

纤维素分解菌产酶性能优化试验 Study on Isolation of Cellulose-decomposing Microorganisms and Its Cellulase-producing Conditions

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摘要: 以甜高粱秸秆为原料, 结合微生物生态学的理论, 从自然环境中分离筛选出具有高酶活力的纤维素分解菌。通过刚果红培养基筛选以及液体培养基的复筛得到一株供试菌株, 选取酶解温度、起始pH值和接种量3因素, 采用五水平正交旋转回归组合试验设计, 进行了产粗酶能力的优化试验。利用SPSS 13.0的回归分析方法以及Matlab 7.0的响应面分析法, 建立并分析了3个因子对还原糖得率影响的数学方程。结果表明, 所得回归方程显著, 拟合情况良好; 3个因子对还原糖得率的影响大小依次为: 酶解温度、起始pH值和接种量; 适宜的酶解条件为: 温度26.64℃, 起始pH值4.96, 接种量5%, 此时还原糖含量达到54.19 mg/g。According to the theory of microbial ecology, with sweet sorghum straw as the raw material, cellulose-decomposing fungi, which had high enzyme activity, were isolated from their natural habitat and screened. Meanwhile, the production conditions of cellulose enzyme were optimized based on the factors of temperature, initial pH value, and inoculation quantity, and the influence of these factors on enzyme activity was discussed. Taking Z15 as a test strain, optimization of production capacity of crude enzyme test was carried out, according to three factors, five-level orthogonal rotational regression test design, to investigate the effects on fermentation temperature, initial pH value and inoculation quantity. The yield of reducing sugar was taken as the indicators, and the impact on the target size about the three factors was analyzed. By calculating the analysis, the following results of the impact on the target was obtained: temperature was the first one, inoculation quantity was the last one and initial pH value was the middle. The optimum conditions for enzymatic hydrolysis were obtained: optimum temperature was 26.64℃, optimum initial pH value was 4.96, and optimum inoculation quantity was 5%, at this time reducing sugar content was 54.19 mg/g.

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