CATALYTIC ACTIVITY OF IRON AND MANGANESE PORPHYRINS AND MICROPEROXIDASES MODULATED BY DIFFERENT MICROENVIRONMENTS

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The association of Fe^{3+} Protoporphyrin IX and meso-tetrakis(2,6-dichloro-3-sulfonatophenyl) porphyrin ($Fe^{3+}TDCSO_3^-Na^+PP$) with cationic CTAB micelles and DODAB liposomes led to changes in the EPR and electronic absorption spectra. The reaction of these porphyrins with *t*-BuOOH led to the formation of Compound II and the completion of the catalytic cycle by using the peroxide or diphenylacetaldehyde (DPAA) as the reducing agent. Besides high-valence forms, Fe^{3+} Protoporphyrin IX and $Fe^{3+}TDCSO_3^-Na^+PP$ were also able to oxidize DPAA. $Fe^{3+}TDCSO_3^-Na^+PP$ associated to DODAB led the vesicles to assembly in a wire-like manner. In DODAB liposomes as well as in CTAB micelles, despite spectral changes, the catalytic activity was not significantly changed in the presence of histidine. Otherwise, different microenvironments provided by apocytochrome *c* and apomyoglobin and metal ligand change accelerated the catalytic cycle of both porphyrins. The peroxidase activity of iron and manganese-microperoxidases (MnMP) was also affected by CTAB micelles and DODAB liposomes and by the pH of the medium. Negatively charged SDS micelles and DCP liposomes and neutral Triton-X-100 micelles accelerated the MP catalytic cycle and free radical production leading to an intense bleaching of the MPs. Comparatively, despite the presence of apoprotein, the hexacoordinated protein, cytochrome *c*, had also the peroxidase activity modulated by micelles and lipossomes in a interface charge - sensitive manner. Multiple enzymatic activities were exhibited by MPs associated to mesoporous silica. All the catalytic systems described above were also able to degrade phenol, an undesirable waste product in effluents.

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