Evaluating solid-state fermentation for cellulases production using *Trichoderma harzianum*

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Trichoderma harzianum was cultivated using different sets of conditions for solid-state fermentation.. These experiments were carried out to understand the behavior of *Trichoderma harzianum*for cellulases production. (FPase, Xylanase, endoglucanase (CMCase), β-glucosidade, and protein). Solid-state fermentations are known to produce more active cellulases at a cheaper cost compared to submerged fermentations. Preliminary kinetic experiments were carried out in flask cultures using 5 gram of wheat bran, Mandel nutrient medium at a humidity of 66%, and inoculated with 10^7 spores to be grown at 29°C. Afterward two further kinetic studies were carried out using flask cultures, which were washed wheat bran and different humidities (30%, 40%, 50%, and 60%). An initial data analysis resulted in a 2 fold increase from preliminary data. These results are competitive to benchmark values compared with submerged fermentations. More experiments needs to be carried out using different solid medium, temperature, and liquid medium to truly obtain the optimal conditions for *Trichoderma harzianum*. Solid-state fermentations hold an enormous potential to decrease the cost of cellulases production, thus allowing further development of second-generation biofuel. Currently, bioreactors are being developed for solid-state fermentation for large scale production. Combining genetically engineered *Trichoderma harzianum*, optimal growth conditions, and large scale production will have an advantage role in cellulose biofuel.

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