

Engineering tolerance and hyper accumulation of heavy metals in recombinant *E.coli* cells by expressing PCS gene from *Leucaena leucocephala*

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Leucaena leucocephala, a leguminous tree with high biomass, has metal tolerance and survival ability in arid, infertile and metal-contaminated areas. But so far, no reports are available on identification and functional characterization of phytochelatin synthase (LIPCS) gene from this tree species. In the present study, we report the isolation and characterization of phytochelatin synthase (LIPCS) gene from this tree species. The predicted 3D structure of this protein exhibited potential possible binding sites for the metals like Cd, Zn, Cu, Fe and Mn. The role of LIPCS gene in metal tolerance and accumulation was characterized in *E. coli*. The LIPCS gene was sub-cloned into pET32a expression vector and bacterial transformation was performed. SDS-PAGE analysis of the total protein isolated from the recombinant *E. coli* revealed the over expression of LIPCS protein along with His-tag. When grown in toxic metal enriched media, recombinant *E. coli* exhibited enhanced tolerance to broad range of metals like arsenic, cadmium, cobalt, copper, mercury, tin and zinc compared to controls. Further, these recombinant *E. coli* cells could also accumulate several folds increased concentrations of toxic metals like arsenite, copper and arsenate compared to controls. Thus the present study suggests that LIPCS gene confers enhanced toxic metal tolerance and accumulation in *E. coli* and might play crucial role in toxic metal detoxification in *Leucaena leucocephala*. This study can help us in better understanding the toxic metal tolerance ability of *L. leucocephala* for its successful usage in bioremediation technologies.

Biography

Merla Sri Lakshmi Sunita has completed her PhD in 2010 at the age of 29 years from Department of Genetics, Osmania University, Hyderabad. She was awarded Dr. D.S. Kothari Postdoctoral fellowship from University Grants Commission, New Delhi and pursuing postdoctoral studies at Centre for Biotechnology, Jawaharlal Nehru Technological University Hyderabad. She has published six papers in reputed national and international journals.

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