

Toxicity of industrial waste water containing Ag/TiO₂ on muscle mitochondria isolated from *Solen dactylus* scallop

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Abstract

Industrial waste water is of global concern due to its severe effects on the environment. Recent studies have suggested that these compounds can cause toxicity via mitochondria-involved mechanisms. According to the fact, that these compounds are freely dispersed in the environment, it is crucial to determine the exact mechanism of toxicity.

Introduction: Compared with municipal waste water, industrial waste water generally contains high concentration of toxic or non-biodegradable pollutants. Recently, it was shown that scallop could filter waste water, but heavy metal such as Ag and TiO₂ could induce Reactive Oxygen Species (ROS) in mitochondria isolated from scallop. Recent studies have suggested that mitochondria have a key role in toxicity via mitochondrial membrane potential collapse and generation of ROS. Therefore, it was decided to determine the mechanistic toxicity of waste water contained heavy metals towards isolated scallop muscle mitochondria using new and reliable methods.

Methods and Results: Isolated scallop mitochondria were obtained by differential ultracentrifugation at before and after exposure to waste water. Our results showed that two heavy metals induced mitochondrial dysfunction via an increase in mitochondrial ROS production and membrane potential collapse, which correlated to cytochrome C release.

Conclusions:

Our results suggest that waste water contained heavy metals-induced toxicity in scallop is result of a disruptive effect on the mitochondrial respiratory chain and increasing the chance of cell death signaling in scallop muscle cells.

Key words: Oxidative stress, Isolated mitochondria, Scallop, Waste water