IN VITRO GENOTOXICITY OF PARTICULATE AND SEMI-VOLATILE ORGANIC COMPOUND EXHAUST MATERIALS FROM A SET OF GASOLINE AND A SET OF DIESEL ENGINE VEHICLES OPERATED AT 30^0F

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ABSTRACT

Extracts of engine exhaust particulate material (PM) or of exhaust semi-volatile organic compound material (SVOC) pooled from a set of gasoline engine automobiles or from a set of diesel engine autos or light trucks, all operated at 30^0 F, were assayed *in vitro* for three measures of genotoxic activity. Materials supplied by the U.S. Department of Energy from modern vehicles operated on the Unified Driving Cycle for light-duty vehicles were acetone extracted and re-suspended into TWEEN-80.

Both diesel and gasoline vehicle PM extracts were significantly active for the induction of gene mutation at dose concentrations from 5 to 120 microgram extract/ml, and both displayed a positive dose-response in the *Salmonella typhimurium* histidine reversion micro-suspension assay with tester strains YG1024 and YG1029, with and without S9 microsomal activation of samples. The diesel vehicle PM extract was about twice as active as the gasoline vehicle PM extract on a mass basis.

Chinese hamster lung fibroblasts (V79 cells) were assayed for chromosome damage and for DNA damage at doses from 50 to 125 microgram extract/ml. For chromosome damage determined by the micronucleus induction assay, the maximum activity expressed by gasoline vehicle PM extract was about three times that of the maximum diesel vehicle PM extract. For DNA damage measured by the single cell gel-electrophoresis (comet) assay, the gasoline vehicle PM extract was significantly active at all but the lowest dose. The diesel vehicle PM extract did not express significant activity at any of the doses.

In general, the SVOC extracts were severalfold less active than their PM extract counterparts in all assays. Results are compared with those of a National Institute of Standards and Technology Standard Reference Material diesel exhaust particulate sample, and with those of a similar study of these gasoline and diesel vehicles operated at 70^0F.