Abstract (In English)

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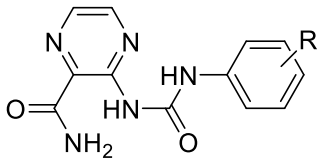
Title: Design, synthesis, and evaluation of heterocyclic compounds with potential antimicrobial activity VI

Despite the existence of a well-established treatment regimens, tuberculosis (TB) continues to be the most leading cause of death by a single microorganism, as reported by WHO. One of the reasons behind treatment failure in completely eradicating this infection is drug resistance.

Novel 3-(phenylureido)pyrazine-2-carboxamide derivatives, refer to figure below, were synthesized by reacting 3-chloropyrazine-2-carboxamide with ammonia to produce 3-aminopyrazine-2-carboxamide as an intermediate building block, followed by reacting with various substituted phenyl isocyanates using a microwave reactor.

The synthesized compounds were evaluated for *in vitro* activity against various mycobacterial strains, where most active ones among them showed moderate to low activities; 4-tertiary butyl (MIC 62.5 µg/mL), 4-NO_2 (MIC 62.5 µg/mL), 4-Bromo (MIC 250 µg/mL), 4-Cl (MIC 250 µg/mL), 2-F (MIC 250 µg/mL), and non-substituted (MIC 500 µg/mL).

As a complementary study *in silico*, the synthesized compounds and some other virtually synthesized were studied for mycobacterial ProRS inhibition as a supposed target for the title compounds.



R: H, 2-CH_3, 3- CH_3, 4- CH_3, 2-Cl, 4-Cl, 2-OCH_3, 3- OCH_3, 4- OCH_3, 4-*t*-Bu, 2-F, 3-F, 4-F, 4-NO_2, 2-Br, 3-Br, and 4-Br.

Figure: The chemical structures of title compounds.