

[Appl Biochem Biotechnol.](#) 2006 Nov;135(2):133-44. doi: 10.1385/abab:135:2:133.

Electrolyzed-reduced water protects against oxidative damage to DNA, RNA, and protein

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PMID: 17159237 DOI: [10.1385/abab:135:2:133](#)

Abstract

The generation of reactive oxygen species is thought to cause extensive oxidative damage to various biomolecules such as DNA, RNA, and protein. In this study, the preventive, suppressive, and protective effects of in vitro supplementation with electrolyzed-reduced water on H₂O₂-induced DNA damage in human lymphocytes were examined using a comet assay. Pretreatment, cotreatment, and posttreatment with electrolyzed-reduced water enhanced human lymphocyte resistance to the DNA strand breaks induced by H₂O₂ in vitro. Moreover, electrolyzed-reduced water was much more effective than diethylpyrocarbonate-treated water in preventing total RNA degradation at 4 and 25 degrees C. In addition, electrolyzed-reduced water completely prevented the oxidative cleavage of horseradish peroxidase, as determined using sodium dodecyl sulfate-polyacrylamide gels. Enhancement of the antioxidant activity of ascorbic acid dissolved in electrolyzed-reduced water was about threefold that of ascorbic acid dissolved in nonelectrolyzed deionized water, as measured by a xanthine-xanthine oxidase superoxide scavenging assay system, suggesting an inhibitory effect of electrolyzed-reduced water on the oxidation of ascorbic acid.

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