

生物化学工程与技术

磁性聚乙烯醇微球固定化 α -乙酰乳酸脱羧酶

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摘要 采用分散聚合法, 用Fe₃O₄磁流体和PVA分子单体共聚合, 制备表面富含羟基和羧基等官能团, 粒径分布在8~64 μ m的磁性聚乙烯醇微球。以CDI为一种PVA的羧基化剂, 并通过共价结合固定化法, 使ALDC固定到磁性聚乙烯醇微球表面上。结果, 固定化ALDC的总活力、蛋白载量、比活和活性回收率分别为65180U/g、74.72mg/g、872.32U/mg和48.71%。固定化ALDC的最适温度和最适pH值分别为50℃和6.0。ALDC被固定化后其热稳定性、操作稳定性、pH稳定性均比自由酶提高。固定化ALDC在4℃、pH 6.0磷酸缓冲液中保存31d, 其相对活力仍保持95.7%, 这比其自由酶的提高7个百分点。

关键词

[磁性微球](#) [聚乙烯醇](#) [\$\alpha\$ -乙酰乳酸脱羧酶](#) [固定化酶](#)

分类号

α -Acetolactatedecarboxylase immobilized onto magnetic polyvinyl alcohol microspheres

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Abstract

Magnetic polyvinyl alcohol (PVA) microspheres with 8—64 μ m in diameter were prepared from PVA by dispersion and copolymerization with Fe₃O₄ as magnetite. There were more functional groups, such as hydroxyl and carboxyl etc. on the microsphere surface. 1,1'-Carbonyldiimidazole (CDI), a carbonylating agent, was used for the activation of hydroxyl groups of PVA, and α -acetolactatedecarboxylase (ALDC) was immobilized onto the magnetic PVA microspheres by covalent bonding through the amino group. The results showed that total activity, protein binding, specific activity and activity retention of the immobilized enzyme were 63293 U·g⁻¹, 72.67 mg·g⁻¹, 870.96 U·mg⁻¹ and 48.71%, respectively. The optimum temperature of immobilization enzyme was 50°C and the optimum pH was 6.0. Compared with the free enzyme of ALDC, the thermal, operational and pH stability of the immobilized enzyme were improved. After being stored at 4°C, pH 6.0 for 31 days, the immobilized ALDC retained 95.7% of its initial activity which was 8% higher than the free enzyme.

Key words

[magnetic microsphere](#) [polyvinyl alcohol](#) [\$\alpha\$ -acetolactatedecarboxylase](#) [immobilized enzyme](#)

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