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Stereoselective epoxidation of 3β-acetoxy-cholest-5-ene catalysed by perhalogenated 5,10,15,20-tetraarylporphyrinatoiron(III) chlorides

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The development of chemical model for cytochrome P450 and determination of mechanism of biomimitic oxidation is an important area of current interest. The reactions of iodosylbenzenes, hydrogen peroxides, alkyl hydroperoxides and other monooxygen donors with 5,10,15,20-tetraarylporphyrinato-iron(III) chlorides [TAPFe(III)Cl] form high valent oxo-iron intermediates which are responsible for biomimitic hydroxylation of hydrocarbons, epoxidation of olefins and oxidation of heteroatom containing organic molecules. Electronegatively substituted TAPFe(III)Cl are more stable and efficient catalysts than simple TAPFe(III)Cl. Hence the epoxidation of 3β-acetoxy-cholest-5-ene with cumene hydroperoxide catalysed by perhalogenated TAPFe(III)Cl is reported.

The reaction of 3β-acetoxy-cholest-5-ene with cumene hydroperoxide catalysed by electron withdrawing and perhalogenated TAPFe(III)Cl gave 3β-acetoxy-5α,6α-epoxy-5β-cholestane and 3β-acetoxy-5β,6β-epoxy-5β-cholestane. Higher yields of 5β,6β-epoxy-5β-cholestane are obtained during the oxidation of 3β-acetoxy-cholest-5-ene with CumOOH catalysed by 2,3,7,8,12,13,17,18-octachloro-5,10,15,20-tetraarylporphyrinato-iron(III)chlorides than the corresponding 5,10,15,20-tetraarylporphyrinatoiron(III) chlorides.

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