

***In vitro* evaluation of the toxicological effects induced by fly ash particles in human airway epithelial cells**

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Combustion-derived nanoparticles as constituents of ambient particulate matter have been shown to induce adverse health effects due to inhalation. However, the components inducing these effects as well as the biological mechanisms are still not fully understood.

Solid waste incinerators reduce the volume and the mass of wastes, but emissions could contain highly toxic components. Major problems regarding the operation of incineration are by-products: bottom ash and fly ash, the latter being much smaller in volume but it contains the highest amount of volatile heavy metals, such as Cd, Pb and Zn, and polychlorinated dibenzo-p-dioxins and dibenzofurans (Yao et al., 2012).

The fine fraction of fly ash particles collected from the electrostatic precipitator of a municipal solid waste incinerator was taken as an example for real particles with complex composition released into the atmosphere to study the mechanism of early biological responses of BEAS-2B and A549 human lung epithelial cells (Diabaté et al., 2011).

Results underlined a concentration-dependent reduction on cell viability (mostly on BEAS-2B cells, as compared with A549 cells) and an increase of ROS production, probably related to the inflammatory response, as confirmed by the study of proinflammatory cytokines (IL-6 and IL-8) production and total glutathione content. However data confirmed a strong correlation between samples composition and their biological effects.

Diabaté S, Bergfeldt B, Plaumann D, Ubel C, Weiss C, Anti-oxidative and inflammatory responses induced by fly ash particles and carbon black in lung epithelial cells. *Anal Bioanal Chem*, 2011, 401(10):3197–3212.

Yao J, Li W, Xia F, Zheng Y, Fang C, Shen D, Heavy metals and PCDD/Fs in solid waste incinerator fly ash in Zhejiang province, China: chemical and bio-analytical characterization. *Environ Monit Assess*. 2012, 184(6):3711-20.