

Effect of Ligand and Their Metal Complexes On the Root Growth

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Abstract- Ligands are the electron rich species. They have tendency to form complexes with metal ion. The root is important part of plant, present in the soil. Although soil is source of nutrient but root system absorbs nutrients from the soil and provide to the leaves, stem and other parts of plants. The root system gives the protection to the plant. Therefore root system plays very important role in the plant growth. It is observed that the plant having good root system absorbs the sufficient water and nutrients from the soil. Seed dressing method is used for the study. Seed are treated with ligand, metal complexes, CowUrine and dung.

Keywords- Ligand, Metal Complexes Seed dressing, Cow Urine, Dung Plant, Root Growth.

I. INTRODUCTION

Essential part of the plant is Root and is normally present in the soil. It absorbs water and nutrients from the soil. Although soil is source of nutrient but root system absorbs nutrients from the soil and provide to the leaves, stem and other parts of plants. The root system gives the protection to the plant. Therefore root system plays very important role in the plant growth. It is observed that the plant having good root system absorbs the sufficient water and nutrients from the soil.

Different chemicals affect root growth. To study the effect of chemicals on root growth, the dressing method is used. Research indicates that ligands and their metal complexes have various effects on root growth. Including positive and negative influences. Some ligands and their complexes can directly stimulate root growth. Aim of the present work is to study the effect of ligand and metal complexes on Root length. The effect of pre-sowing treatment on seed germination by applying various organic compounds¹. The effect of methyl tert-butyl ether on growth of shoots and root elongation in Maize plant². The effect of heavy metal and their role in various plant and metabolic activities are well documented^{3,4} and established. There are some

research papers in which there is pronounced effect of substances on various cellular system, at organizational level and regulatory at molecular levels⁵. Seed dressing method is used to study the effect of ligand and metal complexes on root growth. The seeds of legume plants are used. Seed dressing is carried out data is collected. The graph 'I' indicates the effect of complexing agent on root growth, 'J' graph indicates effect of Fe(II) complexes on root growth. 'k' graph gives information regarding effect of Co(II) complexes on root growth. Vertical graph 'l' regards effect of Cu (II)-complexes on root elongation. Vertical graph indicates that water medium favours root growth, next one urine and third one is dung medium.

II. RESULT AND DISCUSSION

Vertical graph 'l' indicates the effect of different complexing agent on root growth. It is found that DMPS complexing agent it not favorable for root. Only NFSA complexing agent slightly increases root growth. Also this complexing agent increases root growth of pea as compared to other complexing agent (refer table No.1)

Table 1: Effect of complexing agent on root growth

Medium	Root growth (cm)		
	Ground	Gram	Pea
Water	12	3	7
Urine	11	5	4
Dung	10	6	4
(DMPS)	2	1	2
(AMCC)	2	10	1
(CPH2)	1	10	1
(NFSA)	1	1	1

III. EFFECT OF FE (II) COMPLEXES ON ROOT GROWTH

The vertical graph 'J' indicates that the [Fe(II)AMCC] metal complexes after their treatment on the seed, increases length as compared to complexing agent. [Fe(II)DMPS] increases only in case of gram. [Fe(II)NFSA] also increases root growth in case of gram and ground nut refer table-2

Table No. 2: Effect of Fe (II) Complexes on root growth

Medium	Root growth (cm)		
	Ground	Gram	Pea
Water	12	3	7
Urine	11	5	4
Dung	10	6	4
[Fe(II)DMPS]	2	3	6
[Fe(II)AMCC]	10	12	10
[Fe(II)CPH2]	2	6	3
[Fe(II) NFSA]	2	8	3

IV. EFFECT OF CO (II)-COMPLEXES ON ROOT GROWTH

[Co(II)DMPS] Complex [Co(II)NFSA] complex increase the root growth in case of gram seed. There is slight growth of roots if the seeds of pea are treated with [Co(NFSA)] metal complex (refer table No. 3)

Table No. 3: Effect of Co (II)-complexes on root growth

Medium	Root growth (cm)		
	Ground	Gram	Pea
Water	1	2	2
Urine	2.3	2	5
Dung	11	4	3
[Co(II)DMPS]	4	6	4
[Co(II)AMCC]	6	5	3
[Co(II)CPH2]	5	7	5
[Co(II)NFSA]	4	3	2

Figure-i : Effect of control and Ligand on Root Growth

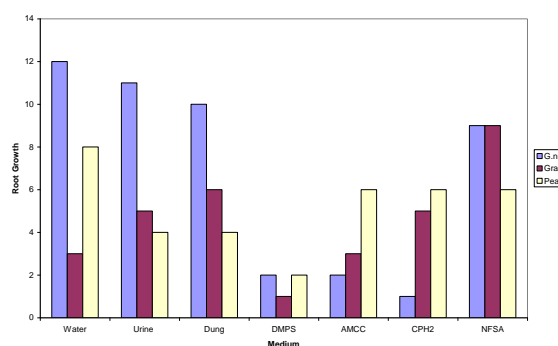
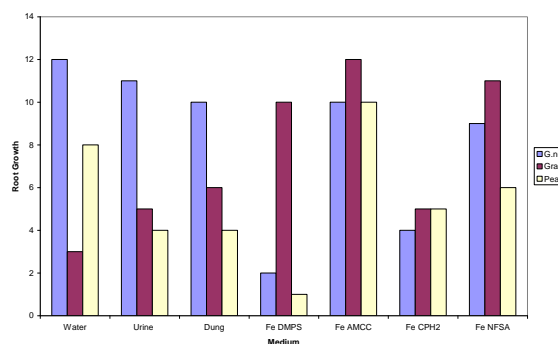
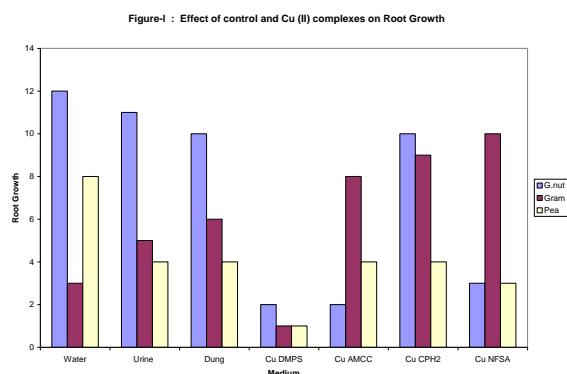
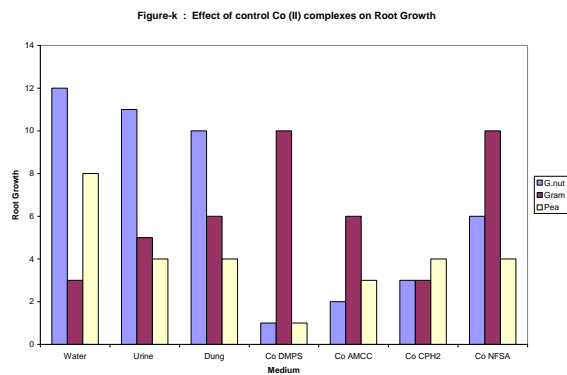


Figure-j : Effect of control and Fe (II) complexes on Root Growth





V. EFFECT OF COPPER COMPLEXES ON ROOT GROWTH

The root length of ground nut, gram and pea is not much increased after the treatment of complexes. [Cu(II)NFSA] complex favors root growth, if the seeds are treated with metal complex refer table. 4.

Table No. 4: Effect of copper complexes on root growth

Medium	Root growth (cm)		
	Ground	Gram	Pea
Water	1	2	2
Urine	2.5	2	5
Dung	13	4	3
[Cu(II)DMPS]	4	5	3
[Cu(II)AMCC]	6	6	3
[Cu(II)CPH2]	5.5	5	2
[Cu(II)NFSA].	1	2	2.5

VI. CONCLUSION

The net effect on root growth after treatment of the seed with complexing agent and metal complexes. We have to consider vertical graph i,j,k,l,. at a glance indicated previously. The water medium favours root growth. [Fe(II)AMCC] complexes increase root growth.[Co(II)NFSA] complex also favors root growth as compared to other complexes.

Along with seed treatment other factors are also responsible for root growth. These factors also to be considered while recommending metal complexes as seed dressing material.

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