Abstract

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Department of Pharmaceutical Chemistry and Pharmaceutical Analysis

Title of the thesis: Design, synthesis and evaluation of heterocyclic compounds with potential antimicrobial activity I

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Antimicrobial resistance is an ever-growing problem that occurs worldwide. Many bacterial strains develop the ability to resist the otherwise efficient substances, thus posing a serious threat for the future. *Mycobacterium tuberculosis* (Mtb), the source of tuberculosis, is no exception. Given that it is the leading cause of death due to a single pathogen, many efforts have been put into finding new active compounds.

The substances synthesized as a part of this thesis are based on previously prepared substances with potential antimicrobial activity. The basic structure consists of 2-aminooxazole or 2-aminothiazole and substituted pyridine or pyrazine carboxamides. The structures were confirmed by the ^{1}H and ^{13}C NMR spectra, IR spectra and mass spectrometry.

All the substances were tested for *in vitro* activity against eight bacterial strains (four gram-positive and four gram-negative) as well as eight fungal strains (four yeast and four fungi). We also measured activity against several strains of mycobacteria, such as *M. tuberculosis* H37Ra, *M. avium* or *M. kansasii*. The substances that showed activity were also tested for activity against *M. tuberculosis* H37Rv and for cytotoxicity (human hepatoma cell line HepG2).

Five substances showed promising activity against the tested mycobacteria with the lowest minimal inhibitory concentration being 0,78 μg/ml (against Mtb H37Ra). Some substances also showed promising antifungal and antibacterial activity, although weaker than the antimycobacterial.