

Antioxidative Activity of Some Quaternary Ammonium Salts Incorporated into Erythrocyte Membranes

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The antioxidative activity of two series of amphiphilic compounds from a group of quaternary ammonium salts has been investigated. They were so-called bifunctional surfactants synthesized to be used as common pesticides or as antioxidants. The latter application was to be ensured by providing the compounds studied with an antioxidant group. Studies on antioxidative possibilities of those compounds were performed on pig erythrocytes. Due to their hydrophobic parts, they anchor in the erythrocyte membrane and influence the degree of lipid oxidation in the erythrocyte membrane subjected to UV radiation. It was found that compounds of both series decreased the oxidation of the membrane lipids. The inhibition of this oxidation increased with the length of their hydrophobic chains up to fourteen carbon atoms. The compounds of the longest hydrophobic chains showed a somewhat weaker antioxidative activity. Of the two series studied compounds were more effective having bromide ions as counterions. The corresponding compounds of a second series (chlorides) protected erythrocyte significantly weaker against oxidation. The effect of the compounds on fluidity of the erythrocyte membrane has been studied in order to explain the oxidation results. Change in fluidity of the erythrocyte ghost membranes was found also dependent on length of the hydrophobic part of the compounds and was more pronounced in the case of bromide surfactants.

The final conclusion is that the compounds studied can be successfully used as antioxidant agents of good efficacy.