

IOHA ROMA 2010

INTERNATIONAL OCCUPATIONAL HYGIENE ASSOCIATION

8th

INTERNATIONAL SCIENTIFIC CONFERENCE

28 SEPTEMBER - 2 OCTOBER 2010

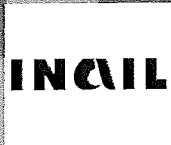
ROMA, Italy - Università Urbaniana

HEALTH, WORK AND SOCIAL RESPONSIBILITY

*The occupational hygienist and the integration
of environment, health and safety*

BOOK OF ABSTRACTS

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[ABSTRACT ID: 305]

EVALUATION OF DIFFUSION OF MICRO POLLUTANTS AND PARTICULATE MATTER COMING FROM HANDLING OF "PET COKE": FROM THE QUAY TO THE FINAL USERS

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OBJECTIVES

The Pet Coke is a solid fuel, residue from the process of refinement of the petroleum. It shows as powder form and, because of low cost, easiness of retrieval and high calorific power, it is used for many years as fuel into industrial furnaces. This study is concentrated, because of powder nature of the material, on the dusts produced during the activities of discharge of the material from the ships using special hoppers and during the following storage into the warehouse. This activity (transfer, transport and storage) belongs to that covered by the V part of D.Lgs. 152/2006.

METHODS

The probability of dust diffusion into ambient is linked to two parameters: the conditions of handling and transport and the meteorological conditions (in particular wind intensity and direction). The monitorings were realized using HVS samplers with the scope to define the following parameters: TPM (Total Particulate Matter), PM₁₀, Total PAHs (Aromatic Polycyclic Hydrocarbons) and Metals. The discharge of the material from ship to quay was monitored using also a mobile laboratory properly toolled up to capture the PM₁₀ and the airborne micro pollutants. The monitorings were set according to the D.M. 60/2002 for PM₁₀ capturing while PAHs monitorings were realized as expected by the ISO 12884 transposed in the Italian law into the D.L. 152/2007. Each monitoring never went on less than 24 hours and they were repeated more days and into many period of the year.

CONCLUSIONS

The concentrations of TPM and also of PM₁₀ emerge consistent for all the monitored period. In particular you can note as the per cent ratio between the PM₁₀ value and the TPM one is averagely 30%. This value gives important informations, in fact this data show as the dusts of pet coke are inclined to propagate in the environment as fraction different from PM₁₀. In fact when you go little by little far from the cargo zone, you can note as the fraction PM₁₀ increases among the TPM one, this phenomenon is connected to the normal trend of the spatial distributions of the dusts because particles having larger diameters fall on the ground earlier than the particles with shorter diameters. From the chemical characterization of metals and PAHs you can note as the identified values are under the objective value, proposed by annex 1 of directive 2004/107/CE of European Parliament.

[ABSTRACT ID: 328]

HEALTH EFFECTS OF OCCUPATIONAL EXPOSURE TO TRAFFIC PARTICLES AND NOISE – EXPOSURE ASSESSMENTMEIER R.⁽¹⁾, GASCIO W.E.⁽²⁾, RIEDIKER M.⁽¹⁾Institut for Work and Health - Lausanne - Switzerland⁽¹⁾East Carolina Heart Institute, East Carolina University - Greenville, NC - United States⁽²⁾

Highway maintenance workers spend up to eight hours per day in traffic and are exposed to traffic-related emissions which are associated with increased cardiovascular and pulmonary mortality and morbidity. To quantify this exposure we use a panel study design with repeated measurements to observe 50 road maintenance workers over 5 non-consecutive working days. The aims of our current project are to provide a better understanding of the workers' exposure to traffic stressors, particularly inhaled particles and noise, and to assess their cardiovascular, pulmonary, and pro-inflammatory health effects.

To assess the workers exposure to particles, noise and co-pollutants, we developed a methodology based on personal and work site measurements:

For examination of personal exposure during and after work, the workers are equipped with a personal dust monitor and a noise dosimeter. The personal dust monitor stays with the worker until the next morning and allows us to take into account potential exposures during leisure activities. Additional exposure measurements at the work site provide a detailed picture of exposure during work. These measurements include ultrafine particle count, measurement of the co-pollutants carbon monoxide, nitrogen dioxide and ozone as well as dust sampling for compound analysis by X-ray spectrometry and analysis of EC/OC ratio. The record of the global position and the workers' activity allows attributing the exposure data to the different work activities.

Preliminary data shows that the exposure level of the highway maintenance workers is highly variable depending on traffic density and work activity and varies strongly between different work shifts. Measurement on normal working days showed mean dust concentrations from 20 to 180 µg/m³ with peaks up to 19 mg/m³. These exposure gradients offer a good opportunity to study dose-dependent effects of particles. Making these first tests we could assure that assessing the workers exposure is feasible and that detailed information about the workers exposure should allow us to apportion the contribution of traffic particle exposure from different activities to the total exposure of workers.

[ABSTRACT ID: 245]

CELL TOXICITY AND APOPTOSIS IN HUMAN EPITHELIAL CELLS AFTER EXPOSURE TO NANOPARTICLES OF ORGANIC CARBON (NOC)PEDATA P.⁽¹⁾, BOCCCELLINO M.⁽²⁾, LA PORTA R.⁽²⁾, QUAGLIUOLO L.⁽²⁾, SANNOLO N.⁽¹⁾Department of Experimental Medicine, Section of Occupational Medicine, Hygiene and Industrial Toxicology, SUN - Naples - Italy⁽¹⁾Department of Biochemistry and Biophysics, SUN - Naples - Italy⁽²⁾

OBJECTIVES

Epidemiologic and clinical studies have linked elevated concentrations of ambient particulate matter (PM) to adverse health effects throughout the industrialized world. In urban environments, combustion-derived nanoparticles of Organic Carbon (NOC) dominate PM number concentrations and contribute significantly to the total PM surface area. The aim of the present study was to evaluate the effect of NOC on growth and apoptosis in keratinocytes cells (HaCaT). We stimulated HaCaT with flame-generated NOC particles collected in water samples. Cytotoxicity as a function of particle concentration was monitored by fluorescence-activated cell sorting (FACS).

MATERIALS AND METHODS

Apoptosis was evaluated by propidium iodide staining of cells followed by flow cytometry analysis. HaCaT cells were incubated for 4 h at 4°C in 2 ml hypotonic solution containing 50 mg/ml PI, 0.1% sodium citrate, 0.1% Triton X-100, and 20 mg/ml DNase-free RNase A. The stained cells were analyzed, for relative DNA content, on a FACScan flow cytometer with a 15 mV air-cooled argon laser tuned to single-line emission at 488 nm. Histograms of cell number versus logarithm integrated FL3 fluorescence were recorded for 20,000 nuclei at flow rates no greater than 50 to 100 events per second. Cells with subdiploid DNA content (sub-G0/G1 peak) were considered apoptotic cells. All cultures were done in triplicate.

In order to discriminate between apoptotic and necrotic cells we used the annexin V-FITC/PI staining assay. Cells were washed twice with annexin V-binding buffer, resuspended in 1 ml of the same buffer and incubated in ice for 30 min with 2 µl of 140 nM annexin V-FITC. Five minutes before flow cytometry analysis.

RESULTS AND CONCLUSIONS

In order to evaluate the effects of NOC on HaCaT cells, cells were exposed to various concentrations of NOC (1.98 µg/ml, 2.16 µg/ml, 2.4 µg/ml), harvested at different time points and examined for DNA content. Apoptosis was investigated by DNA distribution as revealed by flow cytometry demonstrating hypodiploid DNA as described in Materials and Methods. When HaCaT cells were cultured alone, less than 5% were apoptotic. Exposure of cells to NOC