

EFFECTS OF TEXTILE WASTE WATER CONCENTRATION ON CROPS (*HORDEUM VULGARE*
AND CICER ARIETINUM) IN SANGANER, JAIPUR

Rajesh Kumar Yadav, Deepmala Verma

Department of Environmental sciences, S.S. Jain Subodh P.G. College, Rambagh circle, Jaipur (India)

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ABSTRACT: The study examined the effect of Textile waste water concentration on crops (*hordeum vulgare* and *cicer arietinum*). Textile is a most important and rapidly developing industrial sector for Rajasthan, representing over 20 percent of the investment made to the state. The Textile waste water from all these factories ultimate reach into Amanishah Nallah without any pretreatment. The sample was collected 3 locations (Madrapura, railway station, vatika road) of Amanishah Nallah during study period nov.2011 to Jan 2013.

INTRODUCTION

Sanganer is a village situated 16 km south of Jaipur, the capital of Indian state of Rajasthan and has nearly 105 small scale, 25 medium scale and 5 large scale textile industries. It is famous for handmade paper industry, textile printing and for Jain temples. Ecological and toxicological problems due to the discharge of waste water from Sanganer textile industries in local drainage (Amanishah Nallah) have been one of the most important water pollution problems within this area. Studies have clearly indicated that the industrial effluents, which are directly discharged into the Amanishah Nallah, drainage contained highly mutagenic compounds. Textile industry effluents account for several point sources of water pollution thus posing negative effects on aquatic lives and human health ([Bakirdere and Yaman, 2008](#)). These compounds also contaminate the surface and even ground water, thereby, making it unfit for irrigation and drinking, Sanganer, a suburb of Jaipur is no exception to this. Direct dumping of industrial waste water in and around industrial areas causes the transfer of pollutants into the environment ([Baslas and Singh, 1984](#)). It can also lead to significant deterioration in the aesthetic value of downstream waters. The disposal fun treated textile waste water in Sanganer has contaminated ground water with heavy metals such as Zn, Ni, Cr, Cd, Pb, Cu and Fe, which is reported in more than permissible limits by the Rajasthan State Pollution Control Board, Jaipur and other workers ([Manivasakam, 1987](#); [Khan et al., 2003](#)). [Pal and Brijmohan, \(1990\)](#) reported that textile industry possess various types of physical and chemical environmental hazardopus which are responsible for different type of occupational diseases. The ground water is used in the cottage industries ([Khan et al., 2003](#)).The picture becomes more alarming as these water are directly being use for agriculture in the land adjoining the drainage in fact during summer the very little water present in the Amanishah nallah drainage the entire drainage area convert in to agriculture fields. The objectives of this study are to examine the effect of Textile waste water concentration on crops.

MATERIAL AND METHODS

The detailed survey by random sampling methods was conducted to Amanishah nalla different location during study period of Nov. 2011 to Jan. 2013.

Location 1- Madrapura

Location 2- Railway station

Corresponding Author: Deepmala Verma, Department of Environmental sciences, S.S. Jain Subodh P.G. College, Rambagh circle, Jaipur (India). E-mail: deepav762@gmail.com

Location 3- Vatika Road

Seeds of *Hordeum vulgare* and *cicer arietium* were collected from different location of Amanishah Nallah. In laboratory seeds of *hordeum vulgare* and *cicer arietium* were surface sterilized and washed with distilled water, the experiment was performed in petriplates. Different concentrations of waste water were applied to the seeds in *hordeum vulgare* and *cicer arietium*, these were control 10%, 25%, 50%, 75% and 100%. Germination was studied after 48 hours and seedling growth after 7 days.

RESULT AND DISCUSSION

Results of this study indicated variation in response of different levels of waste water concentration applied, effect of waste water concentration on germination after 48 hrs and seedling growth after 7 days.

3.1. Effect of waste water concentration on germination (after 48 hrs) and seedling growth (after 7 days) of *hordeum vulgare*

At the location 1 (Madrapura) seeds of *hordeum vulgare* showed 40% germination at 100% concentration while it showed in table 1 and figure 1. Where at location 2 (railway station) seeds of *hordeum vulgare* showed 45% germination at 100% concentration (table 2) and only 30% germination was observed at location 3 (Vatika Road) showed in table 3. In location 1 the reduction in shoot and root length of *Hordeum vulgare* was recorded up to 34.10% (5.14 cm) and 47.47% (3.12 cm) respectively at 100% concentration in comparison to control (7.80 cm) show table 1. At location 2 the shoot and root length of *Hordeum vulgare* reduced up to 51.28% (3.80 cm) and 49.49% (3 cm) respectively whereas reduced up to 61.53% (3 cm) and 52.52% (2.82 cm) respectively at 100% concentration of waste water in comparison to control (7.80 cm & 5.94 cm respectively). The dry weight of seed also showed decreasing trend with increase in concentration of waste water. It was reduced by 45.45% (0.048 cm), 54.54% (0.048 cm).

3.2. Effect of waste water concentration on germination (after 48 hrs) and seedling growth (after 7 days) of *cicer arietinum*

At location 1 (Madrapura) seeds of *cicer arietinum* showed 30% germination at 100% concentration while it showed 90% germination with control (Table 4), whereas at location 2 seeds of *cicer arietinum*. Showed 23.33% germination at 100% concentration and only 26.66% germination was observed at location 3 (Table 3). Location 1 the reduction in shoot and root length of *cicer arietinum* was recorded up to 75.92% (0.78 cm) and 66.62% (2.51 cm) respectively at 100% concentration of waste water in compared to control (3.24 cm & 7.52 cm respectively). The dry weight of seeds also showed decreasing trend with increasing concentration of waste water. At location 1, 2, 3 it was reduced by 82.50% (0.014 cm), 86.25% (0.011 cm), 87.50% (0.010 cm) respectively showed in table 4, 5, 6 and figure 4, 5, 6.

Table 1: Effect of waste water concentration on germination (after 48 hrs) of *hordeum vulgare* (amanishah Nallah location 1)

Growth parameters Waste water concentrate	% Germination (after 48 hrs)	% Reduction Germination	Root Length (cm)	% reduction	Shoot Length (cm)	% reduction	Total dry weight (gm)	% reduction in total dry weight (gm)
Control	90.00	-	5.94	-	7.80	-	0.088	-
10%	86.66	3.71	4.00	32.65	5.22	25.38	0.074	15.90
25%	80.00	11.11	4.48	24.57	6.71	13.97	0.080	9.09
50%	83.33	7.41	5.10	14.14	7.00	10.25	0.072	18.18
75%	76.66	14.82	3.86	35.01	5.32	31.79	0.052	40.90
100%	40.00	55.55	3.12	47.47	5.14	34.10	0.048	45.45

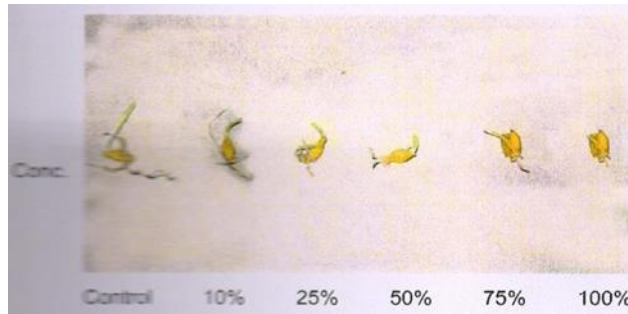


Figure 1: Effect of waste water concentrate on seeding growth (after 7 days) of hordeum vulgare (Amanishah Nallah Location 1 (Madrapura))

Table 2: Effect of waste water concentration on germination (after 48 hrs) and seeding growth (after 7 days) of hordeum vulgre (amanishah Nallah location 2)

Growth parameters Waste water concentrate	% Germination (after 48 hrs)	% Reduction Germination	Root Length (cm)	% reduction	Shoot Length (cm)	% reduction	Total dry weight (gm)	% reduction in total dry weight (gm)
Control	90.00	-	5.94	-	7.80	-	0.088	-
10%	83.33	7.41	5.10	14.14	5.32	31.71	0.075	14.77
25%	80.00	11.11	4.48	24.25	4.52	42.05	0.062	29.54
50%	80.00	11.11	4.48	24.57	4.54	41.79	0.066	25.00
75%	76.66	14.82	4.00	32.65	4.52	42.05	0.064	27.27
100%	45.00	50.00	3.00	49.49	3.80	51.28	0.048	45.45

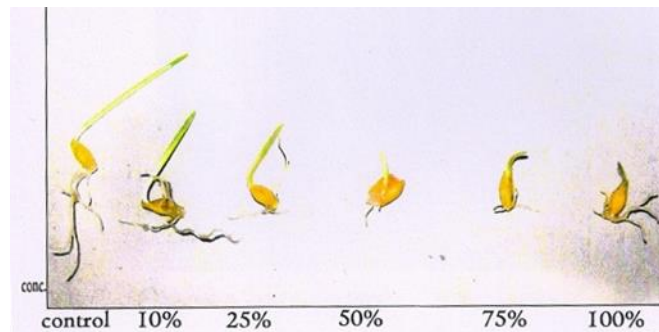


Figure 2: Effect of waste water concentrate on seeding growth (after 7 days) of hordeum vulgare (Amanishah Nallah Location 2 (Railway station))

Table 3: Effect of waste water concentration on germination (after 48 hrs) and seeding growth (after 7 days) of hordeum vulgre (amanishah Nallah location 3)

Growth parameters Waste water concentrate	% Germination (after 48 hrs)	% Reduction Germination	Root Length (cm)	% reduction	Shoot Length (cm)	% reduction	Total dry weight (gm)	% reduction in total dry weight (gm)
Control	90.00	-	5.94	-	7.80	-	0.088	-
10%	81.67	9.25	4.44	25.25	5.22	33.07	0.068	22.72
25%	76.66	14.82	4.48	24.57	4.52	42.05	0.066	25.00
50%	73.33	18.52	3.86	35.01	4.15	46.79	0.052	40.90
75%	50.00	44.44	3.55	40.23	3.92	49.74	0.050	43.18
100%	30.00	66.67	2.82	52.52	3.00	61.53	0.040	54.45

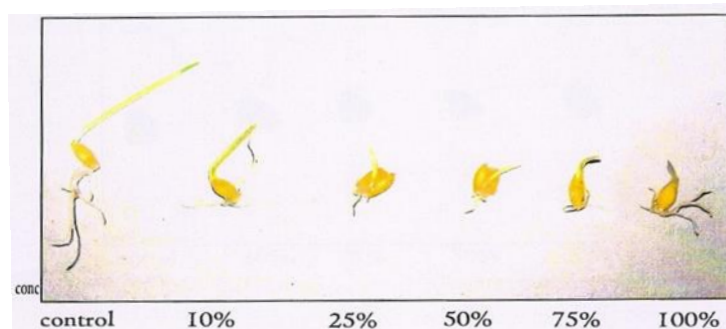


Figure 3: Effect of waste water concentrate on seeding growth (after 7 days) of hordeum vulgare (Amanishah Nallah Location 3 (Vatika road))

Table 4: Effect of waste water concentration on germination (after 48 hrs) and seeding growth(after 7 days) of Cicer arietinum (Amanishah Nallah location 1)

Growth parameters Waste water concentrate	% Germination (after 48 hrs)	% Reduction Germination	Root Length (cm)	% reduction	Shoot Length (cm)	% reduction	Total dry weight (gm)	% reduction in total dry weight (gm)
Control	90.00	-	7.52	-	3.24	-	0.080	-
10%	81.67	9.25	7.00	6.91	2.20	32.09	0.062	22.50
25%	76.66	14.82	6.11	18.75	1.51	53.39	0.051	36.25
50%	73.33	18.52	4.33	42.42	1.10	66.04	0.034	57.50
75%	50.00	38.88	3.20	57.44	0.90	72.22	0.020	75.00
100%	30.00	66.66	2.51	66.62	0.78	75.92	0.041	82.50

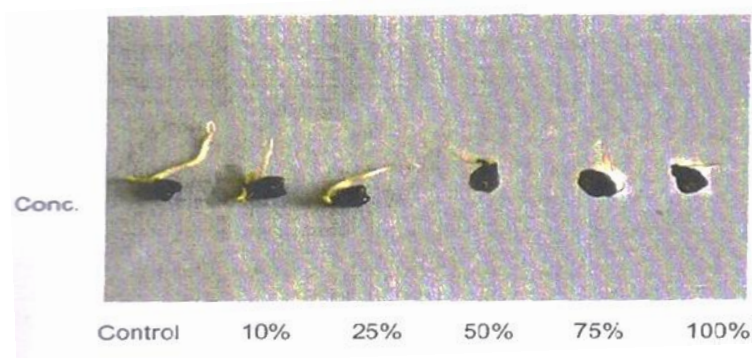


Figure 4: Effect of waste water concentrate on seeding growth (after 7 days) of cicer arietinum (Amanishah Nallah Location 1 (Madrapura))

Table 5: Effect of waste water concentration on germination (after 48 hrs) and seeding growth (after 7 days) of hordeum vulgare (amanishah Nallah location 2)

Growth parameters Waste water concentrate	% Germination (after 48 hrs)	% Reduction Germination	Root Length (cm)	% reduction	Shoot Length (cm)	% reduction	Total dry weight (gm)	% reduction in total dry weight (gm)
Control	90.00	-	7.52	-	3.24	-	0.088	-
10%	80.00	11.11	6.82	9.30	2.11	34.87	0.058	27.50
25%	76.66	14.82	6.00	20.21	1.40	56.79	0.047	41.25
50%	62.00	31.11	4.11	45.34	1.09	66.35	0.031	61.25
75%	50.00	44.44	3.00	60.10	0.88	72.83	0.016	80.00
100%	23.33	74.07	2.32	69.14	0.75	76.85	0.011	86.25

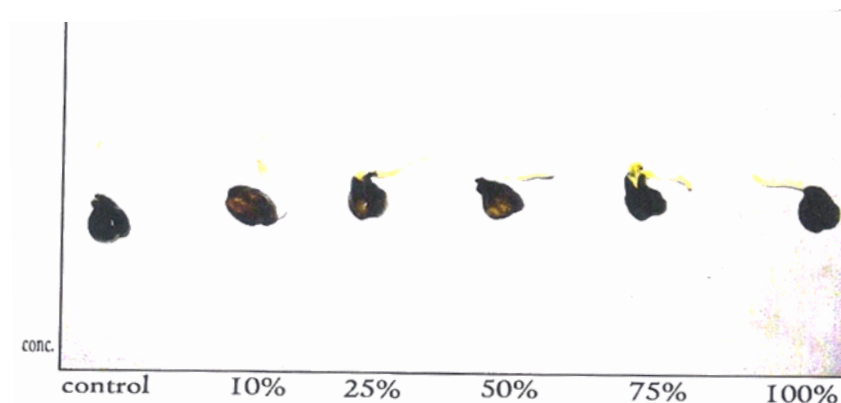


Figure 5: Effect of waste water concentrate on seeding growth (after 7 days) of hordeum vulgare (Amanishah Nallah Location 2 (Railway station))

Table 6: Effect of waste water concentration on germination (after 48 hrs) and seeding growth (after 7 days) of hordeum vulgare (amanishah Nallah location 3)

Growth parameters Waste water concentrate	% Germination (after 48 hrs)	% Reduction Germination	Root Length (cm)	% reduction	Shoot Length (cm)	% reduction	Total dry weight (gm)	% reduction in total dry weight (gm)
Control	90.00	-	7.52	-	3.24	-	0.080	-
10%	80.00	11.11	6.82	9.30	2.11	34.87	0.058	27.50
25%	76.66	14.82	6.00	20.21	1.40	56.79	0.047	41.25
50%	62.00	31.11	4.11	45.34	1.09	66.35	0.031	61.25
75%	50.00	44.44	3.00	60.10	0.88	72.83	0.016	80.00
100%	23.33	74.07	2.32	69.14	0.75	76.85	0.011	86.25

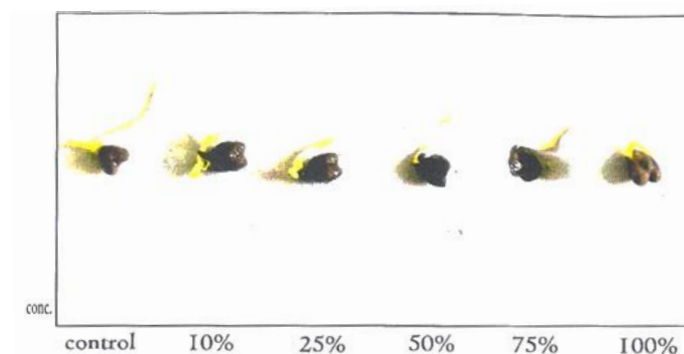


Figure 6: Effect of waste water concentrate on seeding growth (after 7 days) of cicer arietinum (Amanishah Nallah Location 3 (Vatika road))

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