Synthesis of 2-(n-(N,N,N-trimethyl)-n-alkyl)-5-alkylfuryl halides. Useful probes for studying singlet oxygen dynamics and equilibria in microcompartmentalized systems

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Three lipid-soluble furan derivatives, 2,5-disubstituted with different n-alkyl chains, and a terminal trimethylammonium group were obtained by reaction of a metalated monoalkylfuran with alkyl dihalides under conditions of thermodynamic control and subsequent reaction with gaseous trimethylamine. These compounds are useful probes for studying singlet oxygen dynamics and equilibria in microcompartmentalized systems because they react very rapidly with singlet oxygen, physical quenching can be neglected, and medium effects on reactivity are small. Location of the probe, completely incorporated in the lipidic bilayer, is predictable and controllable from structural modifications and the small reactive moiety does not modify significantly the vesicle chain packing. Steady-state and time-resolved kinetics employing 2-(4-(N,N,N-trimethyl)-butyl)-5-dodecylfuryl bromide to monitoring singlet oxygen give a value of 0.27 for the singlet oxygen partitioning constant between the lipidic and aqueo