

Optimization of fermentation process for *Nomuraea rileyi*

薛一祥、謝建元

E-mail: 9019815@mail.dyu.edu.tw

ABSTRACT

The purpose of this research was studying the optima production of mycelia and conidia spore of *Nomuraea rileyi* by using the response surface method in submerged cultural fermentation and solid-stat fermentation, respectively. In submerged cultural fermentation, the glucose was found to be the best carbon source for the growth of mycelia among glucose, fructose, sucrose, maltose, and molasses. On the other hand, the corn steep powder was the better nitrogen in the selected testing nitrogen source such as yeast extract, peptone, and corn steep powder. The V8 juice as the additive was found the promoting mycelia growth effect in the media with glucose and corn steep powder. Other physical conditions in the shake flask study, the pH6 as initial growth pH and higher shaker rotation speed were also found favor the mycelia growth. The optima growth compositions from the RSM was 3.2% glucose, 29% V8 juice, and 15% corn steep powder resulted 12.1 g-cell dry weight per liter. This result was applied to scale up in the 5-L fermentor. The higher agitation speed of the fermentor has higher cell production and has lower oxygen contain in the output gas with 1 vvm aeration. However, at higher aeration of 2 vvm the speed of mixing was not affected significant at 250 rpm, 350 rpm, and 450 rpm. Finally, the best cell production was found as high as 16.4 g-cell dry weight per liter. In solid-stat fermentation, the RSM was also applied in the optima spore production. The molasses, corn steep powder, yeast powder, fishmeal, and sorghum were found to be the best medium for the growth and conidia spore production with 4.76×10^9 conidia/g-dry weight. The scale up study of solid-stat fermentation was carrying out from the plate, plastic bag, and all the way to 22-L bioreactor. In 22-L bioreactor the higher spore production 6.8×10^9 conidia/g-dry weight was found at light intensity 2800-Lumens/m² and light period of L/D=12/12. Against 4-th star larva of *Spodoptera exigua* the conidia spore from the bioreactor has $56.05 \pm 5.43\%$ mortality. This result was closes to the conidia spore from the SMAY slant.

Keywords : *Nomuraea rileyi* ; solid-stat fermentation ; submerged cultural fermentation ; conidia ; mycelia

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