

ENVIRONMENTAL HEALTH PERSPECTIVES ON COAL POLLUTION: A VIEW FROM DIFERENTS TOXICOLOGICAL MODELS

Coal mining is one of the main economic resources in Colombia. However, this activity generates dangerous pollutants to human health. The first aim of this study was to evaluate the toxicological effects of coal dust (CD) on HepG2 cells and exposed organisms. For that purpose, marine sediments were collected in coal loading areas in Santa Marta (Magdalena) and characterized in terms of their chemical composition and toxicity against HepG2 cells. Subsequently, CD (<38 µm) of a bituminous coal sample was obtained to develop a model of exposure to the particulate material using mice (*Mus musculus*) and insects (*Tribolium castaneum*). Finally, an aqueous extract of CD was obtained and characterized by ICP/MS to evaluate the developmental toxicity using zebrafish (*Danio rerio*). The results showed that PAHs levels were higher in the stations near the port and coal loading sites. The highest metal levels corresponded to Sr, As, Cd, Ba, Cu, Pb and Zn, both for the coal sample and for the aqueous extract. On the other hand, the *M. musculus*, *T. castaneum* and cell exposure generated changes in the expression of genes related to oxidative stress. The results of the transcriptomic tests with *D. rerio* confirmed some of the effects that have been studied in other organisms exposed to CD. In fact, this study allowed us to show that coal transport in Colombian ports negatively impacts sediments, effects that can be quantitatively measurable in different models, suggesting that these residues are not inert and are able to interact with biota.