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EFFECT OF CULTURE MEDIA AND FERMENTATION PARAMETERS ON PHYTASE PRODUCTION BY THE THERMOPHILIC FUNGUS *MYCELIOPHTHORA THERMOPHILA* IN SOLID STATE FERMENTATION

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ABSTRACT

Phytase production by thermophilic filamentous fungi was evaluated in solid state fermentation. A total of twenty strains belonging to *Rhizomucor* spp. (9), *Myceliophthora thermophila* (6), *Thermoascus aurantiacus* (4), and *Paecilomyces variotii* (1) were screened. Sugar cane bagasse was used as support for assessing the effect of different carbon and nitrogen sources, as well as mineral salts. Solid state fermentation parameters (initial moisture, initial pH, aeration rate) were also studied. *Myceliophthora thermophila* showed higher phytase activity and was selected for further studies. Synthetic culture media containing different carbon and nitrogen sources were tested for phytase production by this species in solid state fermentation. *M. thermophila* showed the highest phytase activity after 36 h of fermentation, when grown on a synthetic culture medium (glucose 10 g/L; phytic acid 2 g/L). $(NH_4)_2HPO_4$, $CaCl_2$, and $MgSO_4$ favored high phytase activity in *M. thermophila*. Optimal initial culture conditions for phytase production were determined (pH, 6.0; moisture, 75%; aeration rate, 25 ml/min/column). In comparison with *Aspergillus ficuum*, the phytase activity of *M. thermophila* was 2.5 times higher. Phytase was most active at pH 5.5 and 45-50 C, but it was also active at 70 C. Optimization studies resulted in a 4-fold increase of phytase activity.

Key words: Phytase, thermophilic fungi, solid state fermentation, *Myceliophthora thermophila*, carbon source, nitrogen source, $CaCl_2$, $MgSO_4$.