

Extractive Fermentation of Ethanol Using Vacuum Fractionation Technique

Authors : Weeraya Samnuknit, Apichat Boontawan

Abstract : A vacuum fractionation technique was introduced to remove ethanol from fermentation broth. The effect of initial glucose and ethanol concentrations were investigated for specific productivity. The inhibitory ethanol concentration was observed at 100 g/L. In order to increase the fermentation performance, the ethanol product was removed as soon as it is produced. The broth was boiled at 35°C by reducing the pressure to 65 mBar. The ethanol/water vapor was fractionated for up to 90 wt% before leaving the column. Ethanol concentration in the broth was kept lower than 25 g/L, thus minimized the product inhibition effect to the yeast cells. For batch extractive fermentation, a high substrate utilization rate was obtained at 26.6 g/L.h and most of glucose was consumed within 21 h. For repeated-batch extractive fermentation, addition of glucose was carried out up to 9 times and ethanol was produced more than 8-fold higher than batch fermentation.

Keywords : ethanol, extractive fermentation, product inhibition, vacuum fractionation

Conference Title : ICCBE 2014 : International Conference on Chemical and Biological Engineering

Conference Location : Singapore, Singapore

Conference Dates : September 11-12, 2014