

AIR POLLUTION

TRAFFIC RELATED POPULATION EXPOSURE TO BENZENE LEVELS IN BUCHAREST: AIRPECO-PEOPLE PROJECT

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Objective: When the EC directive on air pollution by benzene, has come into force the PEOPLE project aimed to provide measurements of benzene levels to assess the relative influence of outdoor and indoor emission sources on human personal exposure levels to benzene and to ensure policy support to raise awareness of citizens regarding air pollution was implemented.

Methods: The benzene measurement campaign consisted in 24 hours outdoor and indoor benzene measurements and in 12 hour personal monitoring of 150 selected volunteers simultaneously in the same day. Movement diaries for all volunteers ensured the correct assignment to specific study groups. All measurements were performed by using a high resolution diffuse sampler that can measure benzene in a short period of time. The sampler used for benzene measurements in the campaign of 27 May 2003 in Bucharest was validated in laboratory experiments. The analysis of samplers was implemented according to rigorous QA/QC program by the JRC-IES (EU Joint Research Centre

– Institute for Environment and Sustainability) team. Volunteers were selected according to their smoking and non-smoking status and by the means of transport they are regularly using (personal car, public transport, biking, walking) on a usual working day.

Results of the project: Outdoor measurements were done in order to assess the city background concentration in Bucharest in the day of the personal monitoring campaign of the volunteers. The median city background concentration of benzene was $7.1 \mu\text{g}/\text{m}^3$ per 24 h while measurements close to traffic sources (intersections) revealed higher values of 16.0 and $18.2 \mu\text{g}/\text{m}^3$ per 24 h. Personal exposure of volunteers revealed that in the commuters group, in the absence of smoking and other indoor pollution sources, the car users were most exposed to benzene with a median value $20.3 \mu\text{g}/\text{m}^3$ per 12 h while those travelling only by public transport had a median value of $12.4 \mu\text{g}/\text{m}^3$ per 12 h. In both cases the personal exposure is higher than the city background and is approaching even exceeding the hot spots measurements from traffic intersections. The children group had a similar median exposure level of $13.0 \mu\text{g}/\text{m}^3$ per 12h as the adults.

Conclusions: It can be estimated that in the city of Bucharest, concentrations of benzene close to traffic related sites are up to 2 to 3 times higher than the background levels and this is reflected in the personal exposure especially of car drivers.