

Dihydropyridine-fused and pyridine-fused coumarins: Reduction on a glassy carbon electrode in dimethylformamide

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In this study, two series of dihydropyridine-fused and pyridine-fused coumarins were synthesised and electrochemically characterised in aprotic medium. In both series, the most easily reducible groups were the endocyclic carbonyl groups. The electrochemical mechanism for both types of compounds is strongly dependent on the experimental time-scale. Cyclic voltammetric (CV) reduction on a glassy carbon electrode (GCE) of the endocyclic carbonyl group of dihydropyridine-fused coumarins involves an ECEC mechanism with two electron transfer steps that are coupled with chemical reactions to produce the corresponding hemiacetal derivative. In the case of pyridine-fused coumarins, CV reduction of the endocyclic carbonyl group involves an EEC mechanism. ESR studies revealed the presence of a stabilised intermediate only for the pyridine-fused derivatives. Our theoretical study showed a spin density map of radical species delocalised mainly within the coumarin ring, indicating the reduction of t