

Antimicrobial Activity of Plumbagin from Roots Of *Plumbagozeylanica* after Applying bio Fertilizers (Azatobactor and PSB)

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Abstract: *Plumbagozeylanica* Linn. is an under shrub growing 2 to 4 feet in height with woody stem branched wild plant known as chitrak, belong to family Plumbaginaceae. Dry roots of *Plumbagozeylanica* are good source of Plumbagin which is of high medicinal value. Research have shown that plants cannot utilize 60% nitrogen and 20% Phosphorus applied even through best management practices adopted under ordinary condition. This plant avail more than 30% nitrogen and 10% Phosphorus. Due wild habitat following measures should be considered in order to obtain maximum benefit with minimum doses of bio fertilizers. The present study was carried out to grow this wild plant into cultivated habitats and further study of production of root and antimicrobial activity of Plumbagin extract from roots are done.

Keywords:- Plumbagin, Azatobactor, PSB, Chitrak, 4-naphthroquinone.

I. Introduction

Plumbagozeylanica is a wild shrub and root of *Plumbagozeylanica* have Plumbagin. Dry roots have antimicrobial activity against opportunist microbes. It is 2 to 4 feet woody branch stem with well developed root. Now a day there is a growing interest of Pharmacological evaluation. In traditional system of medicine *Plumbagozeylanica* Linn; Chitrak dry root extract having Plumbagin is one of the best antimicrobial effects on opportunist microbes. Dry root alcoholic extract of *Plumbagozeylanica* L., two Plumbagic acids, glucosidase, 3'-O-β-glucopyranosyl, Plumagic acid and 3'-O-β-flucopyranosyl Plumbagic acid methylester along with five naphthoquinones (Plumbagin, chitronone, maritronone, elleptinone and isoshinanone) and five coumarins (seselin, 5 methoxyseselin, suberosin, Xanthyletin and Xanthoxyletin)

Plumbagin is the major ingredient (5-hydroxy-2-methyl-1, 4-naphthoquinone (C₁₄H₈O₃)). Crystallising as orange coloured needles, soluble in organic solvents, less soluble in water and volatile with steam. Chemical abstract service name – 1, 4-Naphtho-lenedione, 5-hydroxy – 2- methyljuglone (9CI). Trade names (synonyms) 5-Hydroxy-2 methyl-1, 4-naphthoquinone, 2 methyl – Juglone; Plumbagin, Plumbagon. The present study was carried to evaluate the antimicrobial activity of ethno extract of dry root, Plumbagin from *Plumbagozeylanica* chitrak.

II. Material And Method

Plant material:- Seeds of *Plumbagozeylanica* L. were obtained from Agriculture college, Jabalpur (M.P.)

Biofertilizers:- Azatobactor and PSB (Phosphate solubilizing bacteria) were brought from M.P. Agro Industries, Bhopal.

Experimental site:- The study was conducted in the Department of Botany Saifia Science College, Bhopal (M.P.) India (23° 16' 0" North, 77° 24' 0" East). The mean maximum and mean minimum temperature ranged 29 – 44 °C and 9 – 23 °C respectively.

The present study performs to evaluate the microbial activity of dry root extract in alcohol.

The field experiment conducted in Saifia Science College, Bhopal (M.P.). The soil is sandy, heavy black cotton soil. Sample collection:- When plants mature and flowering start the roots dug off finally cleaned and stored from pot and field separately and sample were stored for further investigation.

Details of treatments:-

- (i) Azatobactor, 5gm, 10 gm and 15 gm.
- (ii) PSB (Phosphate solubilizing bacteria) 5gm, 10 gm and 15 gm.
- (iii) Urea 2gm, 4 gm, 6 gm.
- (iv) DAP (Di ammonium phosphate) 1 gm, 2 gm, 3 gm
- (v) SOP (sodium ortho phosphate) 1 gm, 2 gm, 3 gm.
- (vi) Untreated – Control.

Doses of bio fertilizers & chemical fertilizers are fixed. Extraction of Plumbagin from root through preliminary experiment. Soxhlet extraction in Methyl alcohol and then chemical composition Plumbagin % calculated.

III. Results And Discussion

The *Plumbago zeylanica* L. (Chitrak) Dry root contains various bioactive compounds of them is Plumbagin. Which is best antibiotic for opportunistic microb. Statistician analysis showed higher doses of Bio fertilizers and chemical fertilization. Plumbagin content more in Chemical fertilizer in comparison of Bio fertilizers. Nitrogen plays important role in the formation of protein of Plumbagin. Similar finding reported by Biswas *et al.*, (2001) in mungbean and Tanwar and Shekhawat, (2005) in soya bean. Nitrogen in maize plants is also strongly associated with metabolism of protein synthesis Lang *et al.*, (1956). Seeds of urd bean inoculated with PSB showed a significant increase in protein content Gupta *et al.*, (2006). Chemical fertilizers directly available to plant through soil, so these effects seem more in comparison of Bio fertilizers. Again *Plumbago zeylanica* L. is a wild plant, therefore effect of chemical fertilizers is more in comparison to biological fertilizers. (Table-1) In this experiment, Bio fertilizers and Chemical fertilizers are in a significant increase of Plumbagin content of root were observed.

Table-1: Plumbagin contents in dry roots of *Plumbago zeylanica* L. in different doses of Bio fertilizers and chemical fertilizers.

S.No.	Fertilizers	Doses	Plumbagin from roots %
(i) Bio fertilizers			
1.	<i>Azotobacter</i>	5gm	0.89%
2.	<i>Azotobacter</i>	10gm	0.92%
3.	<i>Azotobacter</i>	15gm	0.96%
4.	PSB	5gm	0.87%
5.	PSB	10gm	0.91%
6.	PSB	15gm	0.93%
(ii) Chemical fertilizers			
7.	Urea	2gm	0.87%
8.	Urea	4gm	0.89%
9.	Urea	6gm	0.91%
10.	DAP	1gm	0.90%
11.	DAP	2gm	0.93%
12.	DAP	3gm	0.94%
13.	SOP	1gm	0.87%
14.	SOP	2gm	0.88%
15.	SOP	3gm	0.9%
(iii) Untreated			
16.	Control	-	0.82%
	CD =	-	0.02
	SE ± =	-	0.01

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