Behavior of Saccharomyces cerevisiae UE-ME$_3$ in presence of diuron at beginning of exponential phase

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The diuron, 3-(3,4-dichlorophenyl)-1,1-dimethylurea, is an herbicide used on autumn-winter crops, due to its ability to block the chloroplast electron chain at level of photosystem II. Although most of the living beings that contact with diuron are heterotrophic, this shows high toxicity for them, since it can also block the respiratory chain, behaving as ROS inductor. This herbicide is classified as POPs, because the chemical and biological degradation at ground level is very low. The main objective of this study was to evaluate the effect of this phenylurea in *Saccharomyces cerevisiae*, at beginning of exponential phase, a early stage of cell growth.

S. cerevisiae UE-ME$_3$ grown in YEPD medium until the exponential phase were inoculated in the absence and presence of 5, 25, 50, 75 μM diuron and allowed to grow for 200 min. Samples of each culture after lysis by sonication were used to obtain the supernatant and the pellet post-12000 *g* that were used for CAT A enzyme activity determination by spectrophotometry, glutathione, MDA and ROS content by fluorescence and GR, GPX, G6PD, CAT T enzymatic activities determination by spectrophotometry [1, 2, 3, 4, 5, 6, 7, 8, 9].

The results show that cells exposed to 5 μM diuron present a significant increase in MDA, GSH and GSSG content. Also it was detected a significant decrease of cytoplasmic redox status estimates by GSH/GSSG ratio in cells grown in the presence of 50 μM diuron. With respect to the glutathione reductase were not detected significant changes in any of the chosen situations for this study. However, it was observed a significantly decrease of G6PD and GPx enzyme activities, in cells exposed to 50 and 75 μM diuron, whose lack of NADPH availability, probably block the glutathione cycle. In addition CAT T activity presents also a significant increase in cells grown in 50 μM diuron, an answer that seems compensates by the drop of GPx activity. These facts suggest an active process of cell death in *S. cerevisiae* grown in the presence of 50 μM diuron. There was also observed a significant and dependent increase of cytoplasmic ROS, MDA level and CAT A activity. This profile response points us a main role of peroxisomal lipid oxidation, in cells grown in presence of 50 and 75 μM diuron that can trigger cell death by eventual energy constraint.

Keywords: *diuron; Saccharomyces cerevisiae; antioxidant power*

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