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EPR study of radical intermediates from the oxidation of 6-ethoxy-2,2,4-trimethyl- and 6-ethoxy-2,2,4,8-tetramethyl-1,2-dihydroquinoline

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- Abstract

The EPR spectra of 1,2-dihydro-6-ethoxy-2,2,4-trimethyl- and 1,2-dihydro-6-ethoxy-2,2,4,8-tetramethyl-quinolin-1-yl radicals were observed in heptane solution. The hyperfine splittings showed that this class of radical is extensively delocalised with significant spin density at C(8). Both radicals decayed by second-order processes, the rate constants being 5×10^6 and 4×10^2 dm^3 mol^{-1} s^{-1}, respectively at 273 K. The latter reaction is much slower because the 8-methyl substituent blocks the formation of the 1,8′-dimer. Both radicals reacted with oxygen to give the corresponding nitroxides, although reaction was very slow for the 8-methyl

derivative. A mechanism is proposed to rationalise product formation from 1,2-dihydro-6-ethoxy-2,2,4-trimethylquinoline when used as an antioxidant.