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**Metabolic Activity of Bacteria Isolated from an Acidic
Forest Soil**

Bachelor Thesis

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Metabolic Activity of Bacteria Isolated from an Acidic Forest Soil

Summary:

This study concerns *Actinobacteria* and their production of antibiotics. It also reviews *Actinobacteria* importance in the environment including the production of secondary metabolites. That includes the role of *Actinobacteria* in the carbon cycle, nitrogen fixation, or bioremediation. The study further introduces a short overview of antibiotics and basic antibiotic and resistance mechanisms. Finally, the need for discovering novel antibiotics in order to overcome an increasing bacterial resistance is presented. The theoretical introduction is complemented by an experiment which searches for a new antibiotic produced by *Actinobacteria* living in an acidic littoral soil. For that, 211 *Actinobacteria* strains were grown in laboratory settings on solid media in order to test them against four different microorganisms including a multiresistant *Acinetobacter baumannii* ANC 4097. After the preliminary cultivation, 158 strains were tested further, and 94 of them showed antibiotic activity against *Kocuria rhizophila* while 7 contained antibiotics against *Acinetobacter baumannii* strain ANC 4097, isolated in Czech Republic in 2011 (Krizova et al. 2012). That proved our hypothesis of the potential to find *Actinobacteria* producing compounds active against a multiresistant Gram-negative strain in an unusual environment. Five of those strains were grown in liquid media and the spent medium was successfully extracted by the Solid-phase, while 3 of the extracts retained the antibiotic activity against *Acinetobacter baumannii* ANC 4097. The extracts show the potential for discovery of a new antibiotic and are now subjects for further testing.

Keywords: *Actinobacteria*, soil, low pH, antibiotics, *Acinetobacter baumannii*