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交联海藻酸钙凝胶固定化酵母醇脱氢酶研究

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摘 要: 对用海藻酸钙包埋、戊二醛交联法固定酵母醇脱氢酶催化苯乙酮酸合成(R)-扁桃酸的过程进行研究, 比较游离酶与固定化酶的酶学性质。实验结果表明: 固定化酶的热稳定性显著提高, 游离酶在70 °C时酶蛋白变性失去活力, 而固定化酶在65 °C保温1 h的能保持64%的酶活力, 在70 °C时酶活力仍可保留48.6%; 固定化酶的最适温度由30 °C升至40 °C, 最适反应pH值由6.8下降为5.8; 固定化酶保留了62.72%的游离酶活性, 固定化酶的表现米氏常数和最大反应速率分别为37.33 mmol/L和358.42 nmol/min。该固定化酶具有良好的储存稳定性和操作稳定性。

关键字: 海藻酸钠; 固定化; 酵母醇脱氢酶

Immobilization *saccharomyces cerevisiae* alcohol dehydrogenase on cross-linked calcium alginate beads

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Abstract: The optimum technology of immobilized *Saccharomyces cerevisiae* alcohol dehydrogenase (SCAD) within a calcium alginate matrix which was cross-linked with glutaraldehyde was studied. The SCAD was compared with its immobilized enzyme in some properties. The results show that the free enzyme loss all its activity when heated at 70 °C for 1 h but the immobilized enzyme still keeps 48.6% of the original activity. The maximal activity of the native SCAD appears at 30 °C, but the optimum temperature of the immobilized SCAD is as high as 40 °C. The optimal reaction pH of the immobilized enzyme is 5.8 compared to 6.8 of the free SCAD. For the reduction of phenylglyoxylic acid by immobilized SCAD, the kinetic analysis of data indicates that the immobilized SCAD retains 62.72% activity of its original activity, the maximum specific activity and the Michaelis constants for phenylglyoxylic acid are 358.42 nmol/min and 37.33 mmol/L, respectively. Furthermore, the immobilized SCAD enhances storage stability and good durability in the repeated use.

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