

## The Composition and Porosity of Lignocellulosic Substrates Influence Mycelium Growth and Respiration Rates of *Lentinus edodes* (Berk.) Sing.

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The prospects of bioconverting lignocellulosic agro-industrial residues into value-added products led to the evaluation of six commercial and wild strains of *Lentinus edodes* (Berk.) Sing. (S4080, L4100, IK12, SD1198, SIEF0231, SIEF0232) as regards their efficacy of mycelium growth on wheat straw, cotton wastes, oak wood sawdust, and corn cobs. The extension rates were initially examined by the use of the "race tube" technique; oak wood sawdust and wheat straw supported faster growth than corn cobs and cotton wastes. In addition, a strain-dependent behavior was detected, as S4080, SIEF0231, and SD1198 performed much better on oak wood, sawdust, and wheat straw, while L4100 performed satisfactorily on the other two substrates. In general, significantly lower linear growth rates were recorded for corn cobs and cotton wastes.

The influence of substrate porosity (i.e., different air-porous spaces adjusted from 30% to 42% by wheat straw supplementation) on the growth efficacy of strains S4080 and SIEF0231 was investigated on oak wood sawdust, cotton wastes, and corn cobs. Both strains presented faster growth on oak wood sawdust formulated with an increased air porous space (33%), while

corn cobs and cotton wastes presented the best growth at porosity levels of 35% and 38% respectively. For the latter two media, a further increase of the air porous spaces ( $\geq 40\%$ ) resulted in remarkable reductions of the colonization rates. Substrates were analyzed during the entire length of the incubation phase as regards dry matter content, pH, and electric conductivity. The effect of the type of substrate during mycelium colonization on the observed decrease of pH and electric conductivity values is discussed.

Finally, 2 kg of substrate blocks from all four lignocellulosic wastes were spawned with strains S4080 and SIEF0231, and the influence of individual substrates on the mycelium respiration during the incubation phase was investigated. Gas chromatography measurements ( $\text{CO}_2$  and  $\text{O}_2$  concentrations) were performed at 3–4 day intervals, during a 7-week incubation period. Results indicated higher respiration rates on corn cobs, followed by oak wood, sawdust, and wheat straw, whereas the lowest values were recorded on cotton wastes, irrespective of the strain used. The results are evaluated in view of their possible effect on earlier fruiting and increased biomass production.