# Optimizing and Modeling Specific Growth Rate of Candida tropicalis by Designed Experiment

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**ABSTRACT**

Candida tropicalis can produce several economical productions such as xlylitol, ethanol, α,ω-dicarboxylic acid etc.; and can treat wastewater to decontaminate phenol and m-cresol. In this study, a effective designed experiment was used to find the conditions of the optimal growth of Candida tropicalis in continuous fermentation. The response surface methodology method (RSM), a set of designed experiment including two-level factorial design, path of steepest ascent and central composite design etc., was selected. The physical and chemical factors are changed by reaction time in batch fermentation; hence, the chemostat operation through the continuous fermentation is more adopted in this study. Feedback control must be employed in this examination in order to keep the fermentation conditions in setting values even under the unstable region. The parameters in controllers was tuned by a set of proved tuning method. These controller can change the temperature and sugar concentration to designed values very soon and correct. Base on RSM test, the relation among the specific growth rate (μ), temperature (T) and sugar concentration (S) was formulated as μ = −240.31−8.15S + 15.88T−0.296S2−0.245T2 + 0.317ST. This surface plane predicts that the maximum growth rate is 0.687 h-1 at 5.5 g sugar/L medium and 35.9°C. Base on optimal condition, the real specific growth rate in the continuous fermentation is 0.701 h-1 which very close to the predicted result. Moreover, the yield is 0.27 g biomass/g glucose whish is almost same as in batch fermentation.

Keywords : Candida tropicalis ; two-step fermentation ; continuous fermentation

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