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Effects of atrazine, isoproturon and diuron on glutathione metabolism of *Saccharomyces cerevisiae*

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Abstract

Triazines and phenylureas, mainly used in agricultural applications for the selective control of germinating grasses and broad-leaved weeds, are often found in contaminated groundwater, surface water and the effluents of wastewater treatment plants. The toxicity of these herbicides in eukaryotic cells is poorly understood. *Saccharomyces cerevisiae* is a promising unicellular organism for the toxicological evaluation of xenobiotics because its metabolism is similar to that of higher-level organisms. Consequently, the aim of this study was to compare the effects of three herbicides on yeast-cell growth and the glutathione cycle. *Saccharomyces cerevisiae* grown in the presence of 5 or 50 µM atrazine, diuron or isoproturon were compared with control cells grown in a rich medium. The results show that the glutathione-dependent buffer capacity decreased significantly in *S. cerevisiae* grown in the presence of both levels of any of the three herbicides, except in cells exposed to 50 µM isoproturon. In addition, chlorine herbicides inhibited cell growth, probably due to a decrease in antioxidant power and glutathione reductase activity. Isoproturon at 50 µM induced yeast-cell growth, increasing the buffer capacity mediated by glutathione as well as glutathione reductase and glutathione peroxidase activities of UE-ME3 strain. This strain may be useful in studies of isoproturon degradation.

Keywords: [oxidative stress](#); [phenylurea](#); [triazine](#); [yeast](#)

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