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Dry Weight of *Oscillatoria Willei* under Saline Stress

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ABSTRACT
The current study was carried out to investigate the effect of NaCl on dry weight of O*scillatoria willei.* In order to analyze the effect of NaCl, O*scillatoria was* treated with different concentrations of NaCl viz., 0.2, 0.4, 0.6 and 0.8M, besides control over 30 days. Results indicated increase in dry weight at lower concentrations of NaCl but salinity adversely affected the dry weight of *O. willei*, with a significant reduction at higher NaCl concentrations. The present work exhibited that salt stress negatively impacts the dry weight of *Oscillatoria willei*, may be due dehydration of the cells, reduced metabolic activity, growth inhibition and cell damage caused by high salinity.
Keywords : *Oscillatoria willei*, NaCl stress, dry weight, growth inhibition.

INTRODUCTION
Salinity is one of the important environmental factors that influences the growth and productivity of cyanobacteria. It is a challenge for most microorganisms . Changes in salinity levels is particularly due to evaporation or human activities. Salinity stress leads to series of changes in basic biosynthetic functions, including photosynthesis, photorespiration and amino acid synthesis in plants (Kawasaki *et al*., 2001; Ozturk *et al.,* 2002; Seki *et al.,* 2002). It is an important deterrent to agriculture in many areas of the world. However, salts not only affect the growth of plants but also inhibit the proliferation and activity of native or introduced microorganisms. High concentrations of NaCl apparently inhibits the growth more by ionic (Na^+) stress than by osmotic stress (Brownell and Nicolas, 1967). The cyanobacteria in rice fields are subjected to various field problems such as salinity, acidity, herbicide application, etc. which affect their growth and function (Gopalaswamy,2001).Several physiological pathways, i.e., photosynthesis, respiration, nitrogen fixation and carbohydrate metabolism have been observed to be affected by high salinity (Chen and Wang 2008). Hence the current study was carried out to investigate the effect of NaCl on dry weight of O*scillatoria willei.*

MATERIALS AND METHODS
The *Oscillatoria willei* BDU 141621 was obtained from National Facility for Marine Cyanobacteria (NFMC) Tiruchirapalli. ASN III medium at pH 7.5 was best suitable for the growth of the alga in the laboratory. Axenic cultures were maintained at temperature of 26±20 C. Further to study the impact of NaCl the experiments were carried out in 250 ml conical flasks, contained 100 ml of ASN III medium. The cultures were treated with different concentrations of NaCl such as 0.2, 0.4, 0.6 and 0.8M besides control i.e., no NaCl. The samples were drawn periodically during growth (10th , 20th and 30th day) from control and different concentrations of NaCl were subjected for the analysis of dry weight of *Oscillatoria willei*.

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RESULTS

The results revealed that the alga *O. willei* treated with different concentrations of NaCl viz., 0.2, 0.4, 0.6 and 0.8 M over 10, 20 and 30 days exhibited increase in dry weight at lower concentrations of NaCl with maximum of 8.93, 13.13 and 15.70 mg/ml at 0.4 M when compared to control, while dry weight was gradually decreased at higher concentrations with minimum of 2.84, 4.72 and 6.15 mg/ml at 0.8 M respectively (Table 1and Fig 1)

DISCUSSION

Our results are in agreement with findings of Venkataraman and Kaushik (1987) who reported reduced growth rate at higher concentrations of NaCl in *Westiellopsis prolifica*. Vonshak *et al*. (1988) attributed this growth decrease was due to an energy shortage caused by pumping out the entering sodium ions and by the synthesis of sugars as an osmoticum. Similar results were observed in *Spirulina platensis* when exposed to NaCl (Shalaby et al. 2010). According to Hart *et al.* (1991), reduced growth rate at higher salinities was due to decrease in the photosynthetic rate.

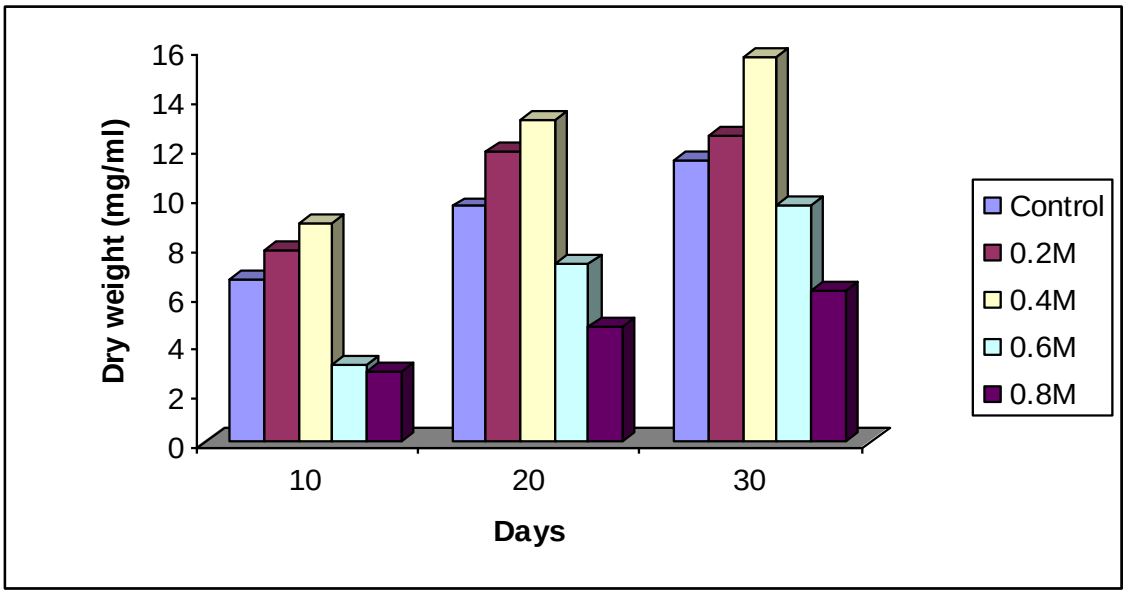
CONCLUSION

This study demonstrated significant reduction in dry weight of *Oscillatoria willei* at higher NaCl concentrations. It was speculated that, it may be due dehydration of the cells, reduced metabolic activity, growth inhibition and cell damage caused by high salinity.

Table1 : Effect of different concentrations of NaCl on dry weight of *Oscillatoria willei*

NaCl con. (M)	Dry weight (mg/ml)		
	10 days	20 days	30 days
Control	**6.61 ± 0.09**	**9.61 ± 0.1**	**11.50 ± 0.03**
0.2	**7.82 ± 0.01**	**11.83± 0.1**	**12.52 ± 0.02**
0.4	**8.93 ± 0.08**	**13.13 ± 0.05**	**15.70 ± 0.01**
0.6	**3.15 ± 0.07**	**7.24 ± 0.05**	**9.63 ± 0.06**
0.8	**2.82 ± 0.07**	**4.72 ± 0.03**	**6.15 ± 0.02**

Fig. 1: Effect of different concentrations of NaCl on dry weight of *Oscillatoria willei*



Oscillatoria willei

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