

Toxicity Effects of Titanium Dioxide Nanoparticles in Marine Algae

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Abstract

Titanium dioxide nanoparticles (TiO₂) are mineral compounds that had been manipulated to its nano-scale dimension, approximately 1 to 100nm. Nano-scaled TiO₂ are claimed to have better chemical, physical and biological properties which make them enormously applied in industrial manufacturing. However, this has become a big threat to the environment due to the increase disposal of TiO₂ into the environment whereby both human and other living organisms could be adversely affected. The aim of this study was to study the effects of TiO₂ nanoparticles on two marine microalgae *Dunaleilla tertiolecta* and *Pavlova gyrans*. The change in photosynthetic pigments chlorophyll a and carotenoid content was used to measure the response of algae species towards the presence of TiO₂ nanoparticle. The results showed *Dunaleilla tertiolecta* was more susceptible to TiO₂ nanoparticles with lower effective concentration of 50% (EC₅₀) at 31.25 mg/L compared to *Pavlova gyrans*. In addition, TiO₂ was found to aggregate and adsorb on algal membrane and reduced its motility. In conclusion, TiO₂ nanoparticles caused an impactful effect to the ecosystem and the post production wastes should be managed appropriately.