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RESEARCH ARTICLE

SCREENING OF BLACKGRAM VARIETIES FOR TOLERANCE TO SAGO FACTORY EFFLUENT

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ABSTRACT

The germination percentage, seedling growth and dry weight of six varieties of blackgram were high at 10 percent of sago factory effluent for all the varieties when compared to control. Among the six varieties studied, Vamban-2 showed better growth, the order of tolerance being Vamban-2>Vamban-1>ADT-4>ADT-5>KM-1>ADT-3.

INTRODUCTION

Sago industry is one of the major water consuming industries responsible for discharging sago effluent into surrounding agricultural fields, which peccolates in to the soil to disturb the ecological balance (Abubacker et al., 2002). In the present study were carried out to find the tolerance variety of blackgram to sago factory effluent.

MATERIALS AND METHODS

Six varieties of blackgram (*Vigna mungo* L. ADT-3, ADT-4, ADT-5, KM-1, Vamban-1 and Vamban-2) were obtained from Regional Pulse Research Centre, Vamban, Pudukottai district. The effluent samples were collected from the main outlet of Kajalakshmi sago factory Athur, Salem district. The physico-chemical properties of effluent were analysed after APHA (1992), Healthy seeds were selected and surface sterilized with 0.2 percent mercuric chloride solution and rinsed with distilled water. Forty two sterilized petriplates were treated with different concentrations (5, 10, 25, 75 & 100%) of effluent. One set of seeds treated with tap water was used as control.

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The percentage of germination was recorded daily. After seventh day, the germination percentage was calculated and ten seedlings from each concentration for all the varieties were randomly selected for the measurement of seedling length and dry weight were also recorded.

RESULTS

The physico-chemical properties of the effluent are shown in Table 1. The effluent was acidic in nature and pale white in colour, rich in total suspended solids and with high BOD and COD Value. A considerable amount of calcium, magnesium and sulphate were present in the effluent. The germination percentage recorded for different concentrations of effluent treatment for all the varieties is shown in Table 2. The highest germination was recorded at 10 per cent effluent.The length of blackgram seedlings under various concentrations of effluent is presented in Table 2.The highest seedling length was recorded at 10 percent concentration. The dry weight of seedlings due to different concentrations of effluent is shown in Table 2. The presence of optimum

level of nutrients in the lower concentration (10%) of effluent might have increased the growth as well as the dry weight of seedlings. The reduction in germination and seedling growth at higher concentrations may be due to the presence of excess quantity of micronutrients, metals and toxic chemicals in the effluent. Among the six varieties studied, Vamban-2 showed the higher percentage and the ADT-3 showed the lower percentage of germination, seedlings growth and seedlings dry weight in effluent treatment.

Table 1: Physico-chemical analyses of sago factory effluent

Characteristics	Values
Physical	
Colour	Pale white
Temperature	27ºC
Suspended Solids	1130.00
Dissolved Solids	1840.00
Chemical	
pH	5.80
BOD	4216.0
COD	5917.0
Chloride	357.50
Phosphate	15.22
Sulphate	157.39
Calcium	200.15
Magnesium	268.80
Sodium	70.0
Fluoride	1.85
Ammonical Nitrogen (NH_3-N)	3.70
Phenolic Compounds as C_6H_5OH	2.0

All parameters are expressed in mg/l except pH, colour and temperature.

DISCUSSION

The same trend was observed in groundnut and paddy treated with sugarmill effluent (Thamizhiniyan et al., 2000). The reduction in seed germination percentage under effluent treatment may be due to high concentration of solids. A similar trend has been reported by Ravimycin & Lakshmanachary (1993). The promotion in seed germination percentage and seedling growth by the lower concentrations of the effluent might be due to the presence of optimum levels of plant nutrients in the effluents. A similar results were observed in paddy due to sugarmill effluent treatment reported by Krishna and Leelavathi (2002). However, all the germination parameters showed a gradual decrease above 25 percent effluent concentration onwards. Similar effect was also observed by Lakshmi & Sundaramoorthy (2001).

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Table 2 : Effect of sago factory effluent on seed germination (G.%), seedling length (S.L.cm) and Dry weight (D.W.mg) of six varieties of *Vigna mungo*.

Effluent (con. in %)		ADT-3	ADT-4	ADT-5	KM-1	Vamban-1	Vamban-2
Cont.	G%	85 ± 5.10	88 ± 5.28	86 ± 5.16	87 ± 5.22	90 ± 5.40	95 ± 5.70
	S.L.	18.0 ± 1.08	20.0 ± 1.20	19.0 ± 1.14	18.0 ± 1.08	19.0 ± 1.14	21.0 ± 1.26
	D.W.	0.757 ± 0.045	0.823 ± 0.049	0.821 ± 0.049	0.819 ± 0.049	0.823 ± 0.049	0.847 ± 0.050
5	G%	88 ± 5.28	92 ± 5.52	89 ± 5.34	90 ± 5.40	94 ± 5.64	98 ± 5.88
	S.L.	20.0 ± 1.20	22.0 ± 1.32	21.0 ± 1.26	21.0 ± 1.26	23.0 ± 1.38	24.0 ± 1.44
	D.W.	0.822 ± 0.049	1.083 ± 0.064	1.081 ± 0.064	1.071 ± 0.064	1.105 ± 0.066	1.125 ± 0.067
10	G%	91 ± 5.46	96 ± 5.76	94 ± 5.64	92 ± 5.52	98 ± 5.88	100 ± 6.00
	S.L.	22.0 ± 1.32	26.0 ± 1.56	24.0 ± 1.44	23.0 ± 1.38	27.0 ± 1.62	29.0 ± 1.74
	D.W.	0.915 ± 0.054	1.174 ± 0.070	1.150 ± 0.069	1.135 ± 0.068	1.196 ± 0.071	1.205 ± 0.072
25	G%	86 ± 5.16	90 ± 5.40	88 ± 5.28	89 ± 5.34	92 ± 5.52	96 ± 5.76
	S.L.	19.0 ± 1.14	21.0 ± 1.26	20.0 ± 1.20	19.0 ± 1.14	21.0 ± 1.26	22.0 ± 1.32
	D.W.	0.762 ± 0.045	0.829 ± 0.049	0.823 ± 0.049	0.821 ± 0.049	0.852 ± 0.051	0.865 ± 0.051
50	G%	73 ± 4.38	86 ± 5.16	84 ± 5.04	76 ± 4.56	8.8 ± 5.28	93 ± 5.58
	S.L.	15.0 ± 0.90	13.0 ± 0.78	14.0 ± 0.84	15.0 ± 0.90	15.0 ± 0.9	16.0 ± 0.96
	D.W.	0.593 ± 0.035	0.602 ± 0.036	0.601 ± 0.036	0.621 ± 0.037	0.623 ± 0.037	0.656 ± 0.039
75	G%	70 ± 4.20	80 ± 4.80	78 ± 4.68	71 ± 4.26	82 ± 4.92	85 ± 5.10
	S.L.	9.0 ± 0.54	11.0 ± 0.66	10.0 ± 0.60	9.0 ± 0.54	12.0 ± 0.72	13.0 ± 0.78
	D.W.	0.496 ± 0.029	0.523 ± 0.31	0.512 ± 0.030	0.493 ± 0.029	0.527 ± 0.031	0.542 ± 0.032

No germination was recorded in 100 percent effluent,
± = Standard Deviation.

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