

## RESEARCH NOTES

### 乳状液膜包酶制备6-APA的研究

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**摘要** Production of 6-aminopenicillanic acid (6-APA) by hydrolysis using penicillin acylase (PA) was studied as a model of an enzymatic emulsion liquid membrane (ELM) process. The loss of PA activity was examined for various membrane compositions (organic solvent, surfactant, carrier). The effects of some experimental variables on the stability of emulsion were investigated. It was found that the choice of organic solvent greatly affected the stability of the emulsion. Increasing the concentration of the carrier in the membrane phase increases the transfer rate of substrate and products but also has a destabilizing effect on the emulsion. The recovery of 6-APA obtained by a di-carrier system (N263-N1923) was much higher than those when either of the di-carriers was used separately. The whole process was controlled both by the enzymatic reaction rate and by the transfer rate of the substrate and the products, however, the ratio of them could be changed by varying the composition of the system. For an optimum condition, it was obtained that the recovery ratio of 6-APA was over 80% and the conversion of benzyl penicillin (PG) was up to 90% in the external phase after 30 minutes. Meanwhile, the breakage percentage of the emulsion was less than 2%.

**关键词** [乳状液膜](#) [反应器](#) [制备](#) [6-APA](#) [生物转化酶](#) [6-氨基青霉烷酸](#) [青霉素](#) [中间产品](#)

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### Preparation of 6-APA by Enzymatic Bioconversion in an Emulsion Liquid Membrane Reactor

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**Abstract** Production of 6-aminopenicillanic acid (6-APA) by hydrolysis using penicillin acylase (PA) was studied as a model of an enzymatic emulsion liquid membrane (ELM) process. The loss of PA activity was examined for various membrane compositions (organic solvent, surfactant, carrier). The effects of some experimental variables on the stability of emulsion were investigated. It was found that the choice of organic solvent greatly affected the stability of the emulsion. Increasing the concentration of the carrier in the membrane phase increases the transfer rate of substrate and products but also has a destabilizing effect on the emulsion. The recovery of 6-APA obtained by a di-carrier system (N263-N1923) was much higher than those when either of the di-carriers was used separately. The whole process was controlled both by the enzymatic reaction rate and by the transfer rate of the substrate and the products, however, the ratio of them could be changed by varying the composition of the system. For an optimum condition, it was obtained that the recovery ratio of 6-APA was over 80% and the conversion of benzyl penicillin (PG) was up to 90% in the external phase after 30 minutes. Meanwhile, the breakage percentage of the emulsion was less than 2%.

**Key words** [6-aminopenicillanic acid](#); [penicillin](#); [enzymatic bioconversion](#); [emulsion liquid membrane](#); [reactor](#)

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