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Vanadium pentoxide – diferential survival of three different strains of *Saccharomyces cerevisiae* is ensured by glutathione reductase and mitochondrial glutathione level

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Vanadium is a heavy metal present in the Earth's crust whose utilization by the industry of steel, pesticides and paints has increased in the last years, contributing to increase of its environmental level, making it a pollutant. Several studies reveal that vanadium causes genotoxic and mutagenic effects, although may be beneficial for some organisms, exerting antitumor effects by activating the signaling pathways, which lead to apoptosis or induces P450 enzymes. Following from the above, the main objective of this work was to evaluate the response of three *Saccharomyces cerevisiae* strains to vanadium pentoxide present in the culture medium. *S. cerevisiae* UE-ME_3, a wine wild-type strain from Alentejo, Portugal; Red fruit, a commercial strain used in Alentejo for wine-make, and BY4741 EUROCAST strain, grown at mid-exponential phase were inoculated in 2% glucose YEPD medium and incubated during 72 hour at 28°C, in the absence or presence of 2 mM V_2O_5. Aliquots of the cultures were then used to dry weight determination, and to obtain mitochondria, for glutathione and glutathione reductase (GR) activity determination, and cytosol for malonaldehyde (MDA) quantification. The results showed that 2 mM V_2O_5 has caused cell growth inhibition in all strains, effect less pronounced in the UE-ME_3 strain in which were not detected significant differences in MDA content between control and treatments ($p < 0.05$). In addition, it was also observed a significant decrease in glutathione reductase activity and mitochondrial GSH/GSSG ratio, in al strains treated with vanadium pentoxide being this effect less pronounced in the wild-type strain. The smallest decrease of reducing power (47%) detected in *S. cerevisiae* UE-ME_3 may justify the better survival to V_2O_5 of wine wild-type strain, probably due better capacity to regenerate GSH via glutathione reductase, an antioxidant enzyme involved in redox cycle of glutathione.