

## EFFECT OF ARSENIC TRIOXIDE (SUPPLIED THROUGH WATER) ON THE MINERAL CONTENT OF *CYAMOPSIS TETRAGONOLOBA* TAUB.

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Seeds of *Cyamopsis tetragonoloba* Taub. were treated with different concentrations of arsenic trioxide, twice a week, till the end of the lifecycle of the crop. Shoots of plants harvested at different intervals and analysed. Arsenic did stimulate the mineral content in the lower concentrations and earlier harvests, but as the concentration and duration of treatments increased, inhibition set in.

**Keywords :** Arsenic trioxide; Mineral contents; *Cyamopsis tetragonoloba*.

Arsenic compounds known to have high toxicity are used as insecticides, weedicides and wood preservatives. Arsenic toxicity causes necrosis or chlorosis and on acute poisoning plants turned black. Sublethal concentrations of arsenic reduced the growth of low bush blue berries (Anastasia and Kender, 1966 and 1974). Arsenic accumulation in the plants is comparatively higher than in soil (Tsutsumi and Takahashi, 1974).

Seeds of *Cyamopsis tetragonoloba* Taub. were sown in polythene bags (35X25cms) containing soil and manure in the ratio 3:1 and treated with arsenic trioxide of different concentrations (viz. 0.1, 1, 10  $\mu\text{g/ml}$ ) twice a week till the end of the life

cycle of the crop. The plants were first harvested after 30 days of sowing, while the subsequent three harvests were done at an interval of 15 days. The harvested plants including controls, were oven dried and used for determining the mineral content.

The plant extract was prepared by dry ashing (Scott, 1939). Sodium, potassium, calcium and lithium was estimated by flame photometry (Crosly, 1977), on Elico Flame Photometer. Sterges *et al.* (1950) modification of Bell and Diosy's (1920) hydroquinone method was used to estimate phosphorus. Iron was determined by Farrar's thiocyanate method (Farrar, 1935). Magnesium, was estimated by E.D.T.A. method.

**Table 1 : Effect of Arsenic Trioxide (Supplied Through Water) on the Mineral Content of *Cyamopsis Tetra-gonoloba* Taub. (Values given as mg/100 gm)**

Har-vests in $\mu\text{g/ml}$	Sodium		Potassium		Calcium		Lithium		Phosphorous		Magnesium		Sulphur		Chlorides		
	T	%DFC	T	%DFC	T	%DFC	T	%DFC	T	%DFC	T	%DFC	T	%DFC	T	%DFC	
I	0.1	2.79	6.08	4.10	19.88	0.36	12.50	0.062	10.71	0.26	8.33	0.68	7.94	3.19	12.32	0.053	10.42
			+		+		+		+		+		+		+		+
	1	2.68	1.90	4.06	18.71	0.34	6.25	0.061	8.93	0.22	8.33	0.68	7.94	3.12	9.86	0.050	4.17
		+		+		+		+		-		+		+		+	
	10	2.62	0.38	4.04	18.13	0.34	6.25	0.057	1.79	0.22	8.33	0.66	4.76	3.06	7.75	0.048	0.00
		-		+		+		+			-		+		+		
II	0.1	2.99	2.40	4.16	8.90	0.39	11.36	0.062	5.08	0.32	3.23	0.74	2.78	3.22	10.65	0.054	5.88
			+		+		+		+		+		+		+		+
	1	2.94	0.69	4.12	7.85	0.37	15.91	0.060	1.70	0.29	6.45	0.73	1.39	3.18	9.28	0.051	0.00
		+		+		+		+		-		+		+			
	10	2.91	0.34	4.09	7.07	0.36	18.18	0.057	3.39	0.27	12.90	0.71	1.39	3.09	6.19	0.048	5.88
		-		+		-		-			-		-		+		-
III	0.1	3.29	1.58	4.18	1.21	0.42	14.29	0.061	1.61	0.33	8.33	0.78	7.14	3.24	9.88	0.054	5.26
			+		+		+							+			
	1	3.19	0.95	4.13	0.00	0.41	16.33	0.060	3.23	0.32	11.11	0.76	9.52	3.19	8.14	0.052	8.77
		+		+		+				-		-		+			
	10	3.09	2.22	4.11	0.48	0.39	20.41	0.057	8.07	0.31	13.89	0.72	14.29	3.09	4.75	0.048	15.79
		-		-		-		-			-		-		+		-
IV	0.1	3.24	0.62	4.14	3.05	0.42	17.65	0.060	10.45	0.35	10.26	0.84	9.68	3.15	4.31	0.054	6.90
			+		-		-							+			
	1	3.19	0.93	4.05	5.15	0.41	19.61	0.060	10.45	0.32	17.95	0.81	12.90	3.04	0.66	0.051	12.07
		-		-		-		-		-		-		+			
	10	3.04	5.59	4.01	6.09	0.39	23.53	0.056	16.42	0.31	20.51	0.75	19.36	2.97	1.66	0.048	17.24
		-		-		-		-		-		-		-			-

DFC. Difference from control : T. in treated sets; -, inhibition; +, stimulation.

Chloride was determined by the volumetric method using silver nitrate, ammonium potassium thiocyanate and ferric indicator as described in A.O.A.C. (1950). Sulphur too was estimated by the method described in the A.O.A.C. (1950) book.

Plants treated with arsenic trioxide showed stimulation in its mineral content. The maximum stimulation observed was 6.08, 19.88, 12.50, 10.71, 8.33, 12.32 and 10.42% in 0.1  $\mu\text{g/ml}$  in the first harvest in the content of sodium, potassium, calcium, lithium, phosphorous, sulphur and chlorides, respectively. Magnesium was stimulated to a maximum of 7.94% in 0.1 and 1  $\mu\text{g/ml}$  in the first harvest (Table-1).

Increase in the concentration of arsenic and the duration of treatment were directly proportional to the percentage of inhibition in the mineral content. The maximum inhibition recorded was 5.59, 6.09, 23.53, 16.42, 20.51, 19.36, 1.66 and 17.24%

in 0.1  $\mu\text{g/ml}$  in the fourth harvest in the content of sodium, potassium, calcium, lithium, phosphorous, magnesium, sulphur and chlorides, respectively (Table-1). Iron was found to be negligible.

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