TOXICOLOGICAL EFFECTS OF GRAPHENE OXIDES TO E. COLI BACTERIA

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Abstract: The human and environmental exposure to graphene based nanomaterials is increasing due to rapid advancements in the synthesis, characterization and large-scale production of graphene and the subsequent development of graphene based biomedical and consumer products. In this study, Graphene Oxide nano sheets (GO’s) were synthesized. The synthesized GO’s were characterized by Fourier transform infrared (FTIR), field emission scanning electron microscopy (FIB-SEM), transmission electron microscope (TEM) and dispersive X-ray spectroscopy (EDX). Cytotoxicity experiments were conducted with spread plate counting method and the LC50 values were calculated. We have determined the toxicological effects of Graphene Oxide (GO) to E. coli bacteria (most widely studied prokaryotic model organism) via spread plate method, Reactive Oxygen Species Assay (ROS), Lipid Peroxidation assay (LPO) and disruption of bacteria cell membrane via TEM and SEM (Scanning Electron Microscope) and surface chemical analysis through FTIR. A key focus of these examinations is to properly associate the biological responses with chemical and morphological properties of GO. In the present work, we have observed dose and time dependent toxicity of GO’s to E. coli. The experiments are in progress to elucidate the toxicological effects of GO’s to E. coli. This study will contribute to the risk assessment, exploitation and application of GO in the future.

Keywords: Graphene nanomaterials, Toxicity, Escherichia Coli, Reactive oxygen species, Lipid peroxidation

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