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Effect Of Industrial Effluents On Seed Germination Of Acacia Sinuata (lour) Merr, Syn. Acacia Concinna.(dc)

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Abstract: *As the number of industries are increasing day by day their has been a substantial increase in generation of waste water. Thise waste water is utilize where shortage of water becomes limiting factor. The water increasing containing industrial iffluents effect the seed germination*

The effect of material effluents on seed germination and root, shoot length of Acacia sinuata (lour) merr, syn. Acacia concinna.(DC) has been investigated. The seeds presoaked in varying concentration of effluent for 15 and 24 hrs were germinated under continuous moisture application of various concentration of effluent and inhibition in germination was recorded with increasing concentration of effluents as well as presoaking period.

Key words: Acacia concinna.(DC), Effluents, Seed Germination, Seedling.

INTRODUCTION:

The critical phase of germination in the life cycle of a crop plant subject to many environmental stresses. Any disturbance in the environment in which seed germinate ultimately and effect the growth of forest plants, pollution of water, soil and air thus affect these markedly. These effects of different factory effluents on germination growth and yield of different forest plants has drawn attention of several workers (Pandey and Srivastava,1980) there has been substaintial increase in germination of untreated industrial waste water, which is discharge either in open land or near by aquatic ecosystems due to this activity soil, air and water pollution increases day by day. The industrial waste water contain nitrogen, phosphate, sulphate, chloride, soluble substances which effect the seed germination. In some areas where shortage or scarcity of water exists. The effluent being used for irrigational purpose by the farmer in agroforestry practices since the industrial effluent generated continuously and production of waste water is continuous process, which may effect the seed germination. The present investigations deals with the effect of industrial effluents release from card board factory on Acacia concinna (DC) it is exclusively demanding spices in soap making industry. A. concinna belong to the family leguminacea. The effect were examined in realtion to various concentration of effluents.

The effluents release from paper card board factory mixed finally in to strong streams, which is used as source of irrigation. The effluent mixed with water may affect the germination of seeds. In the above context the present investigation was undertaken.

MATERIALS AND METHODS

The crude effluent was collected from a local cardboard factory discharge from its outlet. The distilled water was used for the lowering down the concentration of crude effluent. The seeds of Acacia sinuata (Lour), merr. syn. Acacia concinna(DC) obtained from forest department were separated from uniform size shape and colours, which were used for germination experiments.

The experiments were conducted in uniform laboratory conditions. Two sets of experiments were conducted. In one set, the seeds were pre-soaked in 25, 50, 75 and 100 percent concentration of the effluent for 15 & 24 hrs. The seeds were washed thoroughly with distilled water remove traces of effluent, The other set of experiment conducted simultaneously in continuous supply of 25.50. 75 and 100 percent concentration of effluents. The seed were treated with 0.1 % mercuric chloride for two minutes to eliminates the fungus, contamination. In control the seeds were germinated in distilled water. Five replicates of 100 seeds each were kept for germination in Petri dishes of 15 cm diameter lined with cotton and a circle of filter paper. The filter paper was moist with respective concentration of effluent according to the experimental plan. The emergence of radical was used as index for germination. Root and shoot length was evaluated from 10 days old seedling. The seedling were taken out of petri plates and length of root and shoot was measured separately with the help of divider and scale. The physiological properties of effluent were analyzed as per standard methods describe by (APHA, 1995)

RESULTS AND DISCUSSIONS

The observation were made presented in tabular form (Table – 2) Percentage of germination, time of contact of seeds with effluent and concentration of effluent. On the germination of wheat seeds, (Agarwal 1995) respectively by treatment with industrial effluents of Acacia concinna (DC) seed showed an inhibition in germination capacity when

treated with card board factory effluents the seed germination with continuous application of effluent shows less effect on germination as compared to the seed given treatment with pure effluent (Table 2) The early root shoot length is affected by treatment with effluent. The seeds which were supplied with 25% of effluent continuously showed better root shoot length similarly the seed which were presoaked for 15h and 24h in 50% of effluent showed better growth as compared to the control; whereas, The seeds presoaked in 25%, 75% and 100% effluent showed a decrease in early seedling growth. The minimum growth among the three types of treatment was observed in the seeds which were continuously supplied with 100% effluent for 15hrs soaking of seeds showed better growth than 24 hrs presoaked seeds, this indicates that longer soaking period seeds in effluent is comparatively more injurious to seedling growth than the shorter soaking period. Similar observations were recorded by (Shahai et al 1979, Pandey and Shrivastava 1980). In our experiment there the seed soaked for 15 hrs shoved better germination as compared to the seed pre-soaked for 24 hrs. The germination capacity decreases in A. concinna seeds as the concentration and soaking period of effluent increases. The result shows the direct relationships among the percentage of germination and time of contact of seed with effluent as well as the concentraton of drastic decline in germination percentage and root shoot length also the result of present finding are well supported by (singh et al. 2003 and Pandey and Soni 1994) reported that with increase in effluents concentration the germination value was adversely effected in Albizzia procera consequently it was proved that although pure distillery effluents could not be used for germination since the higher concentration is harmful. It is recommended only after treatment and dilution effluent be used for irrigation purpose. Similar observation were recorded by on the germination. Some other plants treated with industrial effluents the effect of various concentration of effluents was studied and data was analyzed statistically in order to find out the suitable concentration of effluents which could be less harmful for seed germination and could be recommended for irrigation purpose (Table 2) it is revealed that the effect of low concentration on seed germination and root shoot length has no adverse effect. As a concentration of effluents increases it has adverse effect on seed germination and root should length 100% pure effluent showed adverse effect chaudhary et al 1987

The effluent has a very high electrical conductivity and falls in the category of saline(table-I). Due to this high salinity the percentage of germination and root shoot length decrease as the concentration of effluents increases. Similar observations were recorded by (Mehta and Desai 1957),(Narale et al 1969), (Rao et al 1969), The effluent is rich in the ionic concentration (table-1). These ions affects the germination and growth processes an having adverse effect as the concentration of these increases, The high cation concentration may also have adverse effect on these processes.

Table-I : Physico chemical properties of industrial effluents

Colour	Treatment	pH	Total N	- - $C0_3$	- $HC0_3$	- cr	Na^+	K^+	$(Ca+Mg^{++})$	-- SO_4	Elec. Cond. (mhos/cm)
	o°c		µg/ml		Hz	Meq/lit					
Dirty Brown	26	7.6	0.47	1.7	998	3.6	1.05	0.78	15.02	0.18	2170

Table-II: Effect of Industrial Effluents on germination (%) and early seed growth of Acacia sinuata (lour) merr, syn. Acacia concinna (DC) seeds.

s. No.	Treatment	Germination% & root shoot length	Concentration of Industrial effluents					
			Control	Total No. of Days	25%	50%	75%	100%
1	Continuous application of effluent	Germination Percentage	41 ± 0.063	30	35 ± 0.063	24+ 0.012	18+ 0.057	11+ 0.057
		Root length	29.5mm		29.+ 0.056	25+ 0.014	18.2+ 0.063	10.6+ 0.012
		shoot length	22.1mm		21.7+ 0.017	19.3+ 0.018	15+ 0.017	10+ 0.013
2	24 hr Soaking	Germination Percentage	43 ± 0.056		37+ 0.027	22+ 0.016	9+ 0.018	5+ 0.131
		Root length	29.6mm		28.4+ 0.031	31.1+ 0.104	20+ 0.056	17+ 0.0121
		shoot length	22.5mm		20.4+ 0.20	23+ 0.013	16.5+ 0.062	13.8+ 0.0193
3	15 hr Soaking	Germination Percentage	42 ± 0.014		29+ 0.050	25+ 0.012	23+ 0.014	12+ 0.131
		Root length	30.2mm		30.2+ 0.059	29+ 0.014	21.7+ 0.011	19.2+ 0.0112
		shoot length	22.6mm		22.6+ 0.084	21.2+ 0.013	18.6+ 0.013	16.7+ 0.184

1.Each value is mean of five replicats
2.+ indicate for standard deviation (S.D)

CONCLUSION

The card board factory industrial effluent can be successfully utilized as irrigation purpose for the germination of A.concinna after appropriate dilution. The findings of present study may be proved useful in forest nurseries and plantation in large scale irrigation of seed beds and plantation sites of A.concinna

The seed germination significantly reduced with increased in osmotic concentration of the medium .The effect of high osmotic levels on germination was purely due to osmatic inhibition of water absorption. (Rao et al 1969) observed the same result on germination and root shoot length of Acacia sinuata (lour) merr, syn. Acacia concinna (DC) found that the growth is also related with increase in osmatic concentrations. The present experiment also confirm the above observations. The concentration osmotic concentration of effluent increases the germination and root shoot length reduced.

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