	>1	>1	<1	>1
Izovaleraldehyde	>1	>1	>1	>1
Valeraldehyde	>1	>1	>1	>1
o,*m*,*p*-Tolualdehyde	>1	>1	>1	>1
Hexaldehyde	>1	>1	>1	>1
2,5-Dimethylbenzaldhyde	>1	>1	>1	>1

Based on the results obtained it can be stated that this study have found sources of aldehydes inside all the rooms where the sampling took place in the high school.

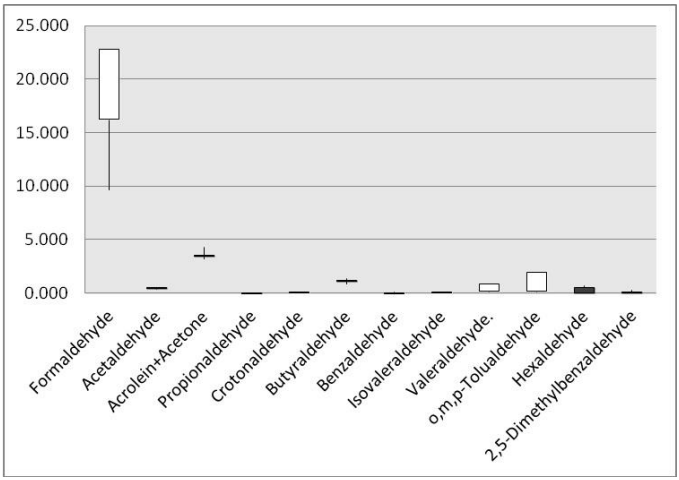

Figure 1. Box Plot Diagram - Aldehydes concentration variation ($\mu g/m^3$)

Following the box plot, we can say that there are common sources in the indoor air for compounds that have a high degree of correlation, both negative and positive.
The present study signals the presence of aldehydes and Formaldehyde in the educational spaces. The highest concentrations were determined for Formaldehyde, Acetaldehyde, Acrolein + Acetone and Hexaldehyde.