



University of Zabol

Graduate school

Faculty of Agriculture

Department of Plant Breeding and Biotechnology

The Thesis Submitted for the Degree of Ph.D

(In the Field of Agricultural Biotechnology)

Title:

**Isolation, identification and evaluation of locally algal strains in
Miankaleh wetland for bioremediation of environmental pollutants**

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Abstract

Industrial human activities and resultant global climate changes have profound implications for ecosystems, as well as for economic and social systems that are dependent upon marine systems. The increasing concentration of atmospheric greenhouse gases (GHGs) has resulted in gradual modification of multiple aspects of ocean properties. Algal communities to play a role in promotion of CO₂ sequestration technologies and biorefinery approaches. Algal cells are introduced as successful cell factories efficiently take up light and carbon to support photosynthetic activity and production of value-added products. In this study, the samples (macro and micro) were collected from different locations in the Miankaleh wetland in the southeastern part of the Caspian Sea, Iran. After identification of algal strains, the effect of variables such as light intensity, CO₂ concentration and concentration of wastewater on the biosorption of nitrate, nitrite, phosphate as well as the rate of CO₂ sequestration were investigated. Results clearly confirm the ability of the studied strains in bioremediation of environmental pollutants. Finally, we investigated the expression of three genes involved in CO₂ sequestration (*CA*, *CIA5*) and light harvesting (*CAB*) by Real Time PCR on *Chaetomorpha antennina* (macroalgae). The results showed that the expression of these genes was significantly responsive to surplus light (8100, 12150 and 16200lux) and CO₂ supply (380, 5190 and 10000ppm).

Keywords: Biosorption; Nutrient removal; CO₂ sequestration; Optimization; Quantitative Real Time PCR