

## Preparation and Antioxidant Activity of Heterocyclic Indole Derivatives

**Authors :** Tunca Gul Altuntas, Aziz Baydar, Cemre Acar, Sezen Yılmaz, Tulay Coban

**Abstract :** Free radicals, which are generated in many bioorganic redox processes, play a role in the pathogenesis of several diseases including cancer, arthritis, hemorrhagic shock, inflammatory, cardiovascular, neurodegenerative diseases and age-related degenerative brain diseases. Exposures of normal cell to free radical damages several structures, oxidizes nucleic acids, proteins, lipids, or DNA. Compounds interfere with the action of reactive oxygen species might be useful in prevention and treatment of these pathologies. A series of indole compounds containing piperazine ring were synthesized. Coupling of indole-2-carboxylic acid with monosubstituted piperazines was accomplished with 1,1'-carbonyldiimidazole (CDI) in a good yield. The structures of prepared compounds were verified in good agreement with their <sup>1</sup>H NMR (nuclear magnetic resonance), MS (mass spectrophotometry), and IR (infrared spectrophotometry) characteristics. In this work, all synthesized indole derivatives were screened in vitro for their antioxidative potential against vitamin E ( $\alpha$ -tocopherol) using different antioxidant assays such as superoxide anion formation, lipid peroxidation levels in rat liver, and 2,2-diphenyl-1-picrylhydrazyl (DPPH) stable radical scavenging activity. The synthesized compounds showed various levels of inhibition compared to vitamin E. This may give promising results for the development of new antioxidant agents.

**Keywords :** antioxidant, indoles, piperazines, reactive oxygen species

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