Comparative production of celluloses by mutants of *Trichoderma parceramosume* PTCC5140

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Abstract

Introduction: Cellulose is the most abundant biopolymer in the world. Celluloses, consisting of endoglucanases, cellobiohydrolases and beta-glucosidases, catalyze the hydrolysis of cellulose. Released glucose from enzymatic hydrolysis of cellulosic biomass is used in different biotechnology fields.

Materials and methods: In this study, seven different *Trichoderma* species were obtained from Persian Type Culture Collection (PTCC) and in order to select the best ones, cellulose activity of native strains was determined. Sodium salt of carboxymethyl cellulose (CMC-Na), avicel and cellobiose were used for endoglucanase, cellobiohydrolase (exoglucanase) and cellobiase (beta-glucosidase) assays, respectively. Kinetic of cellulose production was evaluated for the selected strain. Finally, random mutation with 0.2 M sodium nitrate was done.

Results: Among 7 different fungal species**,** *Trichoderma parceramosum* PTCC 5140 was selected as the best strain with the highest cellulose activity. This strain by production of 0.182 U/ml of endoglucanase, 0.538 U/ml of exoglucanase and 0.109 U/ml of cellubiase showed the highest amount of all three constituents of cellulolytic complex. Random mutation and mutant selection of this strain caused to isolate 4 stable mutants that were able to produce 2 to 11 fold more enzymes compared with the parent strain.

Discussion and conclusion: Evaluation of cellulose production in mutant strains of *Trichoderma parceramosume* PTCC 5140 showed that usage of chemical mutation with 2 to 11 fold increasing in enzyme activity could be a suitable method to improve cellulose complex activity. In the current study, obtained mutant strains could be introduced as a potent cellulose producer for further studies in bioconversion processes.

Key words: *Trichoderma parceramosume* PTCC 5140, Random mutation, Acid nitro, Cellulose

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