



Effect of textile industrial effluents on seed germination of Lentil (*Lens esculentum*)

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Received: 10.01.2013

Revised: 25.02.2013

Accepted: 02.03.2013

Abstract

Textile industrial effluents are highly polluted in nature and vary in its compositions. In the adjoining agricultural area of textile industries sector, there is immense degradation of crops productivity being contaminated by irrigation through tubewells or directly from the effluent drain or village pond. The present paper deals with the physico-chemical parameters of textile industrial effluents and its impacts on germination and growth performance of Lentil (*Masoor*) *Lens esculentum*, (Family: Leguminoceae, Sub-family: Papillionateae). Seeds were found more tolerant against 25% concentrated effluent.

Keywords: Industrial effluents, *lens esculentum*, seed germination

Introduction

Developing countries like India, Bangladesh, etc. discharge the effluents to the surface water without any treatment or sometimes little treatment due to technological and economical limitations. Colours affect the nature of water, inhibit sunlight penetration and reduce the photosynthetic action. Some of the dyes cause rapid depletion of dissolved oxygen in aquatic ecosystem affecting aquatic biodiversity adversely. Industrial effluent when discharged into the pond, pollutants may percolate into ground water. When this water is used for irrigation purpose affects our crop health. The textile effluent had consisting high concentration of trace heavy metals and through its accumulation in different trophic levels of ecosystem ultimately cause the health hazards among livestock and human beings.

Material and Methods

Effluent was collected from common effluents drain of industrial area of Panipat, Haryana and stored in tightly closed plastic container. Four polythene bags were taken for sowing the 100 treated seeds of Lentil (*Lens esculentum*) with 750 gm soil in Green house condition and irrigated by industrial effluent for three days.

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25 seeds were treated with absolute effluent, 25 seeds with 50% concentrated effluent, 25 seeds with 25% concentrated effluent and rest 25 seeds were treated with distilled water as control performance. Germination of seeds and growth performance were noticed for each poly bags everyday. Physico-chemical characteristics of effluents were analyzed according to APHA (1995), Trivedi and Goel (1984).

Results and Discussion

The results of the study are given in table 1 and 2. The appearance of effluent was pinkish red in common effluent drain of textile industries, which might be due to the presence of various dyes. Mean value of effluent pH was found alkaline (8.2) at pH scale. Solids, BOD and COD values were very high, due to the presence of chemicals used in various processes. 25% (S/4) concentration had shown positive performance of seeds germination, radical and hypocotyls growth, almost similar to control condition with distilled water, while 50% (S/2) concentration showed some negative effects on per cent seed germination and growth of seedlings. Saxena and Kaushik (2005) & Bharti and Kumar (2012) also reported the similar effects of effluents on seed germination. 100 % absolute effluent (S) was found very unfavorable for seeds germination and growth of seedlings. Highest root

length of germinated seeds with 100% concentration effluent was found 1.60 cm on third day, which was the shortest root among all the radicals in any poly bag. 25% (S/4) concentrated effluent indicated the high growth rate and seed germination among all other concentrations and it was similar to control conditions with distilled water.

Dutta and Boissay (1998) also stated that the effluent at low concentrations exhibit greater shoot and root length. Seeds of Lentil (*Lens esculentum*) were found more tolerant against 25% concentrated effluent, while against 100% absolute effluent it was found too weak as only 10 seeds were germinated in poly bag consists of total 25 seeds.

Table-1: Characteristics of common effluents of textile industries

Parameter (Unit)	Color	Odor	pH	Temp (°C)	TS (mg/l)	TDS (mg/l)	TSS (mg/l)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Cl (mg/l)	Alkalinity (mg/l)
Common Effluent	Pinkish Red	Threshold	8.2 ±0.14	22.5 ±1.5	370.0 ±90.0	336.3 ±81.89	33.6 ±8.21	1.64 ±0.21	272.5 ±42.5	791.5 ±51.5	340.8 ±28.4	590 ±60

Table2: Germination activities of Lentil (*Lens esculentum*) during experiment.

Effluents	Exposure Hour	Number of seed	% Germination	Radical (Root) Length (Cm)	Hypocotyls (Shoot) Length (Cm)
100% (S)	24	25	40	0.95	-
	48	25	48	1.55	-
	72	25	52	1.60	1.30
50% (S/2)	24	25	60	0.95	-
	48	25	68	1.60	-
	72	25	72	1.75	1.45
25% (S/4)	24	25	84	1.00	-
	48	25	88	1.75	-
	72	25	92	1.95	1.75
Control (Distilled water)	24	25	72	0.95	-
	48	25	76	1.55	-
	72	25	80	1.75	1.50

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