ENZYME-CATALYZED SYNTHESIS OF CHIRAL COMPOUNDS

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In present research transesterification of chiral substrate, *R,S*-1-phenylethanol, with vinyl acetate, catalyzed by immobilized lipase B from *Candida antarctica* and conversion of acetophenone into *R*-phenylethanol, catalyzed by *Lactobacillus brevis* alcohol dehydrogenase, were studied.

The optically active 1-phenylethanol, especially *R*-1-phenylethanol, is used as chiral building block and synthetic intermediate in fine chemical, pharmaceutical and agrochemical industries. In pharmaceutical industry, *R*-1-phenylethanol is used as ophthalmic preservative and may also inhibit cholesterol intestinal adsorption and thus decrease high cholesterol level. The other application area of the enantiomers is in chemical analysis. Both the *R*- and *S*-enantiomer of 1-phenylethanol are used as chiral reagent for the determination of enantiomeric purity and for the asymmetric opening of cyclic anhydrides and expoxides. Moreover, R-1-phenylethanol can be used in Solvatochromic dye.

Firstly, lipase B-catalyzed transesterification of *R,S*-1-phenylethanol was studied in a batch stirred-tank reactor at atmospheric pressure. The influence of different reaction parameters, such as enzyme concentration and temperature, on reaction performance in ionic liquid 1-butyl-3-methylimidazolium tetrafluoroborate [bmim][BF_4] was optimized. Some potential advantages of biocatalytic reactions in ionic liquids, such as high activity, thermal and operational stability of biocatalysts, and good enantioselectivity of biotransformation in comparison with conventional media have been reported.

Secondly, conversion of acetophenone into *R*-phenylethanol using *Lactobacillus brevis* alcohol dehydrogenase as a catalyst was studied. Reaction was performed in various solvents, such as in water and *n*-heptane in batch stirred-tank reactor at atmospheric pressure, and in propane and water/propane biphasic system in high-pressure batch stirred variable-volume reactor.