Genotoxicity of three biofuel candidates compared to reference fuels - DTU Orbit (04/11/2019)

Genotoxicity of three biofuel candidates compared to reference fuels

Global demand for alternative energy sources increases due to concerns regarding energy security and greenhouse gas emissions. However, little is known regarding the impacts of biofuels to the environment and human health even though the identification of such impacts is important to avoid biofuels leading to undesired effects. In this study mutagenicity and genotoxicity of the three biofuel candidates ethyl levulinate (EL), 2-methyltetrahydrofuran (2-MTHF) and 2-methylfuran (2-MF) were investigated in comparison to two petroleum-derived fuels and a biodiesel. None of the samples induced mutagenicity in the Ames fluctuation test. However, the Micronucleus assay revealed significant effects in Chinese hamster (Cricetulus griseus) V79 cells caused by the potential biofuels. 2-MF revealed the highest toxic potential with significant induction of micronuclei below 20.0 mg/L. EL and 2-MTHF induced micronuclei only at very high concentrations (>1000.0 mg/L). In regard to the genotoxic potential of 2-MF, its usage as biofuel should be critically discussed.

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