

XXII Encontro Nacional SPQ



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PORTUGUESA
DE QUÍMICA

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100 ANOS

100 anos
de Química
em Portugal



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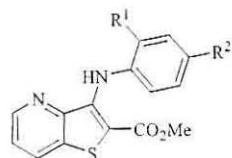
Chemical, biochemical and electrochemical assays to evaluate antioxidant properties of three new diarylamines in the thieno[3,2-*b*]pyridine series

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The continuous discovery of new synthetic products with antioxidant activity is of primary importance as they may substitute with advantage the currently used antioxidant compounds. The reducing properties of diarylamines make them very important as antioxidants, especially as radical scavengers as it has been demonstrated by our and other research groups.¹⁻³ Three di(hetero)arylamines were prepared by C-N coupling of the methyl 3-amino-6-bromothieno[3,2-*b*]pyridine-2-carboxylate with bromonitrobenzenes and further reduced to the amino compounds **1a-c**.⁴ The antioxidant properties of these compounds were evaluated through chemical, biochemical and electrochemical assays. The chemical assays allowed an evaluation of their reducing power (RP) and radical scavenging activity,



1a R¹ = H, R² = NH₂
1b R¹ = NH₂, R² = H
1c R¹ = NH₂, R² = OMe

(RSA), while biochemical assays evaluated the lipid peroxidation inhibition capacity by the β -carotene-linoleate system (CLS) and inhibition of formation of thiobarbituric reactive substances in brain cells homogenates (TBARS); the electrochemical characterization of the compounds was performed by cyclic voltammetry and differential pulse voltammetry. Furthermore, an initial assessment of possible compounds hepatotoxicity was performed by studying their *in vitro* cell growth inhibition activity in a liver primary cell culture. Diarylamine **1a** was the most efficient in RSA (63 μ M) and RP (33 μ M), while compound **1c** gave the best results in CLS (41 μ M) and TBARS (7 μ M), with EC₅₀ values even lower than those obtained for the standard trolox. Despite the similar electrochemical responses of all compounds, diarylamine **1a** presented the lowest oxidation potential, lower than the one of trolox, and the highest "antioxidant power" in the electrochemical assays. All compounds presented low hepatotoxicity when compared with the standard ellipticine (GI₅₀ value 4 μ M), mostly compound **1a** (GI₅₀ value > 125 μ M).

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References [1] Esteves, M.A. *et al.* *J. Nat. Prod.* 64 (2001) 761-766. [2] Ferreira, I.C.F.R. *et al.* *Bioorg. Med. Chem. Lett.* 16 (2006) 1384-1387. [3] Abreu, R.M.V. *et al.* *J. Electroanal. Chem.* 628 (2009) 43-47. [4] Calhelha, R.C., Queiroz, M.-J.R.P. *Tetrahedron Lett.* 51 (2010) 281-283.-