RESEARCH NOTE

Asian Journal of Bio Science (April, 2010) Vol. 5 Issue 1 : 164-165

Influence of cadmium with seed germination and seedling growth of *Cucumis melo* L.

M. VENKATESHWARLU

Department of Botany, Kakatiya University, WARANGAL (A.P.) INDIA

(Accepted : March, 2010)

Key words : Cell membrane synthesis, Cadmium, Plant tissues.

Cadmium was applied in the form of cadmium – chloride. Various growth regulators on tissue and isolated plant cells were studied by several workers and these substances were known to play an important role in cell metabolism, cell membrane synthesis besides growth and differentiation of these growth substances auxins have proved to be an essential suppliement for establishing successful culture of plant tissues. An attempt has been made to asses the response of *Cucumis melo.* It is evident from the results obtained that the increase in cadmium concentration affected all the growth parameters. The morphological parameters such as root length and shoot length showed a decreasing trend with increase of cadmium chloride concentration.

The plant grows in hot and dry regions and requires of plentiful supply of water. It is often grown on sandy river beds hardly suited to any other crop. The plant is extensively cultivated in the warmer regions of the world for its iluscious fruits valued as dessert. *Cucumis melo* is an annual climbing or creeping herb with large, soft hairy leaves and spherical ovoid or elliptic fruits of varying size and colour. The fruits are ready for harvest in 3-4 months and are picked when fully ripe on the vine. Analysis of the fruit showed that it contains carbohydrates, 5-4; fat 0.2; protein 0.6; ash, 0.6; fibre 0.5; calcium 0.016 and phosphorus 0.015%; iron 3.9 mg per kg; copper, 0.6 mg/kg (pro) vitamin A, 2400 IU; vitamin B_1, 57mg, Vitamin B_2 75mg and Vitamin C, 25 mg per 100g. The seeds are edible and are used as substitute for almond and pistachio. The seeds are diuretic. Heavy metal stress causes multiple direct and indirect effects on all physiological processes in plants. The major environmental problems crop out from waste disposal, either from water pollutants or air pollutants. Fribery *et al.*(1974) observed that these pollutants had a high concentration of heavy metals. Many of these metals have direct bering on various physiological and biochemical processes including reduction in growth, photosynthesis, chlorophyll consent, inhibition of enzyme activities and degeneration of chloroplast and mitochandria. Therefore effects of different concentrations of cadmium on germination and seedling growth of *Cucumis melo* L. were studied.

Cadmium chloride solution *viz.*, 05, 10, 15, and 25 mg/l were prepared and used for the germination studies. Ten seeds were evenly placed in each Petridishes. One set was irrigated with distilled water (control). They were irrigated uniformly by various concentrations of cadmium chloride solution in the respective Petridishes. All the Petridishes were kept under diffused light at room temperature. Ten seedlings from each replicate were selected for recording the morphometrical parameters such as length of root and shoot, fresh weight of root and shoot, vigour index and tolerance index. Data were recorded on the 10^{th} day after germination and the germination percentage was also recorded.

The present investigation reveals that the various concentrations of cadmium had drastic effects on germination and early growth. The germination percentage and vigour index in the control was found to be maximum and gradually decreased with the increase of cadmium chloride concentration. The fresh weight of *Cucumis melo* L. seedlings showed a similar trend. The reduction in fresh weight due to cadmium treatment may be attributed to the decreased metabolic rate and reduced transport from the cotyledons and at the same time it may also due to the higher rate of leakage in the membrane permeability. The reduction in germination percentage of *Cucumis melo* may be attributed to the interference of cadmium ions which might inhibited seed germination by exerting a deleterious effect on the activities of hydrolytic enzymes involved in the mobilization of major seed reservoirs. (Table 1). Similar observations were also recorded by Mahalakshmi and Vijayarengan (2003) in three plant species. The same pattern of response was noticed in

Table 1 : Influece of cadmium concentration seedling germination growth index of *Cucumis melo* L.

Sr. No	Cadmium concentration mg/l	Shoot length	Root length	Shoot fresh weight plant	Root fresh weight g/plant	Germination percentage
1.	0	6.5	7.5	0.140	0.50	90
2.	05	6.0	7.0	0.150	0.40	80
3.	10	5.5	6.5	0.145	0.38	70
4.	15	5.0	6.0	0.140	0.36	75
5.	20	4.5	5.5	0.135	0.30	60
6.	25	4.0	5.0	0.100	0.25	50

case *Vigna unguiculata* L. due to chromium treatment by Lalith *et al.* (1999). Similar to present findings Lata (1998) also observed the effect of cadmium on cucurbita seedlings.

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