Effects of two new di(hetero)arylamines on prevention of oxidative stress induced in two different biological models

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We investigated the antioxidant properties of two new diarylamines from organic synthesis (MJQ1 and MJQ2), whose basic structure is similar to others, with reported antioxidant capacity, assessed by chemical tests, and biological activity against microorganisms.

In this study we induced lipid peroxidation, in isolated rat liver mitochondria with ADP/Fe^{2+}, and the diarylamine effects were examined by oxygen consumption and by TBARS method. The anti-peroxidative effect was maximal for MJQ1 at 50 nM (higher than the one reported for trolox) and for MJQ2 at 60 μM. At these same concentrations none of them depressed the transmembrane potential ($\Delta\Psi$) developed by mitochondria, neither the RCR nor the ADP/O ratio values. For 2-fold these concentrations both diarylamines were effective in the prevention of mitochondrial $\Delta\Psi$ collapse observed on respiring mitochondria, with the TPP^+ electrode, which means a stabilization action on mitochondrial inner membrane. The results obtained were confirmed in whole cells. The compounds did not show toxicity to the L929 cell line, evaluated by the MTT reducing test and clearly protected from lipid peroxidation, induced by the oxidant pair ascorbate/Fe^{2+}, to the PC12 cell model, at the concentrations where maximal antioxidant effect was observed in mitochondria.

The new diarylamines revealed as very good antioxidants at very low concentrations, both in mitochondria and in whole cells. The results suggest a specific action site, for MJQ2, at mitochondrial complex I level. We are further exploring other intracellular targets for these new compounds that seems very promising against pathologies where oxidative stress is involved.

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