

Effect of Salt on the Growth Rate of Freshwater Algae in Wastewater Media

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Abstract: In order to understand the growth of algae in saline water, this study was focused on the effect of salinity on the growth of freshwater algae isolated from a water pond and pure culture of *Chlorella Vulgaris* strain. The algae growth was measured using a UV-Spectrophotometer by measuring Optical Density (OD) at a wavelength of 680nm. The growth of UHalgae2 reduced by 86% and for *Chlorella Vulgaris* reduced by 88%, after 7 days of exposure at 15 g/L of sodium chloride (1.5%).

1.Introduction

Energy sources as of today are petroleum, coal, natural gas etc. (Abou-Shanab et al 2011). The resources are limited and are available only in certain regions of the world. It is predicted that at this rate of consumption, the world's fossil fuel reserves might get exhausted in almost 50 years (Chisti et al 2007). An effective replacement would be a renewable and cost effective source. Alternative fuel should be economical, sustainable, eco-friendly. Biofuels are eco-friendly, economical and also sustainable. In recent times, Algal biomass has been proved as a potential source of biofuel. Algae are large group of diverse, simple, autotrophic organism. Algae are photosynthetic organisms like green plants being either unicellular or multicellular. They can also be a fresh water or marine algae. Algae biofuel are biodegradable and emit less Carbon-di-oxide. Algae consist of lipid in their cells. Lipid consists of fatty acids (Demirbas et al. 2011) and fatty acid is the main component that can be extracted and converted as biofuel. Studies have been performed on identifying the species that has high amount of lipids and various parameters like effect of Nitrogen, Phosphorus has been taken into consideration. Cultivation condition has to be given more focus because biomass production and lipid yield are the most important parameters. With high quantity of biomass, generation of biofuel will prove to be economical and may be more efficient. Waste water has been proved as an effective nutrient for the growth of algae (Pittman et al. 2010) as it consist of nutrients like nitrates and phosphates necessary for growth of algae. Municipal waste water are considered one of the best source of nutrients as they contain phosphorus and nitrogen necessary for the growth of Algae.

2.Objective

The effect of salt content on the growth of two freshwater algae by adding varying amount of salt (NaCl) in to the wastewater growth media.

3.Materials and Methods

3.1 Algal strain and media for growth

The growth algae *Chlorella Vulgaris* (UTEX # 1809) and algal sample named UHAlgae2 was collected in a water pond. The algae sample collected from the pond were grown in liquid media (Proteose peptone and F/2 media). For experiment, specimens were incubated in a 200 mL glass bottles with the

wastewater media with salt content 15 g/L. Culture temperature was maintained between $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and 16 hours light and 8 hours dark cycle (Scragg et al 2003). The samples were illuminated with white Fluorescent lamps, maintaining a lux intensity of 3000 lux.

3.2 Methods

The algae growth was measured using a UV-spectrophotometer. The optical density was measured at wavelength of 680 nm (Abou-Shanab et al 2011). All the testing was done at room temperature.

4. Analysis



Fig.1 UHAlgae2 image under optical microscope

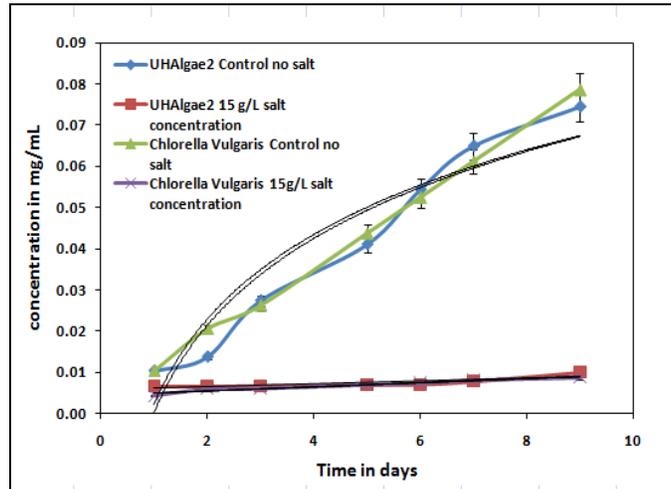


Fig.2 Effect of salt on the growth of Algae2 and Chlorella Vulgaris

The algae growth was affected by the salt content. At a salt concentration of 15 g/L (1.5%), UHAlgae2 growth concentration was reduced by 86% after 7 days and that of Chlorella Vulgaris was reduced by 88% after 7 days.

5. Conclusion

It was observed that the growth of UHAlgae2 and Chlorella Vulgaris were affected by the 1.5% of salt content. With the addition of 15 g/L of salt, the growth was reduced by 86% and 88% for UHAlgae2 and Chlorella Vulgaris respectively.

6. Acknowledgement

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7. Reference

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