Antioxidative activity of some fullerene C_{60} derivatives

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Fullerene C_{60} is known as a very efficient free radical scavenger, the so-called "radical sponge", a prospective structural moiety for design of compounds with antioxidative activity against reactive oxygen species (ROS), *e.g.* superoxide radical-anion, hydroxyl radical, peroxides, *etc.* [1].

Within our work a series of fullerene C_{60} derivatives with indole, quinoline and 2,6-di-tert-butylphenol moieties were synthesized by 1,3-dipolar cycloadition of azomethine ylides to fullerene C_{60} under standard (the Prato reaction [2]) and catalytic (lithium salts-assisted reaction [3]) conditions.

The antioxidative activity of the obtained fullerene C_{60} derivatives against peroxides and superoxide anion radicals was examined. The peroxide radicals were generated *in vitro* under conditions of peroxidation of oleic acid, structural fragment of membrane lipids. The superoxide radical-anion was generated in the enzymatic oxidation of purine base, xanthine, to uric acid by xanthine oxidase. Among the investigated fullerene derivatives, the fulleropyrrolidine with sterically hindered phenol moiety exhibits high antioxidant activity against peroxide radicals. In the enzymatic assay significant inhibition of superoxide radical-anion formation was observed in the presence of *tert*-butyl ester of fulleroproline with quinoline moiety at the concentration of 20 μmol/L.

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