

Table 4: Effect of Cadmium on starch content of *Oryza sativa* L. (Variety- Khandagiri , Tejaswini)

Variety	Treatment	Starch content in $\mu\text{g/g f.wt.}$		
		Days of treatment		
		7	15	21
Khandagiri	Control	65.16 \pm 0.01	68.05 \pm 0.049	74.59 \pm 0.008
	20 μM	58.58 \pm 0.05	51.21 \pm 0.002	45.74 \pm 0.006
	50 μM	51.67 \pm 0.003	51.49 \pm 0.185	44 \pm 0.003
	100 μM	47.76 \pm 0.119	40.36 \pm 0.013	36.41 \pm 0.0025
	200 μM	36.14 \pm 0.003	31.67 \pm 0.042	24.86 \pm 0.005
Tejaswini	Control	59.68 \pm 0.045	64.23 \pm 0.014	72.53 \pm 0.002
	20 μM	53.58 \pm 0.007	52.49 \pm 0.035	49.75 \pm 0.003
	50 μM	49.87 \pm 0.003	43.53 \pm 0.042	38.33 \pm 0.006
	100 μM	39.17 \pm 0.059	19.05 \pm 0.002	15.8 \pm 0.013
	200 μM	19.1 \pm 0.003	15.65 \pm 0.001	11.51 \pm 0.001
	400 μM	20.24 \pm 0.061	15.73 \pm 0.093	6.23 \pm 0.006

*values in the table are mean \pm SD of 3 replicates

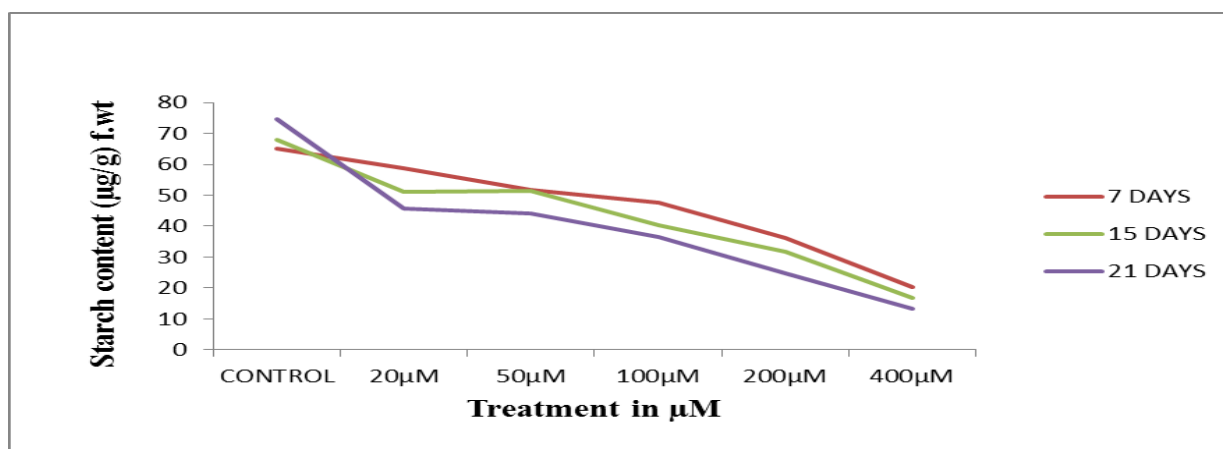


Figure 3a: Effect of Cadmium on Starch content of *Oryza sativa* (Variety- Khandagiri)

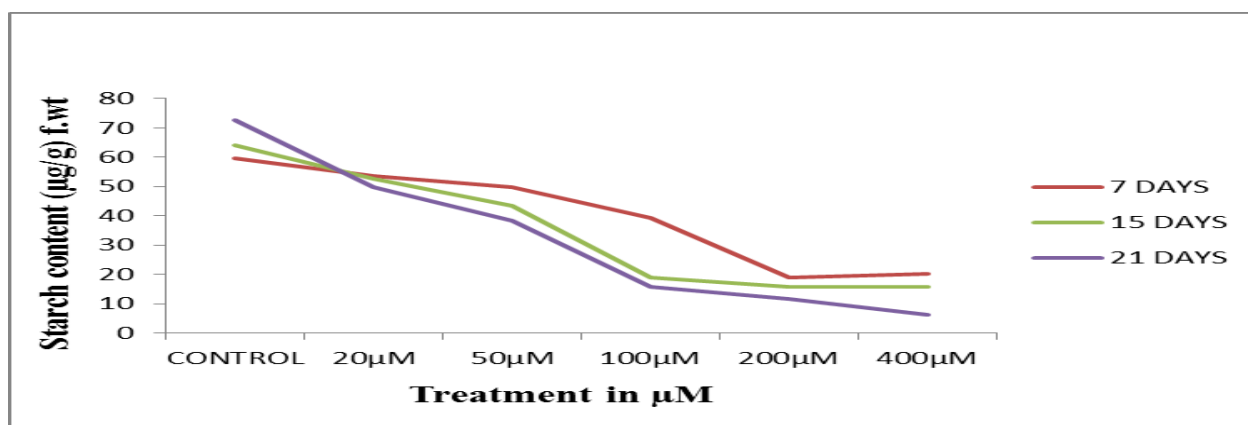


Figure 3b: Effect of Cadmium on Starch content of *Oryza sativa* (Variety- Tejaswini)

3.4. Effect of Cadmium on Proline content

The Proline content of Khandagiri at 21 days interval was 9.62 $\mu\text{g/g}$ and 85.365 $\mu\text{g/g}$ for 20 μM and 400 μM respectively. Similarly for Tejaswini at 21 days the Proline content was 38.62 $\mu\text{g/g}$ and 101.38 $\mu\text{g/g}$ respectively. The Proline content of the two rice varieties increased with increasing concentrations of cadmium stress whereas the control rice varieties showed slight increase in proline content but remained less than the treated plants. Proline content of the two varieties is shown in the Table. 5 and

fig. 4a, 4b . Proline accumulation is a general phenomenon in all the stressed plants. As the rice plants were subjected to cadmium stress, estimation of proline was very important to know whether increase of proline content can be a protection mechanism by increasing osmotic compounds in the cell sap.

Table 5 : Effect of Cadmium on proline content of *Oryza sativa* L. (Variety- Khandagiri , Tejaswini)

Variety	Treatment	Proline content $\mu\text{g/g f.wt.}$		
		Days of treatment		
		7	15	21
Khandagiri	Control	2.6 \pm 0.0033	3.83 \pm 0.0024	4.022 \pm 0.0009
	20 μM	2.8 \pm 0.0024	4.16 \pm 0.0012	9.62 \pm 0.0106
	50 μM	14.7 \pm 0.0179	23.67 \pm 0.0165	25.166 \pm 0.329
	100 μM	23.402 \pm 0.0156	36.92 \pm 0.0115	45.321 \pm 0.0033
	200 μM	37.29 \pm 0.0084	56.71 \pm 0.0434	66.12 \pm 0.0437
	400 μM	50.858 \pm 0.0009	70.987 \pm 0.0045	85.365 \pm 0.0447
Tejaswini	Control	11.15 \pm 0.0082	20.29 \pm 0.0085	30.3 \pm 0.0103
	20 μM	11.18 \pm 0.0024	26.72 \pm 0.013	38.62 \pm 0.031
	50 μM	18.37 \pm 0.003	37.1 \pm 0.032	57 \pm 0.0009
	100 μM	30.57 \pm 0.024	44.87 \pm 0.004	64.67 \pm 0.003
	200 μM	43.91 \pm 0.042	66.07 \pm 0.083	76.8 \pm 0.023
	400 μM	44.95 \pm 0.0046	75.57 \pm 0.018	101.38 \pm 0.09

*values in the table are mean \pm SD of 3 replicates

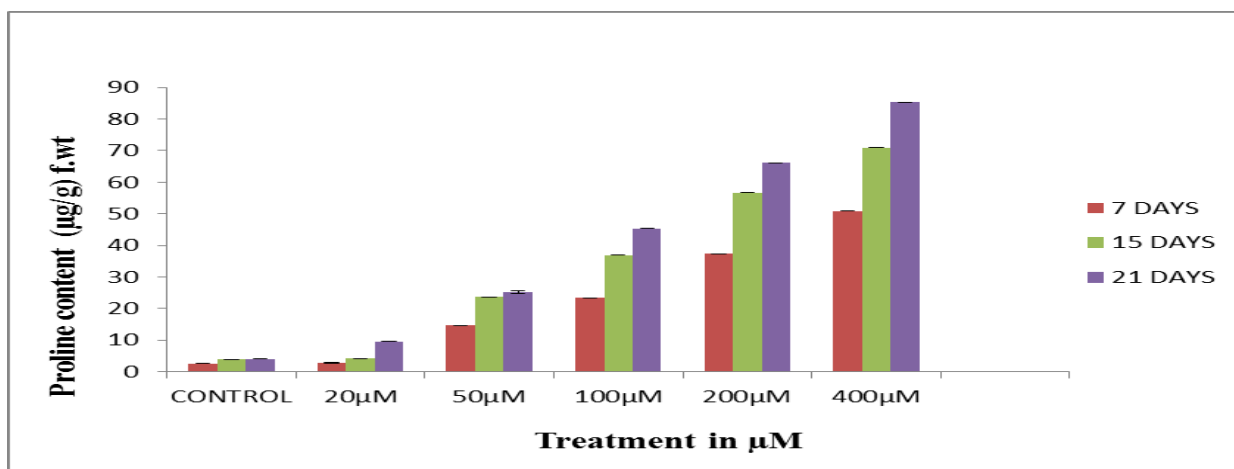


Figure 4a: Effect of Cadmium on Proline content of *Oryza sativa* (Variety- Khandagiri)

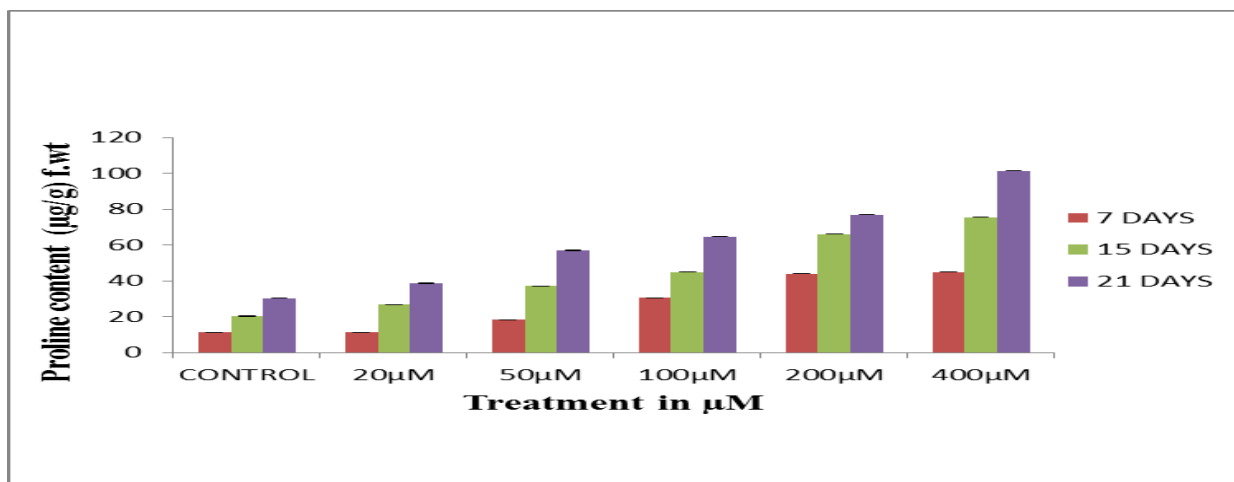


Figure 4b: Effect of Cadmium on Proline content of *Oryza sativa* (Variety- Tejaswini)

4. Conclusion

Cadmium at higher concentrations might inhibit the growth of the plant directly by inhibiting the root growth which in return inhibits the uptake of water and other essential mineral elements through roots, resulting in the uptake of cadmium itself and causing several mineral deficiencies. The water content therefore decreases at

higher cadmium toxicity. At higher concentrations it is highly toxic to plants. Similar results were reported on the effect of cadmium [31][32]. Results from the germination studies indicated that Khandagiri showed higher resistance to cadmium as compared to Tejaswini . This study also revealed that at higher cadmium concentrations there was a significant decrease in photosynthetic activity, total sugar content, starch content whereas proline accumulation increased with increase in cadmium toxicity. As compared

to Tejaswini , Khandagiri showed good resistance effect . This study may help for selection of resistant variety for carrying out further research on the purpose of finding out which concentration of cadmium salts might be useful to control fungal infections.

Acknowledgement

The authors acknowledge the financial support provided by DST- INSPIRE fellowship, UGC-DRS-SAP scheme and PURSE Grant to P.G Department of Botany, Utkal University Bhubaneswar, India.

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