

Pyrogallol red oxidation induced by superoxide radicals: Application to evaluate redox cycling of nitro compounds

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The bleaching of the pyrogallol red (PGR) dye mediated by superoxide anion radicals (O_2^-) generated from the xanthine/xanthine oxidase system (X/XO) was studied by UV-visible spectrophotometry. The absorption band (at 540 nm) of PGR quickly decreased in the presence of X/XO, implying an efficient reaction of O_2^- with PGR. The process was unaffected by catalase (CAT), but completely abolished by superoxide dismutase (SOD). A mechanism of the reaction involving the consumption of one PGR molecule by two O_2^- to generate one molecule of H_2O_2 is proposed. PGR was used as a probe to estimate the rate of O_2^- generation in redox cycling reactions of a series of nitro compounds mediated by rat liver microsomes. The consumption of PGR induced by the redox cycling of nitrofurantoin was totally eliminated by the addition of SOD but unaffected by CAT. The initial rate of consumption of PGR mediated by the redox cycling of others nitro derivatives follows the order: furazolidindione>nitrofurantoin