435e Growth Kinetics of Xanthan Production from Uneconomical Agricultural Products with Xanthomonas Campestris Tistr 1100

Sasithorn Kongruang, Monwadee Thakonthawat, and Roongchawee Promtu

Xanthan gum is an extracellular microbial heteropolysaccharide produced by Xanthomonas spp. The aqueous solution of xanthan gum exhibits a high viscosity colloid; therefore, it has widespread commercial applications as viscosity-enhancing agent, stabilizer and emulsifier. A batch fermentation strategy using Xanthomonas campespestris TISTR 1100 was experimented with the operational conditions at 28 oC, pH 7.0 over the course of 80 hours fermentation time. This research is to study the effect of the shaking speeds at 200, 250 and 300 rpm in 4 culture mediums, including synthetic medium, coconut juice medium, sugar cane medium and combined coconut juice-sugar cane medium. The results indicate that the shaking speed and culture mediums have a significant influence on xanthan production. Growth kinetic parameters of each substrate as specific growth rate, specific rate of xanthan production and specific rate of substrate utilization were summarized. Optimum conditions for xanthan yield were found in a combined coconut-sugar cane medium with the shaking speed at 300 rpm. The comparison analysis of culture mediums revealed that the maximum broth viscosity values were 112, 622, 478 and 914 centipoises in synthetic, coconut juice, sugar cane and combined coconut juice-sugar cane medium, respectively. The growth kinetic parameters showed that the maximum xanthan concentrations of the previous medium were 35.66, 104.90, 64.28 and 117.90 g/L; the maximum biomass concentrations were 1.05, 1.01, 1.06 and 0.96 g/L. Results showed that the increased of the shaking speeds from 20% to 50% were not contributed to a significantly increased in the growth rate in all medium; however, the rates of xanthan production were enhanced. The coconut juice medium appears to be a suitable substrate for xanthan fermentation with the maximum rate of xanthan gum production equal to 1.5 and 2.3 times as increased shaking speeds when compared with that of synthetic, coconut juice, sugar cane and combined coconut juice-sugar cane medium.