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Effect of Textile Waste Water on Seed Germination and Some Physiological Parameters in Vegetable Crop under Drip Irrigation

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A B S T R A C T

The use of industrial waste water for irrigation through drip system has emerged a very important way to utilize its nutrients and removal of its pollutants load by cultivating various crops (tomato, brinjal). An experiment was conducted to evaluate the impact of textile factory effluents (0, 10, 35, 75 and 100% concentration) on germination and some physiological parameters like biomass production, root development in vegetable crop. Plants were raised in small pots in triplicate and irrigated with various concentrations (0, 10, 35, 75 and 100%) of effluent. Germination %, biomass production and various attributes of root development were determined in plants grown under different treatments. Plants exhibited a reduction in percentage germination, root and shoot dry weight, number of root branches/plants grown with higher concentration (75 and 100% concentration) of textile effluents. However, the effect of textile effluents was promotive rather than inhibitory on these parameters when applied in low concentrations (10 and 35%). It was concluded that the effect of textile effluent was crop specific depending on the concentration and stage of growth. It was suggested that waste water from textile industry could be utilized for irrigation purposes through drip irrigation after proper treatment and may contribute, at least in part towards solving the problem of disposal of textile effluent.

Introduction

The continued population growth, increased per capital water consumption and increase water requirements for industry and irrigation have also resulted in considerable decrease of usable water resources (Naddafi *et al.,* 2005). In this view of this scenario, there is an imperative need to exploit non-conventional resources to meet the irrigation water demand.

Materials and Methods

Experimental details

In this study plastic pots of size (15 cm×15 cm) were filled with 2 kg of sandy loam soil and five seed of tomato and brinjal were sown separately after proper seed treatment. A lateral pipe of 16 mm diameter having 2 lph discharge inline emitter with 45 cm spacing

was laid on both line of plastic plot. Drip irrigation was used to irrigate the soil on visual basis. The observations from both crops were taken to evaluate the impact of textile factory effluents (0, 10, 35, 75 and 100% concentration) on germination and some physiological parameters like biomass production, root development.

Treatment details

T_1 – Textile industry effluents with 0 % concentration
T_2 - Textile industry effluents with 10 % concentration
T_3 - Textile industry effluents with 35 % concentration
T_4 - Textile industry effluents with 75 % concentration
T_5 – Textile industry effluents with 100 % concentration

Results and Discussion

The result in Table 1 found that the significant impact of textile factory effluents (0, 10, 35, 75 and 100% concentration) on germination and some physiological parameters like biomass production root development for tomato and brinjal crop under different treatment. The percentage germination was found to be highest in treatment T_1 with a value of 85 %.The biomass parameters such as dry weight of root and dry weight of shoot were found highest under treatment T_3 (Textile industry effluents with 35 % concentration) with values of 89 gm and 55 gm respectively. It possibly due to irrigation water with textile industry effluents with 35 % concentration contain moderate fertility which result better nutrient supply for plant growth and root development. The percentage germination was found to be highest in treatment T_1 with a value of 85 %. The result revealed that percentage germination, root and shoot dry weight, numbers of root branches/plants were found to be minimum under treatment T_4 and T_5 which, shows overall reduction in percentage germination and physiological parameters for both crops. Similar, results was reported by Gurfan khan *et al.*, (2011) (Fig. 1).

Table.1 Percentage germination and physiological parameter like biomass and root development under different treatment

Treatments	Percentage Germination	Dry Weight of Root (Gm)	Dry Weight of Shoot (Gm)	Number of Root Branch/ Plant
T_1	85	82	51	8
T_2	76	86	52	6
T_3	83	89	55	6
T_4	46	59	41	5
T_5	43	54	41	4

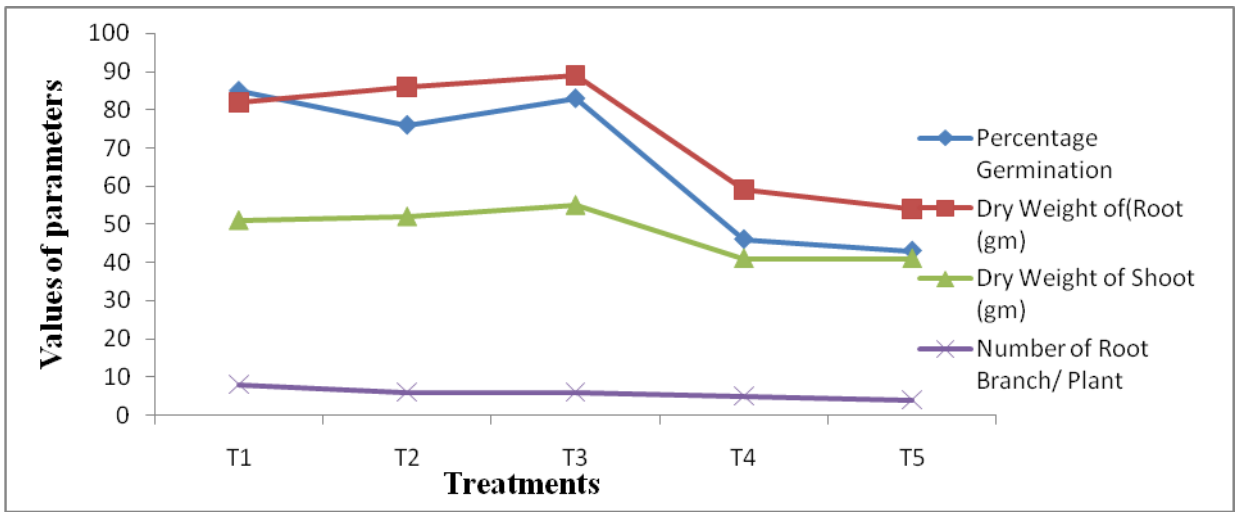

Fig.1 Performance parameters under different treatment

Plate.1 View of root and shoot during drying process

The textile industry effluent with high concentration effect germination percentage as well as physiological parameters of vegetable crop like tomato and brinjal.It was suggested that industrial waste water from textile industry could be utilized for irrigation purposes through drip irrigation after proper treatment and may contribute, at least in part towards solving the problem of disposal of textile effluent.

The overall result concludes that textile industry effluent with moderate concentration up to 35% could be effectively used in vegetable production. The textile industry effluent with high concentration effect germination percentage as well as physiological parameters of vegetable crop like tomato and brinjal.

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