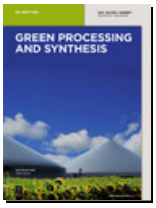

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Heat shock and titanium dioxide nanoparticles decrease superoxide dismutase and glutathione enzymes activities in *Saccharomyces cerevisiae*

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Abstract

The exposure of living organisms to metals can generate reactive oxygen species and failure in their antioxidant defences, triggering oxidative stress and oxidative damage. Despite the intensive use of engineered nanoparticles in numerous consumer and industrial products, data on their potential hazards in eukaryotic cells and their dependence on environmental factors such as temperature are still scarce. The aim of this study was to evaluate the antioxidant response of *Saccharomyces cerevisiae*, grown in presence of glycerol and glucose, to 5 µg/ml titanium dioxide nanoparticles (size<100 nm) under heat shock conditions. The results showed that biomass, levels of reactive oxygen species and glutathione reductase activity in respiratory/fermentative cells were higher than those detected in respiratory cells. Furthermore, respiratory/fermentative cells exhibited lower levels of glutathione, malondialdehyde, cytoplasmic catalase and glutathione peroxidase than those detected in the respiratory yeast. *Saccharomyces cerevisiae* grown in the presence of glycerol, glucose and titanium dioxide nanoparticles, under heat shock conditions, caused oxidative stress, due to a decrease in antioxidant defences such as superoxide dismutases or a slowdown of the glutathione cycle, relative to cells grown in presence of glycerol and glucose.

Keywords: cell damages; oxidative stress; respiratory/ fermentative; yeast