

**“Studies on Proline in Cyanobacteria under
Environmental stresses.”**

ABSTRACT

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ABSTRACT

Micro organisms with ability to grow in the presence of different pollutants and with a significant metal uptake have a potential use in bioremediation of polluted aquatic bodies. It has been established that *Westiellopsis prolifica-331* as a potential biofertilizer. Keeping the above facts and literature in mind, *W. prolifica -331* has been selected for the present study. The effect of environmental pollutants [Salt (NaCl), pesticides (deltamethrin and alphamethrin), heavy metal [Pb(NO₃)₂, Pb Cl₂ and CdCl₂, Cd(NO₃)₂] on proline and antioxidant enzymes in cyanobacterium-*W. prolifica-331*.

We have also studied environmental stress adaptation mechanism of *W. prolifica-331* in response to different environmental stresses. We also study the potentiality to proline in bioremediating different pollutants from the polluted water. The summary of the work carried out towards PhD degree is given below:

1. Progressive growth of *W. prolifica- 331*.

- The growth pattern gradually increased till 21st day and beyond this became stationary.

2. Salt stress

- Growth of the *W. prolifica-331* decreased under salt stress.
- Carbohydrate, protein and proline content increased with increasing concentrations of salt.
- The SOD, catalase and peroxidase activity slowly increased in response to increasing concentration of NaCl in the tested cyanobacterium.
- Salt stress induced generation of free radical (MDA) in the tested organism.

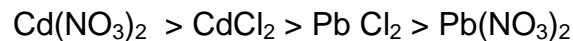
3. Pesticide stress

- The growth of the *W. prolifica-331* was inhibited almost at all pesticide concentrations studied.
- The pigments (Chlorophyll, carotenoid, phycobiliprotein) content were more than control under pesticide stress.

- At all experimented concentrations, the carbohydrate, protein and proline content were more than control.
- The antioxidant enzymes activities (SOD, catalase and peroxidase) were much higher than those of the control.
- Comparatively, alphamethrin induced more antioxidant enzymes activities (SOD, catalase and peroxidase) than the cultures grown with deltamethrin.
- At all the concentration tested, both alphamethrin and deltamethrin stimulated significantly the lipid peroxidation and the level of MDA was more than the control.

4. Heavy metal stress

- Growth of the *W. prolifica-331* was inhibited under heavy metal stress. The maximum reduction in growth was observed with Cd (NO₃)₂. The order of toxicity of studied metals was as follows:



- The photosynthetic pigment (Chlorophyll, carotenoid, phycobiliprotein) showed decreasing trend with increasing metal ion concentration.
- Carbohydrate, protein and proline showed metal concentration dependent increase in *W. prolifica -331*.
- Antioxidant enzymes activities (SOD, catalase and peroxidase) gradually increased in response to concentration of various heavy metals. The heavy metal–induced antioxidant enzymes were found more pronounced with Cd(NO₃)₂ and least antioxidant enzyme activity with Pb(NO₃)₂.
- The level of MDA increased with the increasing concentration of heavy metals.