Poly(ß-phosphorylated nitrones): preparation and characterisation of new class of spin trap

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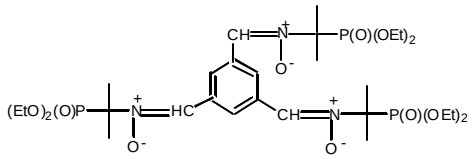
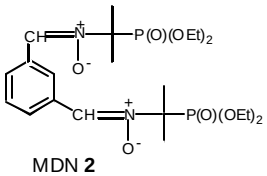
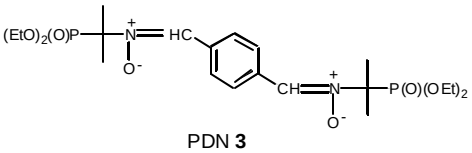
Four new poly-(β-phosphorylated nitrones), the 1, 3, 5- tri [(N-(1-diethylphosphono)- 1-methylethyl) N-oxy-aldimine] benzene (TN) **1**, the 1,3-di [(N-(1- diethylphosphono)-1-methylethyl) N-oxy aldimine] benzene (MDN) **2**, the 1, 4- di [(N- (1- diethylphosphono)- 1-methylethyl) N-oxy aldimine] benzene (PDN) **3**, and the 1, 2- di [(N-(1-diethylphosphono)-1-methylethyl) N-oxy aldimine] benzene (ODN) **4**, derived from the mono-nitrone N-benzylidene-1-diethoxyphosphoryl-1-methylethylamine N-oxide (PPN) **5**, were synthesised.



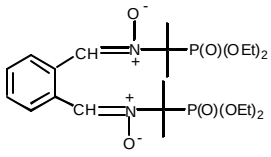
TN **1**



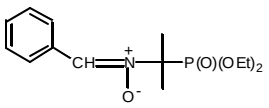
MDN **2**



PDN **3**



ODN **4**



PPN **5**

The capacity of 1-4 to act as spin trapping agents was investigated in phosphate buffers at pH 5.8 and 7.2. Complex EPR spectra of spin adducts have always been obtained with the ortho-dinitrone 4. The three other compounds trapped efficiently superoxide and several carbon-centred radicals, giving mono-spin adducts, although only weak signals were obtained with the hydroxyl radical. When the spin trap concentration was kept below 1 mmol.dm-3, the formation of di-radicals also occurred. The half-lives of the superoxide spin adducts of 1-3 were in the range 5 - 12 min. and did not significantly change between pH 5.8 and 7.2. A competitive kinetic study showed that the tri-nitrone 1 trapped the methyl radical 1.9 time more rapidly than both a-(4-pyridyl-1-oxide)-N-terbutylnitrone (POBN) and 5-diethoxyphosphory-5-methyl-4,5-dihydro-3H-pyrrole N-oxide (DEPMPO) at pH 7.2.

V. Roubaud, H. Dozol, C. Rizzi, R. Lauricella, J.C. Bouteiller, B. Tuccio, *J.Chem.Soc.Perkin Trans.2*, 2002, 958-964.