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Web of Science
Page 1 (Records 1 -- 1)

Print

[1]

Record 1 of 1

Title: Decolorization of Crystal Violet by Mono and Mixed Bacterial Culture Techniques Using Optimized Culture Conditions

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Abstract: Acinetobacter baumannii, Corynebacterium sp., Cytophaga columnaris, Escherichia colt, Pseudomonas fluorescens, and P. luteola bacteria isolated from the sewage disposal lake in Jeddah, Saudi Arabia, can decolorize crystal violet (CV). P. fluorescens was the most potent CV decolorizer, and Corynebacterium sp. was also able to perform this function. Five different media were tested to determine which medium formulation favoured CV decolorization by P. fluorescens and Corynebacterium sp. The basal medium favoured the highest decolorization percentage of 50 mu g CV/ml after 72 h of incubation. P. fluorescens was sufficient to decolorize concentrations of CV up to 150 mu g/ml after 92 h of incubation. A mixed bacterial culture of P fluorescens and Corynebacterium sp. more fully decolorized CV than did a single; the decolorization period for the mixed culture was reduced by more than 37% and the decolorization rate (mu g/h) increased by up to 59%. Two-phase multifactorial optimization statistical analysis (Plackett-Burman and Box-Behnken) were carried out to optimize culture conditions in order to increase the ability of a mixed culture to decolorize 150 mu g CV/ml. Under the optimized conditions the decolorization period was reduced by more than 22% and the decolorization rate was increased by more than 48%.
Crystal violet can be efficiently decolorized by P. fluorescens and Corynebacterium sp. The decolorization process is markedly influenced by the composition of the cultivation medium and the concentration of CV. A mixed culture of P. fluorescens and Corynebacterium sp. was much more efficient at decolorizing CV than was a monoculture. The culture conditions were considerably optimized using Plackett-Burman and Box-Behnken statistical experimental designs.

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Web of Science
Page 1 (Records 1 -- 1)

Print

[1]