

## Studies on the Effect of Polluted Water on *Cassia auriculata* Linn. Seeds

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*Cassia auriculata* Linn. seeds were treated with different distillery effluent concentrations. The catalase activity and chlorophyll contents were studied in 25%, 50% and 100% of distillery effluent. The catalase activity and chlorophyll contents were decreased in the seeds germination.

### INTRODUCTION

*Cassia auriculata* Linn.<sup>1</sup> (Caesalpinaceae) seeds occur in Northern India and its seeds were used in medicine<sup>2</sup>. The second largest industry in India is the distillery industry. The distillery industrial effluent causes pollution in the aquatic ecosystem. It was inferred from studies on the effects of these effluents on tadpole metamorphosis<sup>3</sup>. The distillery effluent caused pollution in rivers<sup>4</sup> and ground water<sup>5</sup>.

To determine the effect of industrial effluents on *Cassia auriculata* Linn. plants (seed germination, chlorophyll contents and catalase activity) aquatic pilot tests should be conducted. The present study deals with the effect of different concentrations of distillery effluent (polluted water) on chlorophyll contents and catalase activity of *Cassia auriculata* Linn. seedlings. The data on the effect of this distillery effluent on chlorophyll contents and catalase activity is very sparse.

### EXPERIMENTAL

The seeds of *Cassia auriculata* Linn. were collected from New Pratap Nursery and Seeds Stores, Panditwari, Prem Nagar, Dehradun (U.P.). The Kisan Cooperative Sugarcane and Distillery Mill Ltd., Anoop Shahar, Distt. Buland Shahar (U.P.) is located in Jahangirabad, about 10 km from Anoop Shahar, 135 km from Agra and 40 km from Narora Atomic Power Plant, Narora. The effluent was collected in the form of polluted water in plastic bottles from the outlets of the distillery factory. The chemical examination of polluted water was analysed for pH, total solids, dissolved oxygen, biochemical oxygen demand, chlorides and conductivity as per procedure outlined in the standard methods<sup>6</sup>. The seeds of *Cassia auriculata* Linn. were germinated on moist filter paper in petridishes under natural day and night temperatures of 32°C and 27°C in different effluent concentrations

(25%, 50% and 100%). The controls were maintained in distilled water. On 10th day, the chlorophyll contents were estimated according to the Arnon method<sup>7</sup> and the activity of enzyme was determined by Gopalachari method<sup>8</sup>.

## RESULTS AND DISCUSSION

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

S. No.	Chemical analysis	Results
1.	Colour	Dark brown
2.	pH	7.70
3.	DO	Nil
4.	BOD	37800 ppm
5.	Total solids	39900 ppm
6.	Chlorides	4650 ppm
7.	Conductivity	1224 micro mho/cm

TABLE-2  
EFFECT OF DISTILLERY FACTORY EFFLUENT ON CHLOROPHYLL CONTENTS AND CATALASE ACTIVITY OF *CASSIA AURICULATA* LINN.

S. No.	Treatments (%)	Chlorophyll 'a' mg/gm fr. wt.	Chlorophyll 'b' mg/gm fr. wt.	Chlorophyll a + b mg/gm fr. wt.	Chlorophyll a/b ratio mg/gm fr. wt.	Catalase activity*
1.	Control	0.272	0.399	0.671	0.681	0.135
2.	25	0.250	0.382	0.632	0.654	0.128
3.	50	0.244	0.374	0.618	0.652	0.122
4.	100	0.223	0.348	0.571	0.640	0.116

\*Catalase activity expressed as mg of H<sub>2</sub>O broken down in 5 min per g fresh water.

The present study indicates that the increasing concentrations of the effluent, decrease the chlorophyll level and catalase activity. The chlorophyll plays an important role in the photosynthesis. The enzyme associated with chlorophyll is the catalase.

The distillery effluent concentrations (25%–100%) in *Cassia auriculata* Linn. seedlings inhibited the chlorophyll levels and catalase activity. The total chlorophyll contents were also decreased in higher concentrations of the distillery effluent. The decrease in chlorophyll contents might be due to the presence of chlorides<sup>10</sup>.

Many investigators have worked on the effect of various chemicals on the catalase activity and chlorophyll contents<sup>9</sup>. Corroborative results were obtained

in the present investigation with high amounts of total solids or high distillery effluent (polluted water) concentration. There was decrement in the chlorophyll contents and catalase activity.

The physico-chemical factors like oxygen, BOD etc. showed the 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 fluctuations<sup>3</sup>, and hence the total solids is taken as standard factor.

The results of the present study indicate that the distillery effluents *i.e.* polluted water must be diluted for irrigation of crop plants and in the ornamental plants of *Cassia auriculata* Linn.

### ACKNOWLEDGEMENT

Author's grateful thanks to the University Grants Commission, New Delhi (India) for the research financial assistance.

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(Received: 6 April 1996; Accepted: 30 July 1996)

AJC-1146