

Stabilization of enzymes by dormancy autoinducers as a possible mechanism of resistance of resting microbial forms

Kolpakov A., Il'inskaya O., Bepalov M., Kupriyanova-Ashina F., Gal'chenko V., Kurganov B., El'-Registan G.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

Alkyl-substituted hydroxybenzenes (AHBs), autoinducers of microbial dormancy (or d1 factors), were found to stabilize the structure of protein macromolecules, making them metabolically less active and more resistant to stresses. In vitro experiments with the *Bacillus intermedius* ribonuclease and chymotrypsin showed that the degree of the physical and chemical stability of these enzymes treated with AHBs depends on their concentration and incubation time. Experiments with RNase, which is capable of refolding, i.e., renaturation after heat denaturation, revealed that AHBs efficiently interact with both intact and denatured proteins. The data obtained allow the inference to be made that d1 factors may play the role of natural chemical chaperons, blocking metabolism in dormant cells through the formation of catalytically inactive thermostable complexes with enzymes. © 2000 MAIK "Nauka/Interperiodica".

Keywords

Alkyl-substituted hydroxybenzenes, Chemical chaperons, D1 factors of microorganisms, Dormancy, Dormancy autoinducers, Metabolic block, Thermostability of enzymes