

exposure and the formation of pleural plaques, increased prevalence of respiratory symptoms, decreases in pulmonary function, and irritation.

AFSSET-OEL committee considered that the carcinogenic potential of RCFs is linked to a genotoxic mechanism with no threshold mode of action. A model assuming a linear relationship between dose and the response (lung cancer) have been used to establish the occupational exposure limit.

Using the approach of benchmark dose modelling such as described by Maxim et al. (2003) which produced RCF unit potency values ranging from  $1.4 \times 10^{-4}$  to  $7.2 \times 10^{-4}$ , the model retained by AFSSET-OEL committee indicated that an excess cancer risk of  $10^{-4}$  is associated with a concentration of 0.02 respirable f/cm<sup>3</sup> based on 40 years of occupational exposure. The linear modelling approach in this analysis of the exposure–response relationship using the animal data takes into consideration possible differences in dosimetry and lung burden between rats and humans.

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#### P104-003

##### Dose-dependent neurologic abnormalities in workers exposed to 1-bromopropane

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**Objectives:** 1-Bromopropane (1-BP) is a neurotoxic compound in animal and human, but its dose-dependency in human remains elusive. The present study investigated the health effects of 1-BP and its dose-dependency in workers.

**Methods:** Data of 60 female and 26 male workers in three 1-BP factories in China and the same number of age-, sex- and region-matched controls were analyzed. Workers were interviewed and examined with a battery of neurobehavioral tests, nerve conduction velocity tests in lower limbs, vibration sense, hematological and biochemical tests. The time-weighted average (TWA) exposure levels of individual workers were estimated with passive samplers. The exposed workers were divided by the median value of the individual exposure level into two groups of equal number for analysis of variance (ANOVA) followed by regression analysis on exposure level.

**Results:** Regression analysis on exposure level following ANOVA showed dose-dependent increase in distal latency of tibial nerve and threshold for vibration sense in both toes in female workers. The analysis also showed dose-dependent decrease in scores of tension and fatigue of profile of mood status (POMS) in female workers. Blood urea nitrogen (BUN), aspartate aminotransferase, lactate dehydrogenase and follicle stimulating hormone increased dose-dependently in female workers and BUN increased dose-dependently in male workers. Red blood cell (RBC) and hematocrit showed dose-dependent decrease in female workers. Among parameters showing significant dose-dependency, DL, vibration sense in both toes, Fatigue of POMS and RBC showed significant difference from the control in low-exposure group (median of exposure level: 2.21 ppm) as well as high-exposure group (median of exposure level: 18.31 ppm) in female workers.

toxicities in female workers. The study suggests that the lowest adverse effect level is 2.21 ppm.

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#### P104-004

##### Risk assessment in occupational exposure to formaldehyde: Differences between anatomy and pathology laboratories and formaldehyde-resins production

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Formaldehyde (CH<sub>2</sub>O), the most simple and reactive of all aldehydes, is colorless, and readily polymerizing gas at normal temperature. The most extensive use is in production of resins and has an important application as a disinfectant and preservative, reason why relevant workplace exposure may also occur in pathology and anatomy laboratories and in mortuaries.

A study was carried out in Portugal, in a formaldehyde production resins factory and in 10 pathology and anatomy laboratories. It was applied a risk assessment methodology based on Queensland University proposal that permitted to perform risk assessment for each activity developed in a work station. This methodology was applied in 83 different activities developed in the laboratories and in 18 activities of the factory. Also, Micronucleus Test was performed in lymphocytes from 30 factory workers and 50 laboratories workers.

In the factory, 94.5% of the activities were classified with low risk and 5.5% with high risk. In the laboratories, 1.41% of the activities were classified with very high risk, 36.32% with high risk, 15.49% with medium risk and, finally 46.48% with low risk. These results were confirmed with the results of the Micronucleus Test performed in both groups that showed micronucleus mean in lymphocytes was significantly higher in the workers from the laboratories ( $p < 0.05$ ).

Results obtained suggest that preventive and protective measures must be applied particularly in anatomy and pathology laboratories in order to reduce occupational exposure to this chemical agent and, subsequently to prevent adverse effects on workers health.

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#### P104-005

##### Occupational exposure to formaldehyde in anatomy and pathology laboratories: Differences between exposure groups?

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Formaldehyde, also known as formalin, formal and methyl aldehydes, is a colorless, flammable, strong-smelling gas. It has an important application in embalming tissues and that result in exposures for workers in the pathology anatomy laboratories and mortuaries.

To perform exposure assessment is necessary define exposure groups and in this occupational setting the technicians and pathologists are the most important groups. In the case of formaldehyde, it seems that health effects are more related with peak exposures than with exposure duration.