

The riboflavin-sensitized photooxidation of horseradish apoperoxidase

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Abstract

Native horseradish peroxidase, as well as its reduced and carboxymethylated form, and the apoenzyme, showed resistance to photodynamic action. Sensitivity to this action was detected only in reduced and carboxymethylated apoenzyme, when the photooxidation of its histidine residues was observed. When analyzing the bulk hydrophobic character (Hf) and the accessibility coefficients (Br) in those amino acid residues which can be subjected to photooxidation in horseradish peroxidase, it was found that all of them are situated in hydrophobic zones with low accessibility coefficients. This could justify the high resistance of this enzyme to photodynamic action. The only exception is tryptophan-117, which has low values of Hf and Br, and therefore its resistance to photodynamic action can only be explained in terms of its location and environment. Tryptophan-117 would be situated in a zone of antiparallel β -structure, according to Chou and Fasman's predictive method for protein conformation.

Keywords Amino Acid Residue, Histidine, Horseradish Peroxidase, High Resistance, Carboxymethylated