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OPTIMIZATION OF PRODUCTION CONDITIONS FOR *Trichoderma sp.* P25 AS A BIOCONTROL AGENT BY USING SOLID STATE FERMENTATION

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Abstract

Biological control is an environment friendly approach which promotes the use of specific microorganisms to protect plants against plant pathogens and pests instead of chemical treatments. The biocontrol agent (BCAs) market has been growing continuously over the last few decades due to the adverse environmental impacts of chemical pesticides. *Trichoderma* type fungi, can be used to control a wide spectrum of soil-borne plant pathogens. Therefore, *Trichoderma* based BCAs are in common use since they have both plant growth stimulation characteristics and high activity on soil bioremediation. For the production of BCAs conidial mass of *Trichoderma* is the most proficient propagule since they withstand downstream processing especially in the drying stage. Although, there is also abundant literature on the use of conventional synthetic media like glucose, cellulose, soluble starch, and molasses to produce *Trichoderma* spp. it is difficult to produce conidia in submerged culture. Moreover, the cost and availability of raw materials are quite important considerations for the commercial productions of BCAs. Therefore solid state fermentation is an attractive alternative since it offers many advantages through the efficient use of agro industrial wastes. Conidia are produced more abundantly than chlamydospores in SSF.

In this study *Trichoderma sp.* P25, which was formerly evaluated with respect of its mycoparazitic activity, lytic enzyme activities, sporulation rate and was demonstrated to have a potential as a biocontrol agent properties, was used for the production of micropropagules in SSF. The effects of various organic nitrogen sources, initial pH were investigated in wheat bran based medium. The effect of incubation temperature, initial moisture content and cultivation time on micropropagule production was further optimized by Response Surface Methodology.

The results indicate that SSF is a feasible alternative production method for the production of BCAs.