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Abstract
Branched chain fatty acids (BCFAs) are fatty acids substituted with alkyl groups. Many of them are chiral and therefore occur in two enantiomeric forms. Chiral BCFAs have been recognized as important flavour components. 2-Methylalkanoic acids and their derivates of high enantiomeric purities have also served as valuable synthetic intermediates.

Lipase-catalyzed enantioselective esterification between (R,S)-2-methylalkanoic acids and n-butanol in organic solvents was developed to produce (S)-butyl 2-methylalkanoate. Partilly purified Carica papaya lipase (pCPL) was uesd to study the effect of organic solvents, reaction temperature, various methods of pretreated enzyme and different alkyl chain length of the chiral center of (R,S)-2-methylalkanoic acids. Isooctane was selected to use for optimally reaction medium. The increase of enantioselectivity of the pCPL was observed with the increase of the straight alkyl chain length of the chiral center of (R,S)-2-methylalkanoic acids from ethyl to pentyl in the esterification reaction. The enantioselectivity for pCPL was exceeded 100 for the kinetic resolution of (R,S)-2-methylheptanoic acid in isooctane, but for the the kinetic resolution of (R,S)-2-methylbutyric acid was only reached about 2 in isooctane. An effect of water activity (aw) on reaction rate and enatioselectivity was observed. The pCPL exhibited an optimal water activity for maximum esterrification rate VS,Q and enantioselectivity E at 0.06 and 0.33, resprctively. Measurements of the temperature dependence of E allows for separation of the enthalpic and entropic components of enantioselectivity. Changes in E with alkyl chain length of the chiral center of (R,S)-2-methylalkanoic acids were mainly caused by changes in the enthalpic component.
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