

Chronic effects of linear alkylbenzene sulfonate on marine green microalgae (*Nannochloropsis oculata*)

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Abstract

In this study, the effects of chronic use of linear alkylbenzene sulfonate (LAS) on the amount of chlorophyll and carotenoids in *Nannochloropsis oculata* microalgae were investigated. The results of the measurement of chlorophyll content in *N. oculata* microalgae showed that there were no significant differences among treatment groups in the three periods at the beginning, middle or end of the test ($p>0.05$). However, comparing the treatments with the control treatment in the early, middle and end periods showed a decrease in chlorophyll content. The results of carotenoid assay showed that there were no significant differences between the levels of carotenoids in the first and second treatments in the initial, middle and end periods ($p>0.05$). Surfactants interfere with the formation of chlorophyll in algae through disturbances in protein synthesis and also disrupt photosynthesis. The cause of the non-significant decrease in carotenoids can possibly be attributed to the low concentration of LAS and the antioxidant properties of *N. oculata* microalgae carotenoids. Microalgae are sensitive to environmental changes, such as increasing the concentration of surfactants, and these changes can cause disturbances in chlorophyll and carotenoids and many of the cellular metabolites. Therefore, the necessity of using surfactants with higher degradability and shorter shelf-life in nature seems to be significant.

Keywords: Chronic test, Surfactants, Chlorophyll, Carotenoids, *Nannochloropsis oculata*.