

## World congress on CLIMATE CHANGE AND ECOSYSTEM

October 06, 2021 | Webinar

**Comparative evaluation of in vitro models in the mutagenicity screening of selected polycyclic aromatic hydrocarbons (PAHs) and nitro-polycyclic aromatic hydrocarbons (NPAHs)****Emmanuel Awulu***School of Biological Sciences, University of Aberdeen, Scotland. United Kingdom*

This study compares the suitability and sensitivity of three (3) in vitro models in the screening of selected PAHs (benzo[a]pyrene (B[a]P), 2-methylnaphthalene (2MN), fluorene (Flu)) and NPAHs (Acridine (Acr), and phenazine (Phe)). These in vitro models include Ames Salmonella typhimurium TA98 and TA100 and Single-cell gel electrophoresis using Caco-2 cells and inducible SOS lux gene biosensors *E. coli* C600 pPSL-1 and *E. coli* DPD1718 in the presence and absence of an S9 mix. Sodium azide, 4-nitrophenylenediamine and 2-aminanthracene caused a strong mutagenic response in the respective designated tester strains. The Ames *S. typhimurium* TA98 and TA100 reported B[a]P as a strong mutagen. Only *S. typhimurium* TA98 reported 2MN as a strong mutagen while *S. typhimurium* TA100 reported acridine, phenazine and fluorene as weak mutagen in the presence of S9 mix. Hydrogen peroxide (a positive mutagen), B[a]P, 2MN, Flu, Acr and Phe caused single- and double-stranded DNA breaks of Caco-2 cells in the presence and absence of S9 mix. Inducible SOS lux gene *E. coli* C600 pPSL-1 and *E. coli* DPD1718 produced luminescence with induction factor above two (2) when treated with a known DNA cross-linker; Mitomycin C (0.0075  $\mu$ M). However, no SOS induction was recorded with *E. coli* C600 pPSL-1 and *E. coli* DPD1718 treated with the selected PAHs and NPAHs. This study presents the comet assay as the most robust and sensitive tool for the screening of PAHs and NPAHs mutagenicity followed by Ames assay. A further modification of the intact cell membrane of inducible SOS lux gene *E. coli* C600 pPSL-1 and *E. coli* DPD1718 is recommended to improve its sensitivity and suitability in screening for PAHs and NPAHs mutagenicity.

**Biography**

Emmanuel Awulu is a PhD researcher with the University of Aberdeen. His research focuses on using in vitro models to assess the impact of environmental pollutants on humans. He is particularly interested in polycyclic aromatic hydrocarbons (PAHs) and their attendant impacts on human health. His years of experience in teaching and research in higher education has solidified his understanding and evaluation of human risk assessment to pollutants. He looks forward to building a network focused on sharing experience and expertise towards the improvement of a healthy environment for humans.

emmanuelawulu5@gmail.com