



PHYSIOLOGICAL ADVANTAGES OF A THERMOTOLERANT WHITE-ROT FUNGUS IN SOLID STATE FERMENTATION

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Introduction. In Solid State Fermentation (SSF), growth of filamentous fungi and enzyme production is affected by limited heat transfer. Thermotolerant fungi might be an alternative when heat overcomes the optimal growth temperature of the microorganisms (1).

The present work describes the advantages in SSF of a thermotolerant white-rot fungus identified as *Fomes* sp. EUM1 for the production of cellulases, xylanases and laccases.

Methods. The morphometric changes of the hyphae were measured at different temperatures over superficial cultures by using an image analyzer (Imagen 2000 software). The specific growth rate, production, productivity and isoenzymes patterns of cellulases, xylanases and laccases were analyzed during growth of *Fomes* sp. EUM1 fungus in SSF over corn stover (2).

Results. The thermotolerant fungus *Fomes* sp. EUM1 adapted its hyphal morphology when grew at above the optimum growth temperature (30°C). The specific growth rate was decreased (30%) while both surface growth rate and specific growth rate increased 193% and 32%, respectively (Table 1). The enzyme production (cellulases, xylanases and laccase) not decreased when temperature was elevated at above the optimal growth, as is usually described in SSF for microbial growth (Fig. 1). The enzyme production rate also was enhanced over two-fold at above the optimum growth temperature (data not shown).

Table 1. Growth and hyphal morphology of *Fomes* sp. EUM1 at above the optimum growth temperature.

T(°C)	Ur (µm h ⁻¹)	Lav (µm)	µx10 ⁻³ (h ⁻¹)
30	285±1.1 ^c	385±28 ^c	30.5±2.4 ^a
35	326±0.4 ^a	462±25 ^b	26.2±0.2 ^b
40	322±0.2 ^b	5.09±30 ^a	21.3±0.9 ^c

Ur, surface growth rate; Lav, length of the distal hyphae; µ, specific growth rate.

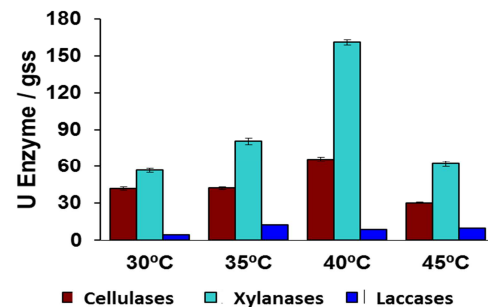


Fig.1 Enzyme production by *Fomes* sp. EUM1 at above optimum growth temperature.

An outstanding fact was the modification of enzymes secretion pattern by *Fomes* as adaptive response for its growth at elevated temperatures. Three new cellulases were synthesised at elevated temperatures as 40 °C (Fig. 2). Only one new xylanases was detected at 45 °C (data not shown) while laccases isoenzymes not were detected

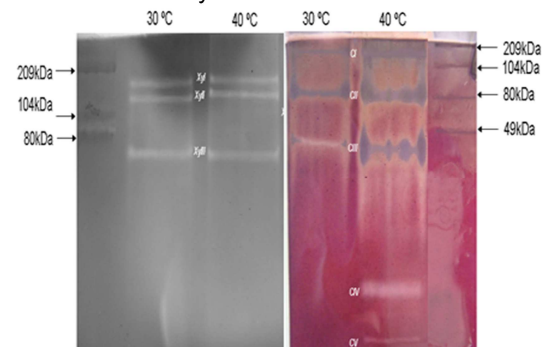


Fig.2 Enzyme production by *Fomes* sp. EUM1 at above optimum growth temperature.

Conclusions. The advantages have not been described to date using a thermotolerant fungus in SSF were, adjust the microscopic growth and adaptation in the pattern of production of enzymes.

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