

GENOTOXICITY OF SILVER NANOPARTICLES IN VICIA FABA: A PILOT STUDY ON THE ENVIRONMENTAL MONITORING OF NANOPARTICLES

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Abstract: The use of silver nanoparticles (AgNPs) in commercial products has increased significantly in recent years. Although there has been some attempt to determine the toxic effects of AgNPs in mammalian and human cell-lines, there is little information on plants which have a vital role in ecosystems. The study reports the use of *Vicia faba* root-tip meristem to investigate the genotoxicity of AgNPs under modified GENE-TOX test conditions. The root tip cells of *V. faba* were treated with four different concentrations of engineered AgNPs dispersion to study toxicological endpoints such as mitotic index (MI), chromosomal aberrations (CA) and micronucleus induction (MN). For each concentration, five sets of microscopy observations were carried out. The results demonstrated that AgNPs exposure significantly increased ($p < 0.05$) the number of chromosomal aberrations, micronuclei, and decreased the MI in exposed groups compared to control. From this study we infer that AgNPs might have penetrated the plant system and may have impaired mitosis causing CA and MN. The results of this study demonstrate that AgNPs are genotoxic to plant cells. Since plant assays have been integrated as a genotoxicity component in risk assessment for detection of environmental mutagens, they should be given full consideration when evaluating the overall toxicological impact of the nanoparticles in the environment.

Keywords: Silver nanoparticles, chromosomal aberrations, mitotic index, *Vicia faba*, genotoxic, micronucleus

Acknowledgement This research was supported by grants from NIH-SEPA (Grant No. RR020405-02) and National Institutes of Health-RCMI Center for Environmental Health (Grant No. 2G12RR01349-12) at Jackson State University.