

Chemical modification of lysozyme, glucose 6-phosphate dehydrogenase, and bovine eye lens proteins induced by peroxy radicals: Role of oxidizable amino acid residues

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Chemical and structural alterations to lysozyme (LYSO), glucose 6-phosphate dehydrogenase (G6PD), and bovine eye lens proteins (BLP) promoted by peroxy radicals generated by the thermal decomposition of 2,2'-azobis(2-amidinopropane) hydrochloride (AAPH) under aerobic conditions were investigated. SDS-PAGE analysis of the AAPH-treated proteins revealed the occurrence of protein aggregation, cross-linking, and fragmentation; BLP, which are naturally organized in globular assemblies, were the most affected proteins. Transmission electron microscopy (TEM) analysis of BLP shows the formation of complex protein aggregates after treatment with AAPH. These structural modifications were accompanied by the formation of protein carbonyl groups and protein hydroperoxides. The yield of carbonyls was lower than that for protein hydroperoxide generation and was unrelated to protein fragmentation. The oxidized proteins were also characterized by significant oxidation of Met, Trp, and Tyr (but not of