Abstract

of the dissertation by Yufryakov Vyacheslav Sergeevich "Chemoenzymatic Production of Physiologically Active Compounds"

The aim of this work is the development of chemoenzymatic approaches for the synthesis of chiral physiologically active organic and organoelement compounds. Particular emphasis is placed on the synthesis of substances with valuable antitubercular or antitumor properties.

The main results obtained include: Isolation of individual stereomers of the chlorine-containing analog of bedaquiline via stereoselective acylation using PPL lipase. A wide range of their soluble salts was prepared. A chemoenzymatic method for the production of *S*,*S*-ethambutol from nitropropane and other readily available compounds was developed through a five-stage process, involving the resolution of racemic 2-amino-1-butanol derivatives at the key step using PPL lipase. A unique stereoselective method for synthesizing the (*S*,*S*)-diastereomer of methionine sulfoxide was established using methionine- γ -lyase. A chemoenzymatic route to 5-fluoro-(*S*)-dihydroxyphenylalanine (5-F-DOPA) from 2-fluorophenol was implemented, employing tyrosine phenol-lyase at the critical stage to obtain enantiomerically pure 3-fluoro-(*S*)-tyrosine.

The theoretical and practical significance of the work lies in the development of novel chemoenzymatic transformations utilizing PPL lipase, tyrosine phenol-lyase, methionine- γ -lyase, and immobilized lipase B from *Candida antarctica*, as well as in the creation of environmentally friendly methods for producing the pharmaceutical agents ethambutol and 5-F-DOPA. The collective results contribute fundamentally and practically to addressing current challenges in organic stereoselective synthesis and enhance the efficiency of manufacturing several pharmaceutical ingredients.

Five peer-reviewed articles on the dissertation topic have been published in journals recommended by the Higher Attestation Commission (White List), including four papers indexed in international databases (Web of Science and Scopus). The research findings have been validated through participation in national and international scientific events, with five works published in proceedings of all-Russian and international conferences and symposia.