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[Lab. of Hygienic Chemistry]

**Detoxification of Paraquat Poisoning: Effects of Carbohydrate Sulfate,  
Alkylsulfate and Alkylsulfonate on Active Oxygen.**

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The potency of carbohydrate sulfate (DS, GS), alkylsulfonate (BDS, TDS) and polyvinyl sulfate (PVP) as the quencher of active oxygen species was studied. When hemolysis was induced by a single oxygen derived from a photosensitizer-coupled reaction, PVP, BDS and TDS lowered its extent by 30 - 40%. DS and GS did not exhibit any effect on singlet oxygen-induced hemolysis. These results strongly suggest that low-molecular weight alkylsulfonates, BDS and TDS, are potent scavengers of perhydroxyl, alkoxyl and hydroxyl radicals, and singlet oxygen although these reagents cannot interact with superoxide anion radicals.

[YAKUGAKU ZASSHI, **115**, 641-660 (1995)]

[Lab. of Hygienic Chemistry]

**Gas Chromatographic Analysis of Reduction Products of Paraquat, Diquat  
and the Related Compounds: Reductive Cleavage of N-alkylpyridinium  
Derivatives with NaBH<sub>4</sub>-NiCl<sub>2</sub> Reduction System.**

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HIROSHI SHIMIZU, SIGEO UKAI

The structures of by-products, observed as side peaks on the chromatogram by GC, were estimated by GC-MS to be 4-(1-methylamino-pent-3'-yl)-1-methylpyridine arising from paraquat and 1-butyl-2-aza-perhydroquinolidine arising from diquat. We elucidated by GC-MS analysis that the reductive cleavage reaction at C-N bond in 1,4-dimethylpyridinium iodide, 1-dodecylpyridinium chloride and 1,1'-diethyl-4,4'-bipyridinium dichloride except for 1-methyl-4-phenylpyridinium iodide occurred as side reaction.

[YAKUGAKU ZASSHI, **115**, 1004-1015 (1995)]

[Lab. of Hygienic Chemistry]

**Gas Chromatographic Analysis of Reduction Products of Paraquat,  
Diquat and the Related Compounds: Reductive Cleavage in the Pyridine  
Ring on N-Alkylpyridinium Derivatives with NaBH<sub>4</sub>-NiCl<sub>2</sub> Reduction  
System, and Inhibition of the Cleavage.**

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When N-alkylpyridinium derivatives were reduced with sodium borohydride-nickel chloride reduction system, reductive cleavage occurred at the C-N bond in the pyridine ring of N-alkylpyridinium derivatives to give a small amount of reductive cleavage product along with the major perhydrogenated product. It was recognized that the precursors of reductive cleavage products were not boron-amine complexes, but 1,2,3,6-tetrahydropyridine.