

## Chronic and acute effects of nickel and cobalt on chlorophyll a and carotenoids of marine micro algae *Nannochloropsis oculata*

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### Abstract

Algae are among the aquatic organisms that are severely exposed to increasing levels of pollutants, which are becoming a concern in marine ecosystems. Heavy metals are among the compounds for which their increase in high levels causes problems in the structure of algae communities in aquatic ecosystems. In this study, the effect of different concentrations of Nickel (1.5, 3, 4, 6, 8, 12, 15 mg/l) and cobalt (1.5, 2, 3, 5, 6, 8, 10 mg/l) on chlorophyll a and the carotenoid level of microalga *Nannochloropsis oculata* was investigated for 72 hours on July 2017. The EC<sub>50</sub> of nickel and cobalt were determined according to the OECD 2011 protocol. The results of acute tests showed that EC<sub>50</sub> of nickel and cobalt was 6.5 mg/l and 5.3 mg/l, respectively. Overall, the results of this study showed that nickel caused toxicity in higher concentrations compared to cobalt. Furthermore, nickel and cobalt heavy metals significantly inhibited the growth and reproduction of *N. oculata*. However, these heavy metals had lower effect on ceratoid contents.

**Keywords:** Heavy metals, EC<sub>50</sub>, Chlorophyll a, Carotenoid, *Nannochloropsis oculata*.