Optimization of conidial production for Trichoderma virens by bioreactor

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ABSTRACT

As a potential biopesticide Trichoderma virens (Tv-R42) is able to prevent and cure the soil-borne disease, advance the plants growth, and induce the plants productive antibody. The object of this study was using response surface methodology (RSM) to optimize the conidia and chlamydospores production for T. virens in submerged fermentation and solid-stage fermentation respectively. On the other hand, a two-stage fermentation strategy was proposed to reduce the time of solid-state fermentation. The optimal medium of submerged fermentation was included 33.39% thin stillage, 0.91% glucose, 0.73% ammonium sulphate and pH 5.5, and the conidial production was 2.03×107 chlamydospores/mL. Applied the optimal medium in a 2-lilter fermentor, the conidial production was 2.38×107 chlamydospores /mL. The optimal medium of solid-state fermentation was included 1.23% rice bran, 0.23 % soybean powder, 1.04% corn steep powder and 0.52 % bagasse powder, and the conidial production was 2.47×109 conidia/g-substrate dry weight . Applied the optimal medium in a 1-lilter fermentor, the conidial production was 2.96×109 conidia/g-substrate dry weight, and the optimal medium in a 22-lilter fermentor, the conidial production was 1.54×109 conidia/g-substrate dry weight. A two-stage fermentation was coducted 1.91×10-3 % (w/w) of mycelia from 1 days ’ submergered culture to solid substrate. The result of two-stage fermentation was 2.60×109 conidia/g-substrate dry weight.

Keywords : Trichoderma virens, chlamydospore, conidia spore, two-stage fermentation.

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