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Adamantane-Isothiourea Hybrid Derivatives: Synthesis, Characterization, In Vitro Antimicrobial, and In Vivo Hypoglycemic Activities

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Abstract

A new series of adamantane-isothiourea hybrid derivatives, namely 4-arylmethyl (Z)-N0-(adamantan-1-yl)-morpholine-4-carbothioimidates 7a–e and 4-arylmethyl (Z)-N0-(adamantan-1-yl)-4-phenylpiperazine-1-carbothioimidates 8a–e were prepared via the reaction of N-(adamantan-1yl)morpholine-4-carbothioamide 5 and N-(adamantan-1-yl)-4-phenylpiperazine-1-carbothioamide 6 with benzyl or substituted benzyl bromides, in acetone, in the presence of anhydrous potassium carbonate. The structures of the synthesized compounds were confirmed by 1H-NMR, 13C-NMR, electrospray ionization mass spectral (ESI-MS) data, and X-ray crystallographic data. The in vitro antimicrobial activity of the new compounds was determined against certain standard strains of pathogenic bacteria and the yeast-like pathogenic fungus Candida albicans. Compounds 7b, 7d and 7e displayed potent broad-spectrum antibacterial activity, while compounds 7a, 7c, 8b, 8d and 8e were active against the tested Gram-positive bacteria. The in vivo oral hypoglycemic activity of the new compounds was carried on streptozotocin (STZ)-induced diabetic rats. Compounds 7a, 8ab, and 8b produced potent dose-independent reduction of serum glucose levels, compared to the potent hypoglycemic drug gliclazide.

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