

Effects of Chlorophyll-Related Compounds on Hydrogen Peroxide Induced DNA Damage within Human Lymphocytes

Ching-Yun Hsu, Chi-Ming Yang, Chiao-Ming Chen, Pi-Yu Chao, and Shene-Pin Hu
Hsu CY;Yang CM;Chen CM;Chao PY;Hu SP

Abstract

Chlorophylls (Chl's) are the most abundant natural plant pigments. Four chlorophyll-related compounds (CRCs), including chlorophyllide a and b (Chlide a and b) and pheophorbide a and b (Pho a and b), were investigated for their antioxidative capacities to protect human lymphocyte DNA from hydrogen peroxide (H₂O₂) induced strand breaks and oxidative damage *ex vivo*. Lymphocytes exposed to H₂O₂ at concentrations of 10 and 50 μ M revealed an increased frequency of DNA single-strand breaks (ssb's; as measured by the comet assay) and also an increased level of oxidized nucleoside (as measured by 8-hydroxydeoxyguanosine, 8-OHdG). All Chl's reduced the level of DNA ssb's and 8-OHdG within human lymphocytes following exposure to 10 μ M H₂O₂. Only Pho a and b were able to decrease DNA ssb's and 8-OHdG following treatment of lymphocytes with 50 μ M H₂O₂, in a concentration-dependent fashion. It was demonstrated herein that Pho a and b were more antioxidative than others. We applied DPPH free-radical scavenge assays *in vitro*, and got similar results. Pho a and b had higher ability in scavenging capacities than others. We conclude that water-extract Chl's are able to enhance the ability of human lymphocytes to resist H₂O₂-induced oxidative damage, especially for Pho a and b.