عنوان مقاله:

Growth evaluation and kinetic investigation of mixed culture as sulfur-oxidizing bacteria in packed bed bioreactor

محل انتشار:

کنفرانس بین المللی یافته های نوین پژوهشی در شیمی و مهندسی شیمی (سال: 1394)

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خلاصه مقاله:

The objective of the work describe here was to identify a potential mixed culture obtained from a hot spring to oxidize sulfur compounds used for the biodesulfurization process in packed bed bioreactor. The mixed culture was grown in the storage tank under aerobic condition. In a batch culture, the growth condition of the media was investigated. The optical cell density was monitored for the evaluation of cell growth. The full cycle of cell growth using sulfur bacterium was completed for duration of 24 hours. The optical density curve indicates that after 4 hours of lag phase, the exponential grow rapidly started and stationary phase was reached at 15 hours. It was observed that in the first 2 days of operation, the value of the cell dry weight was constant at 0.086 g/l. After 22 hours of incubation, stationary growth phase was reached to the maximum value of 2.88 g/l. The experiments were conducted with mixed gas at operating temperature of 25,30,35,40 and 45 °c. Two kinetic models such as; Logistic and Monod models in a batch culture were used to describe the microbial growth and substrate utilization. At low pressure (1atm), the bacterial behavior was substrate related and growth dependent. In operating temperature of 35 °c, maximum cell dry weight of 0.519 was obtained with Logistic model. The obtained regression values for Logistic model were reasonably acceptable for all operating temperature. As the gas temperature was increased to 45 °c, the inhibition coefficient may be dominated in growth kinetic. As the gas temperature increased the inhibition coefficient increased. It was concluded that the isolated mixed culture was able to oxidize and reduce the sulfur compounds as a non-carbon source of energy for the cell growth.

کلمات کلیدی:

sulfur-oxidizing bacteria, mixed culture, cell dry weight, packed bed bioreactor