

Optimization of single-step pravastatin production by *Penicillium brefeldianum* ESF21P through response surface methodology

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ABSTRACT

The aim of the present study was to optimize the fermentation process for enhanced production of pravastatin by a wild-type *Penicillium brefeldianum* ESF21P strain using statistical approaches. Initial screening of significant variables influencing pravastatin production was carried out using 27-3 fractional factorial design. The seven variables involved in this study were slant age, spore concentration, inoculum volume, fermentation time, temperature, initial pH of the medium and agitation rate. Amongst these, slant age, fermentation time, initial pH of the medium and agitation rate had significant influences on pravastatin accumulation. These four variables were further optimized using the central composite rotatable design of response surface methodology. The analysis revealed that the optimal values of the selected variables were a slant age of 5.95 days, fermentation time of 11.87 days, initial pH of the medium of 6.13 and agitation rate of 211.31 rpm (rounded to 210 rpm). These optimized conditions resulted in a maximum level of pravastatin accumulation (234.36 mg/L), approaching the value predicted by the model of 251.19 mg/L. This study confirmed that statistical approaches can be successfully applied as practical tools in improving single-step production of pravastatin by *Penicillium brefeldianum* ESF21P.

KEYWORDS

Central composite rotatable design; Fractional factorial design; Lipid-lowering agent; Submerged fermentation

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