

## Intisari

Fermentasi dengan metode *repeated batch* dapat secara efektif mempersingkat waktu fermentasi untuk mendapatkan konsentrasi etanol yang tinggi. Meskipun demikian, metode fermentasi tersebut memerlukan khamir yang mampu mempertahankan laju fermentasi etanol pada setiap ulangan siklus fermentasi. Penelitian ini bertujuan untuk mengetahui kemampuan *S. cerevisiae* galur SW14 dan S1 dalam fermentasi *repeated batch*. Fermentasi etanol dilakukan dengan teknik *cell-recycle repeated-batch* selama 72 jam menggunakan medium YEPD. Laju evolusi CO<sub>2</sub> spesifik, rasio sel viabel berbanding total sel, dan kadar etanol diuji untuk membandingkan kemampuan khamir dalam fermentasi etanol. Laju evolusi CO<sub>2</sub> spesifik *S. cerevisiae* galur SW14 dan S1 berturut-turut mengalami penurunan dari 0,0361 dan 0,0356 h<sup>-1</sup> di awal siklus fermentasi menjadi hanya 0,0111 dan 0,0158 h<sup>-1</sup> di akhir fermentasi. Rasio sel viabel berbanding total sel di awal setiap siklus fermentasi etanol oleh *S. cerevisiae* galur SW14 dan S1 secara berturut-turut berada di bawah 50% pada siklus ke-6 dan 3. Kadar etanol *S. cerevisiae* galur SW14 dan S1 secara berturut-turut mengalami penurunan sebesar 31,81% dan 24,62% (v/v) setelah 10 siklus fermentasi etanol secara *repeated batch*. *S. cerevisiae* galur SW14 dan S1 secara berturut-turut mampu mempertahankan kemampuan fermentasi etanol secara *repeated batch* hingga siklus ke-7 dan 9.

Kata kunci: fermentasi etanol, *repeated batch*, *S. cerevisiae*

## Abstract

Fermentation with repeated batch method can effectively shorten the fermentation time to obtain a high concentration of ethanol. However, this fermentation method requires yeast that is able to maintain the rate of ethanol fermentation at each repetition of the fermentation cycle. This study aims to determine the ability of *S. cerevisiae* strains SW14 and S1 in repeated batch fermentation. Ethanol fermentation is carried out using a cell-recycle repeated-batch technique for 72 hours using YEPD medium. Specific CO<sub>2</sub> evolution rate, ratio of viable cells to total cells, and ethanol content are tested to compare the ability of yeast to ferment ethanol. The specific CO<sub>2</sub> evolution rate of *S. cerevisiae* strains SW14 and S1 are decreased from 0.0361 and 0.0356 h<sup>-1</sup> at the beginning of the fermentation cycle to only 0.0111 and 0.0158 h<sup>-1</sup> at the end of the fermentation, respectively. The ratio of viable cells to total cells at the beginning of each cycle of ethanol fermentation by *S. cerevisiae* strains SW14 and S1 are below 50% in cycles 6 and 3. Ethanol content of *S. cerevisiae* strains SW14 and S1 respectively is decreased by 31.81% and 24.62% (v/v) after 10 cycles of repeated batch ethanol fermentation. *S. cerevisiae* strains SW14 and S1 are able to maintain the ability of repeated batch ethanol fermentation, respectively, until the 7th and 9th cycles.

Key words: ethanol fermentation, repeated batch, *S. cerevisiae*