

## Transgenic plants for abiotic stress tolerance

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Abiotic stresses such as exposure to salinity, drought, extreme temperature and heavy metal pose major threats to sustainable food production, resulting in 50-70% reduction in crop yield. Transgenic approaches can be used to develop plants tolerant to different abiotic stresses. Glutathione transferases are multifunctional proteins known to have roles in protecting cells from different abiotic stresses. Transgenic tobacco plants expressing a fungal *glutathione transferase* gene were developed and they were found to be more tolerant to salinity, osmotic stress and heavy metal stress compared to control plants. In general, transgenic plants exposed to different abiotic stresses showed lower levels of lipid peroxidation and increased levels of different antioxidant enzymes such as glutathione transferase, superoxide

dismutase, ascorbate peroxidases, guaiacol peroxidases and catalase compared to control plants.

For enhancing remediation of metals such as Zn and Cu, a zinc transporter gene and a copper transporter gene from *Nuerospora crassa* were cloned and introduced into candidate plants and they showed enhanced uptake of Zn and Cu respectively. For degradation of organic pollutants, a human cytochrome p4502E1 gene and a fungal glutathione transferase gene were introduced into tobacco and plants showed enhanced uptake and degradation of lindane, a pesticide and anthracene, a polyaromatic hydrocarbon respectively. The present studies have shown that transgenic plants expressing heterologous genes have developed tolerance to different abiotic stresses.

### Biography

Prof. Susan Eapen, Ph.D. currently the Head of Plant Biotechnology and Secondary Products Section, Bhabha Atomic Research Centre, Mumbai and Professor Homi Bhabha National Institute, Mumbai has about 130 publications in peer-reviewed journals. She is an Associate Editor of several international journals like BMC Biotechnology, In Vitro- Plant etc. She has developed the first transgenic pulse crop in 1987 and has later developed several transgenic crops.