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研究论文

混合溶剂体系中牛肝 β-半乳糖苷酶催化 5-氟-2'-脱氧尿苷区域选择性半乳糖基化反应

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- 参考文献
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摘要 研究了混合溶剂体系中有机溶剂种类和含量对牛肝 β-半乳糖苷酶催化 5-氟-2'-脱氧尿苷区域选择性半乳糖基化反应的影响. 结果表明, 在含 10% (体积分数) 有机溶剂体系中, 该酶稳定性差, 失活严重. 减少有机溶剂含量可显著减轻其对该酶的毒害作用. 然而, 有机溶剂的添加对酶促糖基化反应的区域选择性的影响很小 (均保持在 99% 以上). 牛肝 β-半乳糖苷酶在混合溶剂体系中的催化性能与有机溶剂的介电常数有良好的相关性, 其中在含二甲亚砜 (DMSO) 体系中该酶催化活性最高. 当体系中 DMSO 含量 ≤ 5% 时, 目标产物收率达 71%.

关键词: β-半乳糖苷酶 糖基化反应 区域选择性 5-氟-2'-脱氧尿苷 有机溶剂

Abstract: The influence of organic solvents and their contents on the regioselective galactosylation of floxuridine catalyzed by β-galactosidase from bovine liver was investigated in co-solvent systems. It was revealed that the enzyme was unstable and inactivated substantially in organic solvent (10%, v/v)-containing systems, and the detrimental impacts of organic solvents on the enzyme could be relieved remarkably by decreasing their contents. Nevertheless, the addition of organic solvents exerted no influence on the regioselectivity of the enzymatic glycosylation, which retained >99%. The catalytic performance of *β*-galactosidase from bovine liver correlated well with the dielectric constants of organic solvents in co-solvent systems, among which the enzyme displayed the highest activity in dimethyl sulfoxide (DMSO)-containing system. The yield of desired product reached 71% when the DMSO content was less than 5% (v/v) in the medium.

Keywords: β-galactosidase, glycosylation, regioselectivity, floxuridine, organic solvent

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