Different Effects of Di- and Triphenyltin Compounds on Lipid Bilayer Dithionite Permeabilization

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Phenyltins are chemicals widely used in industry, hence their occurrence in the human environment is frequent and widespread. Such compounds include hydrophobic phenyl rings bonded to positively charged tin. This molecular structure makes them capable of adsorbing onto and penetrating through biological membranes, hence they are potentially hazardous. Two such compounds, diphenyltin and triphenyltin, show different steric constraints when interacting with the lipid bilayer. It has been demonstrated that these compounds are positioned at different locations within model lipid bilayers, causing dissimilarity in their ability to affect membrane properties. In this paper we present a study regarding the ability of these two phenyltins to facilitate the transport of $S_2O_4^{-2}$ ions across the lipid bilayer, evaluated by a fluorescence quenching assay. In concentration range of up-to 60 μM those compounds do not affect lipid bilayer topology, when evaluated by vesicle size distribution. Both phenyltins facilitate the transfer of $S_2O_4^{-2}$ across the model lipid bilayer, but the dependence of dithionite transport on phenyltin concentration is different for both. In principle, above 20 μM triphenyltin is more efficient in transfering ions across the lipid bilayer than diphenyltin.