



Studies on effect of *Oscillatoria* treated effluent on germination of Sorghum seeds.

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Abstract

Sugar factory effluent contains chemicals of organic and inorganic nature, which are harmful for environmental component including soil and plant. Cyanobacteria *Oscillatoria* spp. Filaments immobilized on sand reduces the toxicity and enhance seed germination.

Key words: Immobilization, Sugar factory effluent, Seed germination.

Industrial effluents are now a day's commonly used for agricultural purpose. These effluent based on the type of industry may be beneficial or harmful to crop plants. (Somasekhar et al 1984). Sugar industry is one of the important agro-based industries in Marathwada. Common inorganic nutrients present in effluent include nitrate, nitrite, ammonia and phosphate. Cyanobacteria easily utilized available nitrogenous compounds and phosphate present in the effluent for their growth and metabolism. (Prakashman and Ramakrishna 1998). Hence growth of cyanobacteria in such effluent water not only solves the problem of effluent treatment but also help in biomass production. This can be used for various purposes. Present investigation found that immobilized cells of *Oscillatoria* spp. were more efficient in removal of nitrogenous compounds and phosphate from the effluent of sugar factory.

The sugar factory effluent contain chemical of organic and inorganic nature (Baruah et al 1996) harmful for environmental components including soil and plants. Experiments were conducted to study the effect of treated and untreated sugar factory effluent on seed germination and seedling growth of *Sorghum bicolor* L.

Oscillatoria spp. was isolated from water where the stream of effluent meets surface water body. The morphological character recorded and compared with the genera of already reported alga of standard manuals (Smith, 1950) immobilization was done on sand. Sand was purchased from local market, it was sieved through 2mm mesh and this sieved sand was again subjected to sieving with 1.5 mm mesh (AIMIC made). The grain of sand thus obtained were washed first with 1N HCL and several time sterile dist water. The washed sand was transferred in to flask. The flasks were sterilized in autoclaved at 15 lbs for 20 min.

The content of flask was transferred on petriplates lined with filter paper. 5ml of liquid culture of algae contains 1×10^3 cell/ filaments over grain. The culture and grains were mixed thoroughly. The plates were incubated in growth chamber. The grains were observed regularly under dissecting microscope for adherence and growth of the algae over the surface of sand grains. All operation was carried under aseptic condition. The sand grains after complete growth of algae on the surface were used for further study. Sample of effluent were most conveniently collected and stored in Winchester quart bottle. The water bottle was totally immersed in the water was filled to within $\frac{1}{2}$ inch of the bottom of the stopper. The bottle was well corked and kept in cold dark room.

Seeds of Jowar (*Sorghum bicolor L.*) were soaked in the effluent and were kept in petriplate lined with blotter paper. The paper were moistened with the effluent, seeds were germinated in seed germinator at 25° C and 80% relative humidity and observed regularly for germination and shoot and root length.

The effluent of sugar factory 25, 50, 75 & 100% concentration treated with free cells and immobilized cells of *Oscillatoria* was tested for its effect of seeds germination and observed after 96 hours.

Effect of *Oscillatoria* treated sugar factory effluent on seedling growth of *Sorghum bicolor L.*

Conc. % effluent	Untreated			Treated with free cell /filament			Treated with immobilized filament		
	Germ ⁿ . %	Shoot length (cm)	Root length (cm)	Germ ⁿ . %	Shoot length (cm)	Root length (cm)	Germ ⁿ . %	Shoot length (cm)	Root length (cm)
25	72	3.15	3.71	73	3.17	3.74	75	3.21	3.77
50	68	3.40	3.49	70	3.45	3.51	74	3.50	3.55
75	60	3.16	3.70	65	3.19	3.75	69	3.27	3.82
100	53	2.27	2.50	55	2.30	2.52	57	2.34	2.60

After observation it was found that in free cell, immobilized cell treated and untreated effluent. Treated effluent either free or immobilized filament enhanced the seed germination and seedling growth in all concentration. Over untreated effluent dilution had very marked impact on the percentage of germination and seedling growth. Thus, this study indicates that the sugar factory effluent after treatment with *Oscillatoria* spp. can be used for agricultural irrigation.

Reference –

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