

Abstract

Charles University

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Study program: Specialist in Laboratory Methods

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Title of diploma thesis: *In vitro* screening of novel potentially active antibacterial compounds.

The diploma thesis deals with the antibiotics policy and is focused on resistance and mechanism of action of the antibiotics. A great attention is also paid to novel substances testing in terms of their impact on the selected bacteria.

Theoretical part of thesis describes the system of antibiotic policy including its structure and organization in the Czech Republic. It also briefly summarizes this issue globally as well as individual organizations involved in the organization of the antibiotic policy. The theoretical part is also concerned with the history, classification, effects and significance of the antibiotics. A particular attention is paid to the chapter describing the macromolecular mechanism of action of 2 selected groups of substances (antibiotics) on bacteria, including physiological functions of some bacterial structures. And, last but not least, the theoretical part summarizes principles of bacterial resistance including its origin and development. The diploma thesis also contains description of individual methods for determination of bacterial sensitivity to the antibiotics, from the basic methods up to the most progressive ones, which are fully automated.

The practical part specifies in detail the broth microdilution method that was used to test effectiveness of the novel substances, including the whole working procedure. At the same time, this section contains a list of examined substances including their formulas and other data. An overview of used bacteria, their basic properties and features, pathogenicity and possibility of treatment of the diseases caused by them, is also presented. In the practical part, all obtained results have been assessed and processed. It is also determined here, whether or not the substances are active against the tested bacteria.

Key words: bacteria, antibiotics, resistance, microdilution broth method, minimal inhibition concentration