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Aayushi International Interdisciplinary Research Journal (AIIRJ)

Peer Reviewed And Indexed Journal

ISSN 2349-638x

Impact Factor 7.331

Website :- www.aiirjournal.com

Theme of Special Issue

Recent Innovations in Science And Technology (RIST-2022)

April 2022 (Special Issue No.109)

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Aayushi International Interdisciplinary Research Journal

ISSN 2349-638x

Special Issue No.109

April 2022

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The Study of Seed Germination, Seedling and Early Plant Growth by the Effect of Metal Ion and Their Complexes in Plumbago Zeylanica (Chitrak) Plant

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Abstract

This work investigates the usefulness of 3-(2-methoxyphenoxy)-1,2-propanediol as an alternate fertilizer by field experiments on growing Plumbago Zeylanica. Separate field experiments using 3-(2-methoxyphenoxy)-1,2-propanediol and original soil compare the effectiveness of different products for agronomic applications. Attempt has been made with the impact of heavy metals and their complexes of 3-(2-methoxyphenoxy)-1,2-propanediol on to improve the yield of economically important plant Plumbago Zeylanica (Chitrak). The seeds were immersed in Co (II), ligand and its complexes to study the seed germination and growth pattern and certain physiological processes. Effect of ligand, metal ion and complex solution on growth, determination of % of nitrogen, proteins and chlorophyll in the leaves of plants, are studied. The data harvested indicates increased germinations in all seed treatments. The changes in growth pattern of roots length and shoots length are observed in the experimental plants. However, chlorophyll content was found to be higher in plant species. The percentage of nitrogen and proteins were found affected in the leaves of Plumbago Zeylanica (Chitrak). Plant treated with 3-(2-methoxyphenoxy)-1,2-propanediol, complex and metal Co (II). Nitrogen and protein contents are found higher in the treated plants as - Complex > 3-(2-methoxyphenoxy)-1,2-propanediol > Co (II).
Key words - 3-(2-methoxyphenoxy)-1,2-propanediol, Co (II), Plant, Seed Germination of Chitrak, Chlorophyll

Introduction:

Plant growth regulators are organic compounds, other than nutrients, that produced naturally in higher plants, controlling growth or other physiological functions at a site remote from its place of production and active in minute amounts, modify plant physiological process. The plant physiologists not only to supply basic information regarding how plants grow and develop but also to undertake research program undergo designed specifically to increase yield of plant products. Seed germination behavior is important for horticulture and agriculture [1-2]. One of the important contributions of the 19th century experimental plant physiology to agriculture was to discover that soil fertility and adding several nutrients to the soil could increase crop yields. Agricultural scientists realize that crop plants grow in production to the amounts of various nutrients present in soils. Today the application of various salts to soils is a basic future of agricultural practice. With the application of these and other fertilizer to soils, the large crop yields obtained in developing countries throughout the world during the past 50 years and more could not be possible. In modern agricultural practice, various chemicals in solution or aqueous suspension are sprayed on the crop plants with in the object of accelerating and modifying the plant growth and developing.

The complexes of transition metals with bi- allyl thiourea are prepared and their herbicidal and plant growth regulating activities are tested with wheat and cucumbers by Daverski et al [3]. Complexes of Piperidine-2-Carboxylic acid with some bivalent metal ions have been reported to be useful in agriculture as plant growth regulators [4]. The Complexes of rare earth with peptides showed the herbicidal and plant growth regularity activity with wheat and barley plant [5].

Since 3-(2-methoxyphenoxy)-1,2-propanediol has intense biological activities, anti-inflammatory, antipyretic and analgesic activities. 3-(2-methoxyphenoxy)-1,2-propanediol inhibits the activity of the enzymes and since no work is reported on the biological application of binary complexes of Co (II), with 3-(2-methoxyphenoxy)-1,2-propanediol and comparing with pure ligand, metal and control solution (double distilled water) to study the effect of complex, metal, ligand and control solution on germination, survival seedlings height etc, on Plumbago Zeylanica (Chitrak) plant in order to make suggestion whether complex metal and ligands can be used as a plant growth regulator.

Also, biological analysis of chlorophyll contents and percentage of nitrogen and proteins in the leaves of leafy vegetables are carried out at room temperature.

Material And Experimental Methods:

Seed of Plumbago Zeylanica Species were collected from forest department Akot. Various seed characteristic like seed size, Shape, color and weight of seed/gm. would be observed. Seed shape - oblong, Seed coat- Hard, Seed color- reddish brown, no. of seeds/gm- 47.9 and Seed size- 5-6mm. The solution of Co (II) in the form of nitrate and 3-(2-methoxyphenoxy)-1,2-propanediol of the concentration of 0.01 M was prepared in

double distilled water. The applications of complex, metal, ligand solution are studied by dissolving it in proper solvent at 4, 7.00 and 9.5 pH and at constant ionic strength of 0.01 M potassium nitrate solution. Fertilized soil was collected from agricultural land. It was then ground and filtered. This soil was filled in two wooden trays and tray was moistened with water. Sowing of seeds was done in the soil after one hour.

Experiments Performed:

In general practice various chemicals are used in agriculture as an ingredient of various pesticides, insecticides, fertilizers etc, to improve the crop yield. Amongst several economical and medicinally important plants *Plumbago Zeylanica* (Chitrak) is selected as a plant system.

1. 20 gm healthy seeds of *Plumbago Zeylanica* (Chitrak) were taken 4.0, 7.00 and 9.5 pH for about three hours. These seeds soaked were taken out of each solution and sowed in the wooden tray in a row, during 14 August 2021 to 30 Sept.2021; the wooden tray was kept under atmospheric pressure at room temperature.

2. Effect of ligand, metal Co (II), complex on percentage of nitrogen, protein and chlorophyll in the leaves of *Plumbago Zeylanica* (Chitrak) plant. Chlorophyll pigments in fresh leaves were determined by spectrophotometric method given by Jahagirdar^[21].

Parameters:

Soil pH of soil sample was measured by taking extract of mixture of soil water with pH-meter. Plant growth is decided on the basis of parameter such as percentage of germination, survival, seedling height, shoot length; root length and thickness of young leaf having high values compare to control systems. Germination was noted after 3½ days and survival were noted after 10 days.

After noting the survival of plant, they were taken out of soil. The seedling height and thickness of leaves of survived plants were measure.

Table 1
Effect of Ligand, Metal ion and Complex on Germination, Survival, Seedling height etc. on *Plumbago Zeylanica* (Chitrak) Test System.

Test System	Effect of	pH	Parameters						
			%Germination after 3½ days	% Survival after 10 days	Seedling height (cm)	Root length (cm)	Shoot length (cm)	Root/ Shoot	Width of young leaf (cm)
Plumbago Zeylanica (Chitrak). Test System	Water (Control)	4.0	73.00	72.00	21.084	7.552	13.478	0.5603	3.25
		7.0	78.66	76.66	22.569	7.256	13.698	0.5415	3.27
	Ligand	4.0	75.66	75.33	21.964	7.698	13.852	0.5557	3.87
		7.0	82.00	81.66	24.214	7.963	15.108	0.5270	3.63
	Complex	4.0	76.00	76.00	22.458	8.748	13.563	0.6449	3.56
		7.0	79.66	78.00	23.569	8.986	14.231	0.6314	3.89
	Metal	4.0	82.00	79.33	21.483	8.698	14.125	0.6157	3.12
		7.0	50.00	91.33	26.586	9.025	14.244	0.6336	3.56

Table 2
Estimation of Chlorophyll for *Plumbago Zeylanica* (Chitrak) Plants System

S.No.	Treatment	Leaves of plant	Total Chlorophyll gm/Lit.x10 ⁻³	Chlorophyll 'a' gm/lit.x 10 ⁻³	Chlorophyll 'b' gm/lit.x10 ⁻³
1	Control	Plumbago Zeylanica(Chitrak).	4.986	3.714	1.754
2	Ligand		5.725	4.821	1.018
3	Complex		5.782	3.560	1.215
4	Metal		6.312	5.255	1.196

Table 3
Estimation of Total Nitrogen and Proteins in Leaf Powder of *Plumbago Zeylanica* (Chitrak)

S.No	Plant	Treatment	% Element			% Protein
			Nitrogen	Carbon	Nitrogen	
1		Control	6.58	55.28	7.52	44.562

2	Plumbago Zeylanica (Chitrak).	Ligand	6.90	56.22	7.34	42.816
3		Complex	7.26	54.28	7.12	46.195
4		Metal	6.02	52.78	7.01	41.406

Results And Discussion:

Seed of the target species were taken to study the germination behavior under the influence pre-treatments. Germination starts when the seed shows emergence phase of growth, which begins, with penetration of embryo from the seed coat and end with the development of root and shoot system. Elongation of shoot axis follows emergence of radical.

The rate and extent of elongation is subjected to the variety of controls, including nutrition, hormones and environmental factors. Though the root and shoot development start within a fraction of time but the further developments may vary according to the nutrients required for the development of root length and length shoot independently. Therefore, root length and shoot length differs. The observation table clearly indicates that average root length in 3-(2-methoxyphenoxy)-1,2-propanediol, complex, Co(II), at all pH increase over is seen that in complex, Co(II), showed decrease in shoot length control. But in case of Plumbago Zeylanica (Chitrak) plant system shoot length increases in 3-(2-methoxyphenoxy)-1,2-propanediol, complex and Co(II), and all pH over control.

Chlorophyll pigment / chlorophyll control were found affected in Plumbago Zeylanica (Chitrak) plant by the treatments. Total chlorophyll was found to be higher in Plumbago Zeylanica (Chitrak). Total chlorophyll content in 3-(2-methoxyphenoxy)-1,2-propanediol and complex is higher than in metal and control treatment in both plant systems.

Percentage of nitrogen and proteins were found affected in leaves of Plumbago Zeylanica (Chitrak) by the treatment of 3-(2-methoxyphenoxy)-1,2-propanediol, complex, Co (II). It is observed that percentage of nitrogen and protein are higher than that of control.
Complex > 3-(2-methoxyphenoxy)-1,2-propanediol > H₂O > Co (II).

References:

1. Vaishali S. Kohale; Advances in Horticulture Sciences Vol.2 Integrated Publications (2021)
2. Frey KJ, Takeda K., Simultaneous selection for grain yield and protein percentage in backcross populations from Avenasterilis × A. sativa matings by using the independent culling levels procedure. TAG Theoretical and Applied Genetics. 1985; 69: 375-382. [6]
3. Daverski K, Versile V.G., Genchev M. and; DolkBolgAkad. Nauki32(12), 1705 (1989) Chemical abstract 92 13 (1990).
4. Khobradade B.G. Ph.D. Thesis in Chemistry SGB Amravati University, Amravati (1998)
5. Moss HT. Quality standards for wheat varieties. J Aust Res. 1973; 39: 109- 115.
6. Frye WW, Thomas GWJ. Carbon sequestration in dryland soils. Agron. 1991; 83: 38-44. [7]
7. Mackie and Mcartney, Practical Medical Microbiology, Vol II 13th Ed., 260. [8]
8. Mudd AAOAC. Official Methods of Analysis, Washington. J Chem Eco. 1985; 11(1): 51-57. [09]
9. Pugalvendhan R. Sharavanan PS, Prabakaran G. J Recent Research in Science and Techology. 2009; 1(5): 207-210. [10]
10. Srivastava N, Sahai R. Effects of distillery waste on the performance of Cicer arietinum L. Environmental Pollution. 1987; 43(2): 91-102 [11]
11. Ashraf M. Akhtar N. Tahira F, Nasim F. Effects of storage period and temperature on seed viability of wheat. Pakistan Journal of Biological Sciences. 1999; 2 (4): 1492-1493. [12]
12. Le Gouis J. Grain filling and shoot growth of 2-row and 6-row winter barley varieties. Agronomie 13 (1993) 545-552. Smita Suresh Rao et al. / Int J Cur Bio Med Sci. 2011; 1(2): 35 – 38 37 [13]
13. Gupta S.K Adhikari S.; Mitra A. and Gupta S.K.; J. Instr. Publi. Hlth. Engrs, India, 25 (1998).
14. Gautam DP, Kumar K, Bisnoi S J of Environmental Biology. 1992; 13(1): 7- 12. [16]
15. Abdul-Baki AA, Anderson JD. Vigour determination in soybean and multiple criteria. Crop Sci. 1973; 13: 630. [17]
16. Banerjee A, Nayak D, Chakraborty D, Lahiri S. Uptake studies of environmentally hazardous 51Cr in Mung beans. Environmental Pollution. 2008; 151(2): 423-427. [18]
17. Adhikari S. Mitra A, Gupta SK. . J Instr Publ Hlth Engrs. India, 1998; 2: 5.
18. Yeh TY, Pan CT (2012) J Environ Anal Toxicol 2:2161-0525
19. Ali S, Farooq MA, Jahangir MM, Abbas F, Bharwana SA, Zhang GP (2013a) 57:785– 791
20. Jahagirdar DV. Experiment in Chemistry, 1st Ed., Himalaya Publishing House 1994. [14]
21. Bera A.K. and Bokaria K.; Envir Ecol, 17(4) 958 (1999)