

Evaluation Of The Sensitivity Of Qatari Marine Microalgae *Synechococcus Sp*, To Three Reference Toxicants

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Abstract

Background

Marine phytoplankton form the basis of the marine food chain and are essential for the normal functioning of ecosystems. Any disturbance to this component, due to the release and accumulation of toxic compounds can have an impact on higher trophic levels.

In this study, we investigate the impact of toxicants on the microalgae isolated from Qatari seawater and cultured under controlled laboratory conditions.

Objectives

- * Develop a toxicity test for *Synechococcus sp* that can be added to the suite of tests currently available for marine invertebrates and fish.
- * Perform chronic toxicity tests of three reference toxicants (DCA, SDS and Zn)
- * Evaluate the sensitivity of *Synechococcus sp* to three reference toxicants and compare sensitivity to other species used in toxicity tests.

Methodology

Chronic toxicity tests were carried out in 24-well microplate for a period of 3 days for the DCA and Zn tests and 7 days for SDS test. Algal cultures in logarithmic growth phase (cell density of about $3.105 \text{ cells mL}^{-1}$) were used as inoculum. Each test consisted of at least five test concentrations and a control, in triplicate. A different range of concentrations were used to estimate the range findings for each toxicant.

- * Cell counting using an hemocytometer was conducted to evaluate the inhibition of microalgal growth
- * The average specific growth rate and the percent inhibition of growth rate were calculated, the lowest observed effect concentration (LOEC) and the no observed effect concentration (NOEC) were statistically determined.

Results

A growth inhibition toxicity test was successfully developed for *Synechococcus sp*, which was isolated from Qatari coastal waters. Prior to conducting the toxicity testing, key environmental parameters including light, temperature and nutrients were optimized to obtain acceptable algal growth rates over 72 hours.

Results showed that *Synechococcus sp* was more sensitive to DCA than SDS and Zn.