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Effect of Tannery Effluent on Bhendi

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A pot culture experiment was conducted on red and alluvial soils with *bhendi* as test crop at two levels of tanney effluent application, mixing it with water in 25 and 50% propotions. The yield of *bhendi* was adversely affected by application of tannery effluent and the effect was more pronounced with increase in concentration.

In recent years, safe disposal of tannery effluent from leather industry has been a problem of considetable importance from the point of view of agriculture as well as sanitation and public health. With a view to utilise the tannery effluent in agriculture, earlier workers have suggested different treatment methods (Thabaraj *et al.*, 1964; Varadarajan *et al.*, 1970; Kothandaraman *et al.*, 1972; and Sundaresan and Chengappa, 1972). In this study, an attempt was made to find out the effect of iluted tannery effluent as an irrigation source for a vegetable crop was made.

MATERIAL AND METHODS

A pot culture experiment was conducted on red and alluvial soils with *bhendi* as test crop at two effluent concetration levels. The red and alluvial soils were collected from Chemankuziyur, Coimbatore District and Tamil Nadu Agricultural University campus, Coimbatore, respectively. Four kg of soil were weighed and transferred to each pot. The experiment, was laid out in randomized block design replicated four times. The treatments were :

T_1 = Application of water alone
T_2 = 25% effluent + 75 % water
T_3 = 50 % effluent + 50% water.

All the treatments received normal fertilizer schedule as a basal dressing.

Bhendi (Pusa Sawani) seeds were sown on 27.2.78 and were irrigated immediately after sowing and subsequently once in a week with rain water (one litre) as well as with the tannery effluent (one litre at a time to each pot) as per the treatment schedule. The fruits were harvested as and when they matured. Initial and post harvest soil samples were sampled and analysed for chemical constituents such as available nitrogen, phosphorus, potassium, calcium, magnesium and sodium, EC and pH. The plant samples (both fruits and

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stalks) were analysed for major nutrients, *viz.*, nitrogen, phosphorus and potassium. From the nutrient concentration, uptake values were calculated by multiplying with dry matter yield. Effluent was analysed and the results are presented in Table I.

RESULTS AND DISCUSSION

Yield of bhendi fruits was adversely affected by application of tannery effluent and the effect was more pronounced with higher concentration of effluent. Yield was higher in alluvial soil than in red soil (Table II).

Uptake of nitrogen, phosphorus and potassium by *bhendi* decreased with increase in concentration of the effluent. This was in accordance with the observation of Thabaraj *et al.* (1964) who reported that excessive amounts of nitrogen, sodium and chloride present in the tannery effluent (Table I) interfered with and inhibited the uptake of other elements like potassium, phosphorus and magnesium by the plants. Though the effluent contains appreciable amounts of nitrogen and phosphorus, the high amounts of organic matter content results in immobilisation of nitrogen through microorganisms because of the high C/N ratio. This is in line with the findings of Dolar *et al.* (1972). The over-all effect of the effluent can be apportioned among the beneficial one due to the presence of plant nutrients and the adverse one brought about by high electrolyte concentration.

Soil available nitrogen was more in effluent treated pots than in control. There was not much variation between the two concentration levels. There was not much variation in the concentration of other nutrients due to effluent application. pH did not vary much but there was a slight increase in the electrical conductivity of the soils due to addition of effluents.

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TABLE I Composition of Tannery Effluent

Particulars of analysis		
Total solids	(ppm)	3,271
Suspended solids	"	328
Calcium bicarbonate	"	388.9
Calcium sulphate	"	88.0
Magnesium sulphate	"	97.5
Magnesium chloride	"	066
Sodium chloride	"	381
Ammoniacal nitrogen	"	57
Nitrate nitrogen Nitrite nitrogen	"	absen
Water soluble phosporus	"	6.7
Total copper	"	0.0[illegible]
Total manganese	"	0.20
Total zinc	"	0,35
Total iron	"	2.0
Electrical conductivity (mmhos/cm)	"	3.2
pH		7.80
Organic Carbon (per cent)		1.26

TABLE II Effect of effluent application on *bhendi* and soils.

Treatment	Post-harvest soil analysis (Available)							E.C.	Yield of bhendi fruits (g/pot)	Uptake of nutrients by *bhendi* (mg/pot)		
	N	P	K	Ca	Mg	Na	pH	(mmhos/cm)		N	P	K
S_1 T_1	118	4.8	132	3890	2131	476	8.3	0.60	39.52	51.07	147.38	117.03
S_1 T_2	123	4.5	111	3886	1969	559	8.3	0.80	25.75	33.82	120.58	79.30
S_1 T_3	124	3.7	95	3803	1934	635	8.4	0.90	20.63	27.91	78.10	62.38
S_2 T_1	126	3.6	58	1914	1003	260	6.3	0.20	22.97	21.00	116.90	74.98
S_2 T_2	135	3.1	68	2006	994	313	6.6	0.25	12.18	11.80	61.53	44.56
S_2 T_3	133	3.6	73	2246	948	334	6.8	0.30	9.48	3.78	29.60	22.46

S_1 × Alluvial soil. S_2-Red soil. T_1--Water alone. T_2--25% effluent, T_3--50% effluent.