ASSESSING THE PHOTO-INDUCED CYTOTOXICITY OF C_{60} FULLERENES BY MEASURING THE VIALBE COUNT OF Escherichia coli

Jasmine I. Watson\textsuperscript{1}, Erbo Ying\textsuperscript{2}, Winfred G. Aker\textsuperscript{2} and Huey-Min Hwang\textsuperscript{2}

\textsuperscript{1}Department of Chemistry, Xavier University of Louisiana, 1 Drexel Dr., New Orleans, LA 70125, USA
\textsuperscript{2}Department of Biology, Jackson State University, 1400 Lynch St., Jackson, MS 39217, USA

Abstract: Our goal was to add research data to the effort of assessing the realistic health hazard of releasing C_{60} into the natural environment. Assessment of C_{60} nanotoxicity requires a variety of strategies for dispersing it into biological systems. To achieve this goal, we developed a protocol that involves a suitable organic solvent/surfactant combination using Escherichia coli as the model. DMSO was the optimum solvent for defining a concentration-response relationship for assessing the toxicity of C_{60}, while N,N-dimethylformamide (DMF) showed the greatest potential to be a safe solvent. Since UV-A irradiation is potentially a dominant environmental factor affecting the ecotoxicity of C_{60} fullerenes, the photo-induced cytotoxicity of C_{60} fullerenes in DMSO and DMF solvent/surfactant combinations was assessed using the viable count of E. coli after exposure in the presence and absence of light. The results show that, in DMSO, there is photo-induced cytotoxicity which increases with concentration of C_{60}, but none in DMF.

Keywords: C_{60} fullerenes, N,N-dimethylformamide, DMSO, photo-induced cytotoxicity

Acknowledgements: This study was supported in part by the following grants (1) JSU Interdisciplinary Center for Nanotoxicity - NSF HRD #0833178 and (2) National Science Foundation REU DMR- Award 0755499.