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研究论文

5-氟尿苷 5'-棕榈酸酯的酶法合成

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- 摘要
- 参考文献
- 相关文章

摘要 考察了 10 ml 丙酮-四氢呋喃 (85/15, 体积比) 混合溶剂体系中, 各关键因素对脂肪酶 Lipozyme TL IM 催化 5-氟尿苷 5'-棕榈酸酯合成反应的影响. 结果表明, 添加分子筛能有效除去溶剂中的水分, 从而极大地提高了目标产物收率. 在最优反应条件下, 该体系被成功放大至 200 ml (5-氟尿苷克级用量), 产物收率高达 99%; 同时脂肪酶 Lipozyme TL IM 表现出优异的操作稳定性, 重复使用 10 批次后, 产物收率仍可达 97%. 另外, 填充床反应器的体积生产效率为 22.4 g/(L•h), 远高于批次反应时的 0.5 g/(L•h).

关键词: 5-氟尿苷 5'-棕榈酸酯 固定化脂肪酶 区域选择性 棕榈酰化 填充床反应器

Abstract: In a 10 ml co-solvent system of acetone-THF (85/15, volume ratio), the effects of key parameters on the synthesis of 5'-palmitate of 5-fluorouridine (5-FUR) catalyzed by Lipozyme TL IM were investigated. It was revealed that water in the mixture could be removed efficiently by adding molecular sieves, thus significantly improving the yield of the desirable product. The batch enzymatic reaction was successfully scaled up to 200 ml (1 g 5-FUR scale), furnishing a yield of 99%. Moreover, Lipozyme TL IM displayed excellent operational stability in this reaction system. The yield of 97% was obtained after reuse for 10 cycles. Additionally, the volumetric productivity in a packed bed reactor for the synthesis of 5'-O-palmitoyl-5-FUR was 22.4 g/(L • h), which was much higher than that in the batch reactor (0.5 g/(L • h)).

Keywords: 5-fluorouridine, 5'-palmitate, immobilized lipase, regioselectivity, palmitoylation, packed bed reactor

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