CONCLUSIONS

The present piece of work highlights the following points:

- In general, the compartmental distribution of chromium (Cr III and Cr VI) taken up by the plants shows the following order of chromium accumulation: Root > shoot > fruit.

- Root serves as a barrier restricting the movement of metals (chromium) to the aerial parts of the plant.

- The manner in which metals enter the growing media govern the degree of chromium burden in the plants. The chromium accumulation in various parts of the plant has been found to be higher when supplied through solution form (irrigation) as compared to solid amendments.

- Organic acid supplementation results into statistically significant increase in the chromium burden in the plants. The observation reflects the existence of metal-organic acid interaction in the soil-plant system.

- Chromium enrichment from Cr III treatment in presence of organic acids can be assigned to the tendency of Cr III to interact with organic ligands, resulting in the formation of organically bound Cr III which is soluble, mobile and therefore, becomes plant available.

- For chromium, among the organic acids, carboxylic acids have been found more effective than amino acids in complexing the Cr III species and converting them into a form which is plant available.

- Metal solubilizing ability of organic acids is reported to be parallel to their metal binding ability which in turn is correlated with their dissociation constants. Amino acids, having lower dissociation constant show less affinity to interact with Cr III species.
Chromium enrichment in the plants grown in sand culture is the resultant of Cr III - organic acid interaction only. Sand being an inert matrix leave the treatment as such for the uptake without involving any modifications by the naturally occurring complex species present in soil.

It is noteworthy that increasing concentration of organic acid, increases plant uptake of chromium without affecting its distribution between root and aerial parts of the plant.

The level of metal contamination of the soil of course governs the metal accumulation during the uptake process. Source to plant transfer coefficients, however, provide a more realistic and accurate assessment of the metal burden in the plants.

On the basis of comparison of our hydroponic, sand and soil experiments, we support the school of thoughts that organic complexation of Cr III resulting into the formation of organically bound chromium seems to be the major contributor for plant chromium enrichment.