

Ethanol production from date syrup with flocculent yeast: Optimization study

Abstract

The current study was an attempt to produce ethanol from date syrup by using flocculent yeast, *Saccharomyces uvarum*. Due to its availability and cheap, the date syrup was used as the main carbon source. The central composite design (CCD) was applied to determine the optimum conditions of fermentation parameters in order to achieve high ethanol production. The selected parameters, fermentation temperature, concentration of date syrup sugar, and feed flow rate, were optimized through CCD. The study was conducted in a pilot scale plant tower fermenter. The highest conversion of the sugars was 95.75%, where it was achieved under the following optimum fermentation conditions: 29.06°C, sugar concentration of 55.00 mg/mL, and the feed flow rate of 100 mL/h (dilution rate 0.133 h⁻¹). The flocculent yeast seemed to have a significant impact on the continuous ethanol production process due to its flocculent behavior. The phenomenon seemed to reduce the washout of cells with the product.

Keywords

Central composite design; Continuous fermentation; Date syrup; Ethanol; Flocculent yeast; Recycle tower fermenter