

TITLE: Impact of peptides on the use of *Saccharomyces cerevisiae* as a mitochondrial model against oxidative stress

AUTHORS: LIMA, G.C.; SANTOS, W.L.; QUEIROZ, J.J.F.; OLIVEIRA, L.H.A.S.; SILVA, M.E.B.; SILVA, E.F.T.; BARBOSA, M.A.P.; MARINHO, T.A.F.; MOREIRA, K.A.

INSTITUTION: UNIVERSIDADE FEDERAL RURAL DE PERNAMBUCO, GARANHUNS, PE (AVENIDA BOM PASTOR, S/Nº, CEP 55292-270, GARANHUNS- PE, BRAZIL)

Mitochondria are intracellular organelles that play a crucial role in apoptosis (programmed cell death) and mitochondrial dysfunction has been indicative of diseases such as Alzheimer's disease, Parkinson's disease and diabetes. This dysfunction can be caused by reactive oxygen species (ROS) or free radicals, that include superoxide (O_2^-), hydrogen peroxide (H_2O_2), and peroxynitrite ($ONOO^-$). When there is an imbalance between the free radicals and the defense system, known as oxidative stress can cause oxidation in cells components like the DNA, alteration on lipid bilayer of cells, modifications of polypeptide chains and interferences in the inflammatory response. Due to moderate sensibility of yeast *Saccharomyces cerevisiae* displays against oxidative stress induced by H_2O_2 , was used as a system for modeling mitochondrial disease in animals cells, in addition was evaluated the antioxidant capacity of the peptides obtained from the casein of the buffalo milk of the enzymatic hydrolysis employing bromelin, pancreatin and trypsin for 2, 4 and 6 hours. *Saccharomyces cerevisiae* (YNN27) cells, grown in yeast extract, peptone and dextrose (YPD) broth, were suspended in the same broth at absorbance (600 nm) of 0.1. Peptides (200 $\mu\text{g/mL}$) were incubated at 28 °C with yeast suspension for 1 h. An oxidizing agent (H_2O_2) was added (2 mmol/L), and the incubation was extended for 48 h. A 10 μl portion of serially diluted cultures in 2 mmol/L H_2O_2 was spotted on YPD agar plates containing 2 mmol/L H_2O_2 . Plates were incubated for 72 h at 28 °C and the colony forming units of yeast was estimated after incubation of the agar plates at 28 °C for 72 h. Data was presented in CFU/mL. After the experiment was carried out, the potential antioxidant was identified in all peptides, but the peptides obtained by the pancreatin elapsed 6 and 4 hours is the highest (2.57 and 2.53 $\times 10^6$ CFU/mL respectively), even having no statistical difference between them ($p < 0.05$). The rest of the peptides did not present statistical difference, but it was possible to identify a proportional relationship between activity antioxidant and time of hydrolysis. In conclusion, is possible identified that peptides obtained by the hydrolysis of buffalo casein employing trypsin, bromelain and pancreatin exhibited notable protective effects on yeast cells stressed by H_2O_2 .

Keywords: Mitochondria; buffalo caseinate; bioactives peptides; yeast cells.

Development: CAPES, CNPq and FACEPE.