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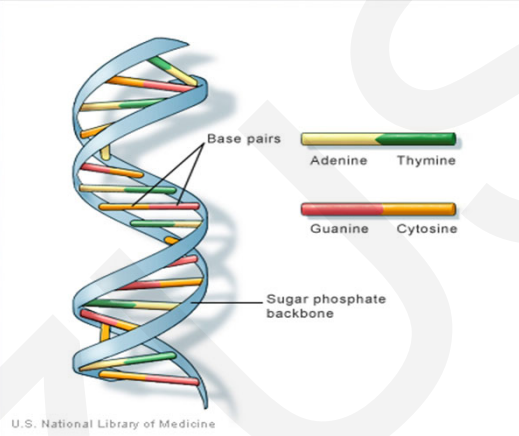
Random amplified polymorphic DNA reveals that TiO_2 nanoparticles are genotoxic to *Cucurbita pepo*

Key words:

Random amplified polymorphic DNA (RAPD), Titanium dioxide (TiO2), Nanoparticles (NPs), Genomic DNA, Zucchini

Genotoxic effects of nanoparticles

- ZnO and CeO_2 NPs have shown to have genotoxic effects on soybean (Lopez-Moreno *et al*. 2010)



- TiO_2 NPs affect genomic DNA in *A. thaliana* plant (Landa *et al*. 2012)
- There are no reports on the genotoxic effects of TiO_2 NPs on zucchini

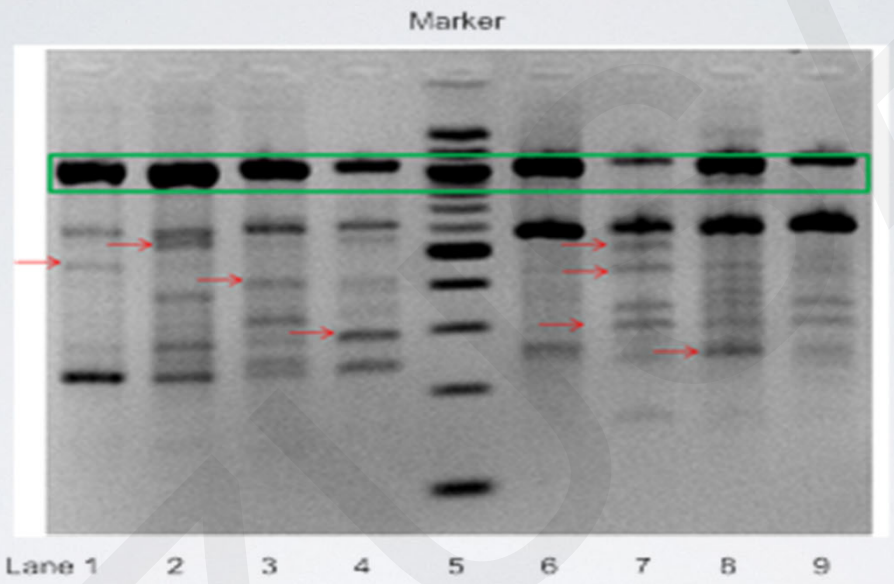


Fig. 1. Individual study RAPD profiles in the roots of zucchini plants treated with TiO_2 nanoparticles at 0 (control) and 50 mg L^{-1}. RAPD profiles were generated using primer OPB-3. Lane number 5 is a 100 bp DNA marker (100-1500 bp).

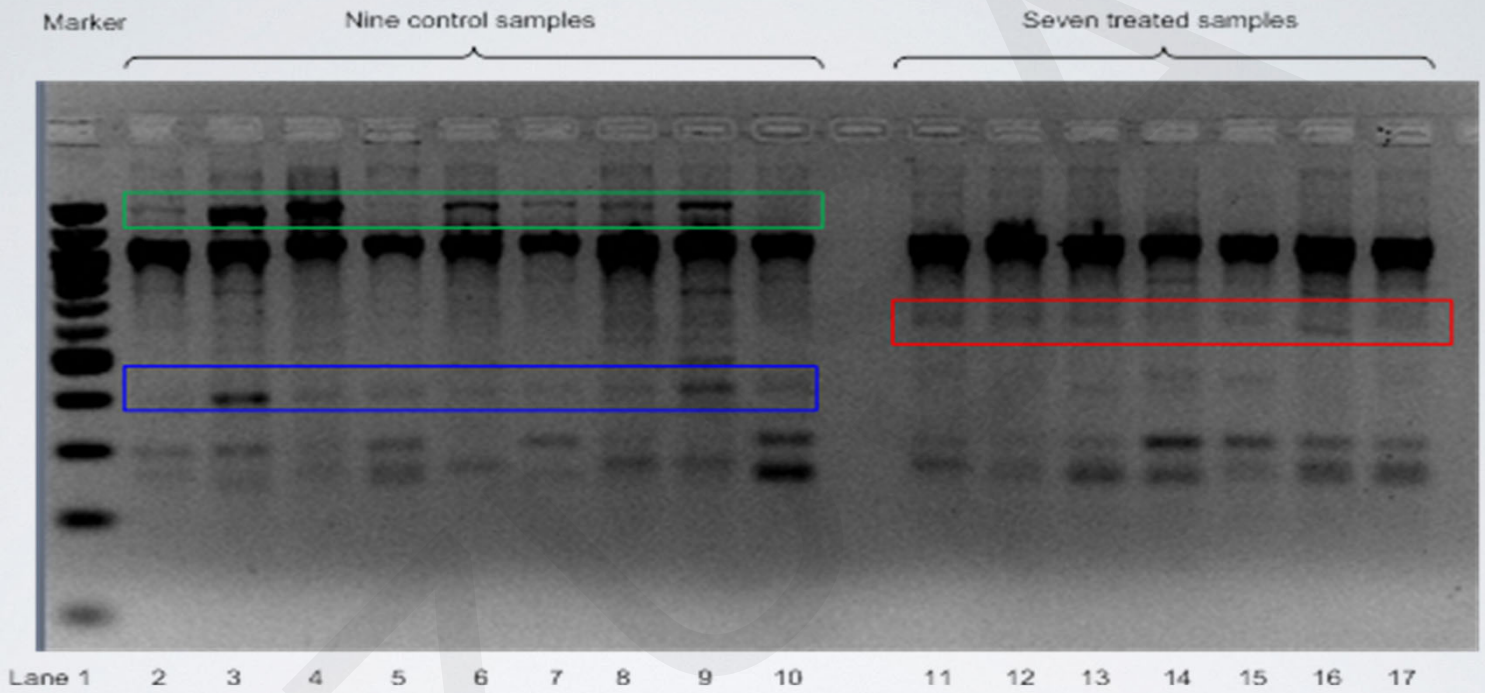


Fig. 2. RAPD profiles from the roots of a population of zucchini plants treated with TiO_2 NPs at 0 (control) and 50 mg/L. RAPD profiles were generated using primer OPB-3; first lane from bottom to top in all gels is a 100 bp DNA marker (100 -1500 bp).

Perspectives and Research Priorities

Research Priorities:

- Further study on specific genetic alterations caused by TiO_2 NPs on the zucchini plant genomic DNA
- Additional analysis such as cloning and sequencing the bands of interest is required to determine the exact nature of the changes.

Due to the lack of genomic sequence information available for *C. pepo*, it is not yet feasible to perform such techniques on this plant. However, it might be instructive to compare the sequences of the altered genes to those of other plants whose genomic sequences are present in the databases, in case they occur in conserved regions of the genome.