

RESEARCH PAPER:

Effect of paper mill effluent on seed germination and seedling growth of pea

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SUMMARY

The present paper deals with the study of physico-chemical characteristics of a industrial effluent and its effect on the germination and growth of pea (*Pisum sativum* L.) It has been observed that effluent (100%) was detrimental for the growth of the plant. The untreated effluent can be used at lower concentrations for the irrigation of the crop without decrease in the biomass or the fruits but higher concentration is harmful to the crop since it contains many toxic elements which cause reduction in the growth parameters and yield of the plant.

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Industrial activities generate large quantities of water containing alkaline calcium carbonate, sodium, potash, nitrates, aluminum etc. discharged either into an ecosystem or spilling over the agricultural fields directly or through irrigation canal or even entering into the groundwater leading to the deterioration of the land, agricultural crops or the soil system. Various raw material used are wood, bamboo, straw, bleaching powder, caustic soda, ferric alum, dyes etc. in the paper mills. The treatment used for industrial waste are almost the same as that of sewage. Different treatments such as preliminary treatment, primary, secondary, tertiary are also necessary in case of industrial waste treatment. It is impossible to select a well suited treatment for a particular effluent (organic, inorganic and chemical effluent) because of the fact that the quality of water is uniform as well as predictable and the pollutant present is known. In the present investigation an attempt was made to analyze the physico-chemical aspect of paper mill effluents and their effect on the growth parameters of pea (*Pisum sativum* L.)

MATERIALS AND METHODS

The materials and methods includes the following aspects.

- Location of site
- Sampling

– Water analysis

– Plant growth

Sample of water for various examinations were collected from paper mill located in Bari-Brahmana, Jammu. Water samples were collected in plastic cans for analysis of physico-chemical characteristics of various parameters i.e. pH, electric conductivity, total dissolved solid, total hardness and alkalinity and were estimated as per the methods of APHA (1985).

Seeds of pea were procured from the Directorate of Agriculture, Jammu. The seeds were sown in polyethylene bags filled with garden soil and farmyard manure (1:1). Data on seed germination were recorded after 20 days and on other parameters of growth at different intervals of time.

RESULTS AND DISCUSSION

The results of the above study are presented in Tables 1-3. The quality and composition of effluent dependent upon the type of industry. According to Agarwal (2005) colour of the water is usually estimated by visual method and depends upon the chemicals or raw material used.

Temperature is an important factor for its effect on chemicals and biological reaction in water. The mean value of temperature recorded was $29 \pm 0.82^{\circ}$ C. Electric conductivity is an induction of dissolved solid

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