

NOTES

Effect of Polluted Water on Seeds of *Phaseolus radiatus* L.

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Seeds of *Phaseolus radiatus* L. were treated with different concentrations of distillery effluent. Catalase (Ec 1.11.1.6) activity and chlorophyll contents were studied. In 25%, 50% and 100% of effluent the catalase activity and chlorophyll contents were decreased.

The second largest industry in India is distillery industry. Distillery industrial effluent causes pollution to aquatic ecosystem. It was inferred from studies on effects of these effluents on tadpole metamorphosis¹. Distillery effluent pollution effect on rivers² and groundwater were studied³.

To determine effect of industrial effluents on crop plants, that is to study the effect on seed germination chlorophyll contents and catalase activity adequate pilot tests should be conducted. In the present study an attempt is made to assess the effect of different concentrations of distillery effluent on chlorophyll contents and catalase activity of *Phaseolus radiatus* L. seedlings. Even though there are many reports on distillery effluents, the data on the effect of this distillery effluents on chlorophyll contents and catalase activity is very sparse.

The seeds of *Phaseolus radiatus* L. were procured from S.V. Agricultural College, Tirupathi, India. The O.R. Distillery Factory, Tirupathi, Andhra Pradesh is located in the industrial area at Gajulamandam about 15 km from Tirupathi. The effluent was collected from the outlets of the factory using plastic bottles and was analysed for pH, total solids, dissolved oxygen, biochemical oxygen demand, chlorides and conductivity as per procedure outlined in standard method⁴. *Phaseolus radiatus* L. seeds were germinated on moist filter paper in petridishes under natural day and night temperatures of 30° and 26°C in different concentrations of effluent (25%, 50% and 100%). Controls were maintained in distilled water. On 10th day chlorophyll contents were estimated according to the method of Arnon⁵. The activity of the enzyme was determined according to the method of Gopalachari⁶.

The physico-chemical properties of distillery effluent are presented in Table 1. The results on the effect of different concentrations of distillery factory effluent on chlorophyll contents and catalase activity are given in Table 2.

TABLE 1
PHYSICO-CHEMICAL PROPERTIES OF DISTILLERY EFFLUENTS

Colour	dark brown
pH	7.6
DO	Nil
BOD	38000 ppm
Total solids	40000 ppm
Chlorides	4600 ppm
Conductivity	1221 micro mho/cm

TABLE 2
EFFECT OF DISTILLERY EFFLUENT ON CHLOROPHYLL LEVELS AND
CATALASE ACTIVITY OF *PHASEOLUS RADIATUS* L.

Treatment %	Chlorophyll a (mg/gm fr. wt)	Chlorophyll b (mg/gm fr. wt)	Chlorophyll a + b (mg/gm fr. wt)	Chlorophyll a/b ratio	Catalase* activity
Control	0.271	0.397	0.668	0.682	0.135
25	0.248	0.383	0.631	0.647	0.127
50	0.243	0.373	0.616	0.651	0.120
100	0.221	0.347	0.568	0.636	0.115

*Catalase activity expressed as mg of H₂O₂ broken down in 5 mnts per gm fresh wt.

The present study indicates that increasing concentration of the effluent decreases the chlorophyll level and catalase activity. Chlorophyll plays an important role in photosynthesis. The enzyme associated with chlorophyll is catalase⁸.

Effluent concentration 25% upto 100% in *Phaseolus radiatus* L. seedlings inhibited chlorophyll levels and catalase activity. Total chlorophyll contents were also decreased in higher concentrations of distillery effluent. The decrease in chlorophyll contents might be due to chlorides⁷.

A number of investigators have worked on effect of various chemicals on catalase activity and chlorophyll contents⁸. Corroborative results were obtained in the present study with high amounts of total solids or high effluent concentration. There was decrement in chlorophyll contents and catalase activity.

The physicochemical factors like oxygen, BOD, etc. show fluctuations every hour as the effluent comes out depending on the factory work-load, man-made errors, dilutions, etc. The total solids content would not show much sudden fluctuations¹. Hence the total solids is taken as standard factor.

The results of the present study indicate that distillery factory effluents must be properly diluted for irrigation of crop plants.

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(Received: 10 January 1993; Accepted: 15 May 1993)

AJC-629