Potential Protection of Hydroxycinnamic Acid Derivatives Against Oxidative Stress in *Saccharomyces cerevisiae* Cells

Prudêncio, E.R.[1]; Monken, F.F.[1]; Cavalcanti, L.R.I. [1]; Castro, R.N.[2]; Riger, C.J.[1]

[1]Laboratório de Estresse Oxidativo em Micro-organismos (LEOM), Departamento de Química, UFRRJ, Seropédica, Brazil. [2]Laboratório de Química Medicinal e Laboratório de Química do Mel (LabMed & LabMel), Departamento de Química, UFRRJ, Seropédica, Brazil.

Introduction and Objectives: Research indicates that oxidative stress plays a crucial role in neurodegenerative diseases, cardiovascular problems and some cancers. Epidemiological and clinical studies have shown that there is an inverse association between the consumption of polyphenol-rich foods and the reduction in the risk of diseases. Caffeic acid and their derivatives are the major representative of hydroxycinnamic acids and they are widely distributed in foods such as fruits, vegetables, wine, and coffee. The aim of this study is to compare the efficiency of three important hydroxycinnamic acids derivatives – caffeic acid, chlorogenic acid and caffeic acid phenethyl ester (CAPE) – in the reduction of the oxidative stress in *Saccharomyces cerevisiae* cells.
Materials and Methods: To test the antioxidant activity of these substances, cells in exponential growth phase were preincubated with caffeic acid, chlorogenic acid and CAPE (10µg.mL^{-1}) for 2 hours. After incubation, the cells were harvested, washed, and incubated with hydrogen peroxide (1.0mM) for 1 hour. The results were compared to control cells (non-incubated cells) and cells under oxidative stress. Subsequently it was determined cell viability, lipid peroxidation and glutathione ratio levels (GSH/GSSG).
Results and Conclusions: The cells pre-treated with chlorogenic acid showed an increase in the survival rate after oxidative stress (79%). However caffeic acid and CAPE (26.04 ± 8.90 and 23.06 ± 9.65 pmol MDA/mg protein) showed a reduction of the lipid peroxidation values below the control cells (38.84 ± 10.45 pmol MDA/mg protein), while chlorogenic acid had similar levels to the control cells. The GSH/GSSH ratio showed no changes with chlorogenic and caffeic acids, and the effect of CAPE is still being tested. Mutant strains *Δgsh1* and *Δsod1* have been used to define the most effective substance for protecting against intracellular oxidation, even when endogenous antioxidant defense system is deficient. So far, the three substances showed great importance in antioxidant protection in *S. cerevisiae* cells.

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