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Comparative study for production and characterization of cellulase produced by *Trichoderma reesei* RCMB 017006 and *Trichoderma viride* RCMB 017002 under solid state fermentation

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Lignocellulose includes in excess of 60% of plant biomass created on earth, which for the most part comprises of three segments: Cellulose, hemicellulose and lignin. On overall premise, arrive plants create around 25 tons of cellulose for every individual every year. Lignocellulose constitutes a large proportion of agricultural, industrial, municipal and forest wastes, the disposal of which is a growing problem. Fungi are known to produce enzyme systems for efficient biodegradation of cellulose and will ultimately providing means to a greener technology. The present study examines the possibility of enhancement of the *T. reesei* and *T. viride* growth and enzyme productivity by modifying the composition of the culture medium. The effect of different carbon sources, different nitrogen sources, inoculum size, different incubation periods, different pH values, different incubation temperatures, some surfactants and effect of gamma irradiation doses were studied. The obtained results show that; the *T. reesei* and *T. viride* have cellulitic dissolver ability. The maximum enzyme production was achieved when the medium was supplemented with sugar beet pulp as carbon source which the activity was (65.5 U/gds) using *T. viride*, while *T. reesei* showed enzyme activity of (56.4 U/gds). The addition of other carbon sources gave lower enzyme production except for sugar beet pulp+wheat bran, *T. reesei* showed enzyme activity of 69.9 U/gds higher than *T. viride* which gave enzyme activity of 65.9 U/gds. Yeast extract is the most potent nitrogen source used to give the highest cellulase activity produced by *T. viride* which determined by about 65.5U/gds, while, $(NH_4)2SO_4$ is an inorganic nitrogen source that affected in the induction of cellulase production in comparison to the yeast extract as organic nitrogen source as the activity was 60.5 U/gds. The maximum cellulase production took place at the inoculum size of 1.8×10^5 for solid state fermentation using *T. viride* which determined by about 65.5 U/gds, over than *T. reesei* which gave cellulase production by about 56.4U/gds. *T. reesei* showed its maximum activity ob the sixth day of the incubation (68.7U/gds) while, *T. viride* showed its maximum activity in the eighth day of the incubation (68.3 U/gds) then, began to decrease significantly with the increase of the incubation period. The maximum enzyme activity was observed at pH 5.5, 65.5 U/gds for *T. viride* and 56.4 U/gds for *T. reesei*. The enzyme activity increased gradually by the rise in incubation temperature to 30 oC, the maximum activities were (70.5 U/gds) and (72.4 U/gds) for *T. viride* and *T. reesei* respectively. Highest level of cellulase production was obtained upon addition of Tween 40 (0.1%) to the culture medium contained *T. reesei*, which the activity was 109.8 U/gds, higher than culture medium contained *T. viride*, the activity was 102.6 U/gds. *T. viride* and *T. reesei* exhibited the maximum cellulase production upon using 0.7 kGy of gamma irradiation, the activities were 127.5 and 132.5 U/gds, respectively as compared to the parent strain. Also, *T. reesei* and. *T. viride* mixed culture used for cellulase production and increase the cellulase degrading capability by about 11% higher than *T. viride* only and 12.8% higher than *T. reesei* only.

Biography

Ahmad Abd El-Kader has experiences in microbiology and chemistry fields. He holds a Bachelor of Science in Microbiology and Chemistry, Master of Science in Applied Microbiology as well as Diploma in Analytical Biochemistry and has worked as a Chemist in the Research and Development Department in the field of Organic Polymers and has extensive experience in this approach. He currently works as a Scientific Assistant at Al Azhar University, Cairo, Egypt. He is studying for a PhD in Microbiology, also likes scientific research and development.

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