

TITLE: FUNGAL AGARICOMYCETES GROWTH TIME INFLUENCE IN THE CARMINE INDIGO AND TEXTIL EFFLUENT DECOLORATION.

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ABSTRACT

Fungal bioremediation through enzymes is an efficient treatment of textile effluents that contain xenobiotics. Those fungi synthesize enzymes throughout their life in different proportions. It depends on the nutritional stress (NS) that the fungus is subjected to. The aim of this study is to evaluate the influence of this NS, when induced during the initial growth stage, on the discoloring of a textile effluent (TE) and carmine indigo dye (CI), by using 4 Agaricomycetes species coming from the Caatinga (PE-Brazil). The species *Hjortstamia crassa* F1, *Loweporus tephroporus* F2, *Schizophyllum commune* F3 and *Lentinus besteroi* F4, were placed to grow in two different initial growth time conditions: C_i1 and C_i2, corresponding to 20 and 45 days in agar Sabouraud at 30°C and with no further addition of nutrients. Then, they were subjected to nitrogen restriction in Kirk medium throughout one day to stimulate the ligninolytic enzymatic production at 30°C, in light absence and with a 150rpm agitation rate. Next, they were vacuum filtrated and put in contact with CI-50ppm and with the original laundry TE during 10 days, maintaining same experimental conditions. Spectrophotometric measurements (665nm) were made every 3 days within this period of time. During C_i1, the TE discoloration percentages (%_{DEC}) were found to be 68.07 for F3, 64.92 for F2, 58.25 for F1 and 47.02 for F4. For the CI the values were 44.33, 51.93, 63.58 and 45.16, respectively. In C_i2, %_{DEC} resulted in 38.60, 41.75, 42.11 and 42.72 for TE, and for the CI dye yielded 91.76, 56.70, 71.08 and 61.23, respectively. The lowest NS in C_i1 increased the activity in the TE due to a greater intermediate enzymes production which, in turn, made it easier to transform other xenobiotics. This, however, caused to lower the synthesis of ligninolytic enzymes and then, the reduction of dye. This was evident during the discoloration of the CI. The F1 fungus species was, nonetheless, an exception, surpassing the corresponding %_{DEC} value in 5.33. On the contrary, C_i2 showed higher NS because of the longer growth time in the initial stage with no new nutrient additions. The later yielded higher %_{DEC} values in the CI test. This result contrasts with the ones obtained from the TE were produced enzymes transformed the dyes along with a few xenobiotic recalcitrant compounds that were present. In conclusion, the generated NS during the initial growth time has an influence on the TE and CI discoloration.

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Keywords: water, xenobiotic transformation, ligninolytic enzymes, efficiency.

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