Organska hemija / Organic Chemistry

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Oksidacija 1,4-dihidropiridina katalizovana rekombinantnom bakterijskom lakazom eksprimiranom u *E. coli*

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Lakaze predstavljalju raznoliku klasu enzima koja nalazi primenu od valorizacije otpada do organske sinteze. U ovom istraživanju ispitivane su cele ćelije koje sadrže bakterijsku lakazu kao katalizator u oksidaciji 1,4-dihidropiridina. Ekspresija *cotA* gena iz *Bacillus licheniformis* je izvršena u ćelijama *E. coli* i za nastali biokatalizator je ustanovljeno da ubrzava oksidaciju 1,4-dihidropiridina. Pored toga, ustanovljeno je da „multicopper" oksidaza CueO iz *E. coli* takođe poseduje aktivnost prema oksidaciji 1,4-dihidropiridina. Ekspresioni sistem koji sadrži lakazu iz bakterije *Bacillus licheniformis* zatim je imobilizovan na bakterijskoj nanocelulozi i upotrebljen je kao katalizator u istoj transformaciji. Takav katalizator je bilo moguće ponovo upotrebiti tri puta, nakon čega je njegova aktivnost iznosila 37 % od početne. Navedeno istraživanje predstavlja prvu primenu celih ćelija sa rekombinantnom lakazom u oksidaciji 1,4-dihidropiridina.

Oxidation of 1,4-dihydropyridines catalyzed by recombinant bacterial laccase expressed in *E. coli*

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Laccases are a versatile class of enzymes with applications ranging from waste valorization to organic synthesis. We have tested whole-cell systems containing bacterial laccase as catalysts in the oxidation of 1,4-dihydropyridines. *E. coli* was used as the expression host for the *cotA* gene from *Bacillus licheniformis*, and the resulting whole-cell catalyst facilitated the oxidation of 1,4-dihydropyridines. It was found that multicopper oxidase CueO from the *E. coli* expression host also possesses catalytic activity in the oxidation of 1,4-dihydropyridines. The whole-cell biocatalyst expressing *Bacillus licheniformis* laccase was subsequently immobilized on bacterial nanocellulose and utilized in the same transformation, retaining 37 % of its original activity after three consecutive catalytic runs. This is the first report of a whole-cell catalytic system containing recombinant laccase for the oxidation of 1,4-dihydropyridines.

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