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LETTER TO THE EDITOR

About exposure data used in paper "Assessing the potential exposure risk and control for airborne titanium dioxide and carbon black nanoparticles in the workplace"

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Dear Editor-in-Chief,

Environmental Science and Pollution Research published recently the paper by C-M Liao et al. "Assessing the potential exposure risk and control for airborne titanium dioxide and carbon black nanoparticles in the workplace" (volume 18, number 6, pp 877–889, DOI: 10.1007/s11356-011-0447-y), presenting a computational approach to the assessment of the potential exposure risks for workers exposed to airborne titanium dioxide nanoparticles (TiO_2-NPs) and carbon black nanoparticles (CB-NPs), to evaluate if and how to implement risk control measures.

Input data for the computational model were taken from the literature, both for exposure and for hazard: in particular, it is stated in the paper that CB-NP concentration and size distribution data were obtained from the paper "Number size distribution, mass concentration, and particle composition of PM1, PM2.5, and PM10 in bag filling areas of carbon black production" by T.A.J. Kuhlbusch et al. (J Occup Environ Hyg, 2004, 1:660–671, DOI: 10.1080/15459620490502242). It must be stressed that the findings of Kuhlbusch's work appear unusable for the purpose of the C-M Liao paper: as a matter of fact, conclusions of Kuhlbusch's work were that "carbon black particles emitted during bag filling have size characteristics with particle sizes starting at ≈0.4 μm in aerodynamic diameter with modes at particle sizes of 1–2 μm d_{ae} and >8 μm d_{ae}," i.e. the paper used by C-M Liao as source of CB-NP exposure data got to the conclusion that CB-NPs were *not* detected in the examined plants.

When nanoparticles were detected in the Kuhlbusch study, they were attributed to sources other than CB. Quoting Kuhlbusch:

"In each plant, the number size distribution comparisons identified particles >0.4 μm d_{ae}.

Particle emissions in the ultrafine range (<100 nm) were observed in Plant 2 and 3 but not in Plant 1.

Electric forklifts were used in Plant 1, propane forklifts in Plant 2, and diesel forklifts in Plant 3.

Comparison of crude forklift emission measurements with size distributions identified in the bag filling areas correlated well, implicating the forklifts as the source of increased UFP.

Additionally, butane space heaters were the likely continuous source of ultrafine particles in Plant 3."

The C-M Liao paper on one side acknowledged Kuhlbusch's conclusions, stating that "The NPs were most likely attributed to exhaust emissions from forklift and gas heater running," but then adopted anyway "the experimental data [of Kuhlbusch paper] to assess the potential exposure risk in CB plants due to workers who may be exposed to part of CB-NPs": such an approach goes much beyond any "very conservative assumption" which might be made on a reasonable and scientific base. Otherwise, we shall conclude that the exposure assessment of materials being moved by a forklift depends on the emission level of the forklift itself. On the other hand, if the exposure scenario were focussed on internal combustion engine emissions, toxicity data on such particles should have been used instead of those for CB-NPs.

Best regards,
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