

# Decomposition of Organic Hydroperoxides in Mixed Micelles with Ionic Surfactants

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The behavior of organic hydroperoxides plays an important role in the lipid and hydrocarbon oxidation. The kinetics and mechanism of hydroperoxides (cumene, ethyl benzene, tertiary butane, and sunflower oil) decomposition, in the presence of surfactants have been investigated by means of NMR, GC-MS, UV and IR spectroscopy, DLS and kinetic approaches. Hydroperoxides (LOOH) are the primary products of lipid oxidation. LOOH were shown to decrease the surface tension and to form mixed micelles together with known surfactants (S): direct micelles are formed in water solution and reversed micelles are in organic media. Mixed micelles sizes depend on the S nature and change in the range 1-200 nm, so mixed micelles can be named as self-organized nanoreactors in which active polar substances such as LOOH, metal compounds, phenols, amines, etc are concentrated. Cationic surfactants (S+) were found to catalyze LOOH decomposition into free radicals. Binary systems {nLOOH mS+} can be used as lipophilic initiators for radical polymerization and other chain radical processes at low temperature.

Contrary to S+, some anionic surfactants (S-) were found to catalyze nonradical decomposition of LOOH. Sodium dodecylsulfate (SDS) catalyzes the decomposition of alkylaromatic hydroperoxides into phenol and corresponding carbonyl compound. Because phenol is an acceptor of free radicals, the alkylaromatics (ethylbenzene, cumene, etc.) oxidation is completely inhibited in the presence of SDS.

Some hydroperoxides derived from aliphatic hydrocarbon oxidation were found to undergo the heterolytic decomposition in the presence of SDS resulted in olefins formation.

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