31º ENCONTRO DE QUÍMICA DA REGIÃO SUL
A QUÍMICA COMO PROPULSORA DE NOVOS ECOSSISTEMAS DE INOVAÇÃO
19 A 21 DE NOVEMBRO
Campus Toledo
Unioeste

Área: INO

Antioxidant Properties of a Zn-complex in *Saccharomyces cerevisiae*: understanding the connection between zinc(II) complexes and oxidative stress

Isabela L. Eidam (IC)[1], Christiane Fernandes (PQ)[1], Marcos D. Pereira (PQ)[2]

isaeidam.ufsc@gmail.com

[1]*Departamento de Química,* Universidade Federal de Santa Catarina- *UFSC;* [2] Departamento de Bioquímica, Instituto de Química, Universidade Federal do Rio de Janeiro (UFRJ).

Zinc-complex; Oxidative stress biomarkers; Chronological aging; Redox homeostasis; antioxidant mechanisms; Saccharomyces cerevisiae

Highlights

The pre-treatment of *S. cerevisiae* with cycloheximide and the zinc(II) complex conferred cytoprotective effects during chronological aging and also lipid peroxidation and protein carbonylation reduction in wild-type cells.

Abstract

Zinc plays essential roles in cellular homeostasis and resistance to oxidative stress, directly impacting the aging process. Aiming to expand our understanding of the biological activity of coordination compounds, in this study we investigated the antioxidant and anti-aging potential of a zinc(II) coordination compound, {[Zn(II)(HPClNOL)]–Cl_2–[Zn(II)(HPClNOL)]}$(ClO_4)_2$, where HPClNOL is the ligand 1-(bis-pyridin-2-ylmethylamino)-3-chloropropan-2-ol), using *Saccharomyces cerevisiae* as a eukaryotic model.

The compound was obtained by reacting 1 mmol (0.29 g) of the ligand HPClNOL with 1 mmol (0.14 g) of anhydrous $ZnCl_2$ in ethanol/isopropanol, followed by the addition of 1 mmol (0.11 g) of $LiClO_4$. The solution was stirred and heated for 1 hour, and after one day, colorless single crystals suitable for crystallographic studies were obtained. Yield: 20%, m.p. 230 °C. Anal. Calcd. for {[Zn(II)(HPClNOL)]-μ-Cl_2-[Zn(II)(HPClNOL)]}$(ClO_4)_2$ ($Zn_2C_{30}H_{36}N_6Cl_4O_{10}$): MW = 984.13 g·mol^{-1}: C, 35.95; H, 3.82; N, 8.82. Found: C, 35.96; H, 3.73; N, 8.67%. The resulting dinuclear compound features hexacoordinated Zn(II) centers with distorted octahedral geometry, as evidenced by the bond angles between the metal center and the nitrogen and oxygen atoms of the ligand, as well as bridging chlorine atoms between the Zn(II) centers.

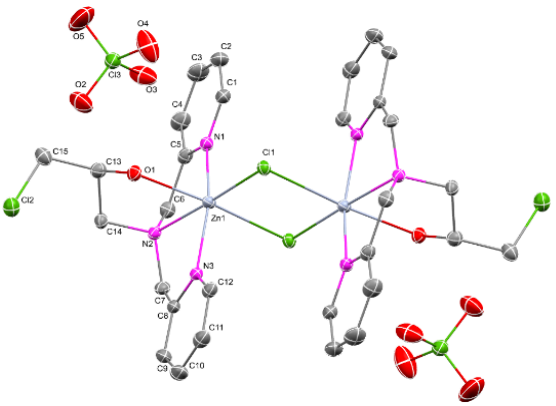

Figure 1. Ellipsoid probability representation of Zn-complex.

Pre-treatment with the Zn(II) complex and cycloheximide (inhibitor of protein synthesis in eukaryotic cells) significantly increased yeast survival under oxidative stress and reduced lipid peroxidation levels. These effects were also observed in strains in which the major antioxidant enzymes, cytosolic superoxide dismutase (SOD1) and catalase (CAT1), are suppressed, reinforcing the protective effect of the zinc-complex.

Acknowledgments

Central de Análises-Department of Chemistry (UFSC), LABIME (UFSC), and PIBIC/CNPq.