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Title (English)

Characterization of arginine deiminase (ADI) and adenosine deaminase (ADA) for the biocatalytic buffer system

Title (Swedish)

Abstract

Two enzymes/substrate pairs were characterized as alkaline producers for a biocatalytic buffer system and the application of achieving complete hydrolysis of the neurotoxin diisopropyl fluorophosphate (DFP) in solution by organophosphorous hydrolase (OPH): arginine deiminase (ADI) with arginine and adenosine deaminase (ADA) with adenosine. ADI from *Streptococcus rattus* was cloned into *E. coli*, expressed and extracted, and found to be inapplicable because the hydrolysis of arginine at pH 7 did not raise the pH. ADA from calf intestinal mucosa was purchased and kinetically characterized. It was found that the enzyme hydrolyzed adenosine maximally at pH 7 at room temperature and showed decreased activity at lower and higher pH-values. It was also found that adenosine hydrolysis of ADA was 50% inhibited by about 50mM fluoride, a product of DFP hydrolysis, and that OPH was 50% inhibited by about 0.25mM adenosine. Complete conversion of DFP was achieved using OPH and ADA in the biocatalytic buffer system.

Keywords

Enzymes, biocatalytic buffer, arginine deiminase, ADI, adenosine deaminase, ADA, diisopropyl fluorophosphates, DFP, neurotoxin, nerve agent, pesticide, decontamination

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