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Gold catalyzed double condensation reaction: Synthesis, antimicrobial and cytotoxicity of spirooxindole derivatives

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ABSTRACT:

Microwave assisted synthesis of spirooxindoles via tandem double condensation between isatins and 4-hydroxycoumarin under gold catalysis is reported. The reaction is practical to perform, since the products can be isolated by simple filtration without requiring tedious column chromatography. The scope of this chemistry is exemplified by preparing structurally diverse spirooxindoles (22 examples) in excellent yields. Antimicrobial evaluation of the synthesized compounds revealed that three compounds (**3a**, **3f** and **3s**) exhibited significant MIC values in comparison to the standard drugs. Molecular docking studies of these compounds with AmpC-β-lactamase receptor revealed that **3a** exhibited minimum binding energy (-117.819 kcal/moL) indicating its strong affinity towards amino acid residues via strong hydrogen bond interaction. All compounds were also evaluated for their in vitro cytotoxicity against COLO320 cancer cells. Biological assay and molecular docking studies demonstrated that **3g** is the most active compound in terms of its low IC_{50} value (50.0 μM) and least free energy of binding (-8.99 kcal/mol) towards CHK1 receptor, respectively.

Keywords:

Microwave chemistry, Gold catalysis, Spirooxindoles, Biological activity, Molecular docking

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