DECOLORIZATION OF BLUE DYE BY STRAINS ISOLATED FROM A ACIDOGENIC BIOREACTOR

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Introduction. In the State of Guanajuato, there are several number of textile industries, it is calculated that already 76 million m^3/year of fresh water are used for this industry. The generated wastewater had high concentrations of synthetic dyes which generally are resistant to biological attack. Under the new tendencies, this wastewater could be revalorized and used for obtaining value products and at the same time treated. In a previous work, textile effluents were enriched with an external carbon source and used for hydrogen production using acidogenic fermentation (1). The textile effluents were successful decolorized, and hydrogen and volatile acids were accumulated.

In this way, the objective of this work was to study the potential of decolorization of strain isolated from acidogenic reactors fed with textile effluents.

Methods. Previously, 35 strains were isolated from acidogenic reactors fed with textile effluents (2,260 mg COD/L and pH 8.7). The strains routinely maintained on agar with blue dye as the only carbon source. These strains were subjected to a decolorization assay in 10 mL tubes with mineral medium containing per liter: with glucose (g+) 50mg of blue dye, 2.5g of glucose and 5g peptone; without glucose (g-) 50mg of blue dye and 5g peptone. The strains were incubated at 37°C during 15 days under static conditions. At the end of the incubation,it was determined cell growth by Bradford method (2), final pH and glucose consumption by reducing sugars (3).

Results. Figure 1 shows the cell growth on medium with (g+) and without glucose (g-). The left panel shows the stains with growth (expressed as protein) between 5 to 75 µg protein/ml. From these, strains BT15A, BT26, BT27 and BT28 had the highest cell growth on the medium with blue dye as only carbon source (g-). Strains BT21, BT5, BT16 and BT28 had the highest cell growth on the medium with blue dye and glucose as carbon source (g+). The right panel shows the cell growth of BT31, BT33 and BT34 strains, these ones had very high cell growth on medium g+, while BT31 had similar growth with or without glucose. The initial pH of the cultures was 6.9, at the end of the incubation was observed a general tendency, lower values were registered in cultures g+ (4.2 – 6.9), while the cultures without glucose (g-) the final pH was higher than the control (6.9 – 7.85). The results of reducing sugars showed that the glucose consumption was related with the cell growth as was expected.

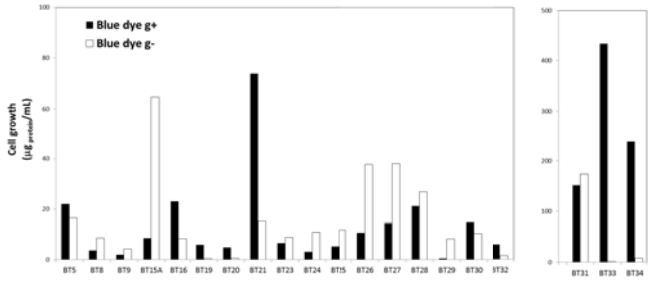

Fig.1 Cell growth of strains on medium with blue dye and glucose (g+) and blue dye without glucose (g-)

Figure 2 shows representative cultures with decolorization: a) control with blue dye; b) BT34 strain and c) BT27 strain forming cell aggregates in aerosol particles; and BT20 strain forming cell aggregates in pellet form.

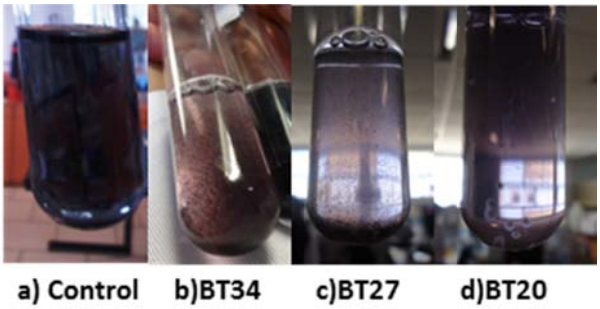

Fig.2 Decolorization in cultures with blue dye and glucose (g+).

Conclusions. The strains with higher potential of decolorization were: BT31, BT15A, BT26, BT27, BT33 and BT34. Some of these strains do not need an external carbon source to growth, biodegradation of synthetic dye had to be verified optimizing the conditions. These strains are of great interest since there are involved in a microbial consortium decolorizing textile effluents and producing biofuels (hydrogen) at the same time.

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