

Evaluation of Endocrine Disrupting Chemicals-Complex Mixture in Diesel Exhaust Respirable Particulate Matter

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It is well known that diesel exhaust particulate matter contains mutagenic PAHs, such as benzo[*a*]pyrene, benz[*a*]anthracene, chrysene, etc. Therefore it is suspected that these chemicals act on estrogen receptor and reveal endocrine-disrupting effects. Recent attention has focused on causative chemicals of endocrine-disrupting effects. We examined the estrogenic activity of respirable diesel exhaust particulate matter derived from diesel powered vehicle. PM_{2.5} diesel exhaust of vehicle was collected using a high volume sampler equipped with a cascade impactor. Diesel exhaust samples were fractionated according to EPA methods. The presence of estrogenic and antiestrogenic chemicals in PM_{2.5} diesel exhaust was determined using E-screen assay. To quantitatively assess the estrogenic and antiestrogenic activities in diesel exhaust particulate matter, estradiol equivalent concentration (bio-EEQ) was calculated by comparing the concentration response curve of the sample with those of the estrogen calibration curve. Weak estrogenic activities and strong antiestrogenic activities were detected in the crude extract and moderately polar fractions. Higher antiestrogenic potency was observed with higher EROD activities in aliphatic and aromatic compounds fraction. In conclusion, estrogenic/antiestrogenic-like activities were present in diesel exhaust particulate matter. However, the health consequences of this observation was unknown, the presence of these activities may contribute to and exacerbate adverse health effect evoked by diesel exhaust particulate matter.