Abstract

Specialized microbial metabolites are described as low-molecular-weight bioactive compounds, which are dispensable for the growth, evolution, or reproduction of its producer. This group of substances includes the lincosamides, which are produced mainly by the bacteria of the *Streptomyces* genera. Apart from other precursors, two low-molecular-weight thiols, ergothioneine and mycothiol, are essential participants of the lincosamide biosynthesis. Mycothiol (MSH) serves in this pathway as a source of sulphur, on the other hand, ergothioneine (ESH) constitutes a conjugate with the aminosugar moiety of lincosamide structure. The conjugate is condensed with an activated amino acid, which is catalyzed by an unusual enzyme to form a core of the lincosamide molecule.

The objective of this diploma thesis is to isolate the conjugate of ESH and aminooctose, which serves as a substrate of the LmbD biosynthetic protein. Another aim is to study the links between the thiol metabolism and the biosynthesis of three lincosamides, lincomycin, celesticetin, and intervencin, which are produced by different bacterial strains.

Bacterial strains were cultivated under laboratory conditions and methods of liquid chromatography with UV and MS detection were used for the analysis. The parameters of the methods were developed and optimized within this work.

The outcome of this diploma thesis is the purified conjugate of ESH and aminosugar in an amount of 1.39 mg and purity of 71.4 %. Furthermore, it was found out that the amount of the excreted lincosamides into the media relates to the amount of thiols in the cells in the case of at least two the producing microorganisms.

Keywords: ergothioneine, mycothiol, lincosamides, biosynthesis, LmbD substrate, purification, UHPLC-DAD-MS, HPLC-UV