

## Effects of arsenic toxicity on germination, seedling growth and peroxidase activity in gram seeds

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Arsenic is a metalloid of great environmental concern because of its highly toxic carcinogenic properties to human beings. At a higher concentration, arsenic is toxic to most plants. It interferes with metabolic processes and inhibits plant growth and development through arsenic induced phytotoxicity. Seed germination rate and the early seedling growth are sensitive to metal toxicity. Hence toxicity of various metals can be evaluated properly in early stages of plant development. Heavy metals including arsenic have been reported to stimulate the formation of free radicals and reactive oxygen species which can lead to oxidative stress. Arsenic accumulated in the plant tissues can also stimulates peroxidase enzyme activity during the early phases of plant development. The objective of this study was to investigate the *in vitro* effects of different arsenic concentrations on germination and change in peroxidase activity in gram seeds and seedlings. The germination of gram seeds were studied in presence of

both arsenic tri-oxide and sodium arsenate solutions (200 ppm, 400 ppm, 600 ppm and 800 ppm) in earlier part of the study. The sequestration of arsenic in different parts of the seedlings was estimated by using Atomic Absorption Spectrophotometer. In order to assess the oxidative stress, Guaiacol peroxidase (GPX) activity was also estimated in different parts of the seedlings. The germination of the seeds decreased significantly with the increase in concentrations of both As (III) and As (V) salts. On the other hand, peroxidase activity in the seeds and seedlings increased significantly with time in response to arsenic stress. Interestingly, maximum increase in enzyme activity was observed in roots, followed by seeds and shoots. The experiment, therefore, indicates that arsenic toxicity has the potential to affect both the quantity and quality of gram seed production in arsenic contaminated areas. This may have its natural economic and health implications.

### Biography

Sayan Bhattacharya has completed his M.Sc. in Environmental Science from University of Calcutta. Presently he is working as a Senior Research Fellow in the Department of Environmental Science in University of Calcutta. He has presented papers in several National and International Conferences and has published 4 research papers and articles.

