STRUCTURAL CHARACTERIZATION AND IN VITRO CYTOTOXIC POTENTIAL OF COAL DUST IN A ROMANIAN POWER PLANT

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Abstract

A number of specific measures have been undertaken in Romania in the power generation sector in order to limit or eliminate the pollutants and to prevent their adverse health effects of occupational exposure. However these measures did not result to the expected efficiency, and a number of work places still exist within the thermal power plants where the employees work under improper conditions. The infliction of the working environment, dust and ash fine particles from coal-fired power plants has a detrimental effect upon the exposed subjects depending on the pollutants toxicity, the concentration, exposure duration, and health state of the subjects exposed.

The paper presents a quantitative and qualitative assessment of dust, with estimation of chemical-structural composition and particle size distribution within Deva-Romania power plant. The cytotoxic potential in vitro on BALB/c 3T3 fibroblast cell line is also presented as a measure of the biological reactivity of hazardous compounds existent in coal dust and ash samples from the investigated site. The preliminary in vitro results indicate that even at small doses of the dust and ash samples the cytotoxic effects were detectable by inhibiting cell proliferation and increasing LDH release and following a dose-effect behavior.

Key words: ash, coal dust, coal power plant, crystalline silica, in vitro cytotoxicity, size distribution

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