DETERMINATION OF THE KINETIC PARAMETERS OF A MIXED CULTURE OBTAINED FROM GREEN COFFEE BEANS FOR WASTEWATER TREATMENT.

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Introduction. Green coffee beans have been used as substrate for microbial growth of communities capable of the degradation of many kinds of pollutants, on contaminated soil or water. It has been found that some genera of fungi and bacteria like *Aspergillus sp.*, *Penicillium sp.,* or *Pseudomonas sp.* (1), can grow on the beans and degrade pollutants from the wastewater.
The objective of this work is to determine the kinetic parameters, essential for the design of biological wastewater treatment, of the mixed culture acquired from the green coffee beans.

Methods. To obtain the mixed microbial culture, the green coffee bean was wetted and incubated at 28°C. After a week, different spores were observed and a solution of 5 $X10^6$ spores/ml was prepared. Six concentrations of synthetic wastewater were used for microbial cultures of 90 hours. Each sample was employed to determine biomass concentration as g dry weight/L (2) and COD (Chemical Oxygen Demand) by the method 5220 (3).

Results. For each COD concentration, the experimental biomass concentration obtained, was fitted to the Monod model through the Euler method, in order to get the corresponding value of μ (specific growth rate), used to build figure 1.

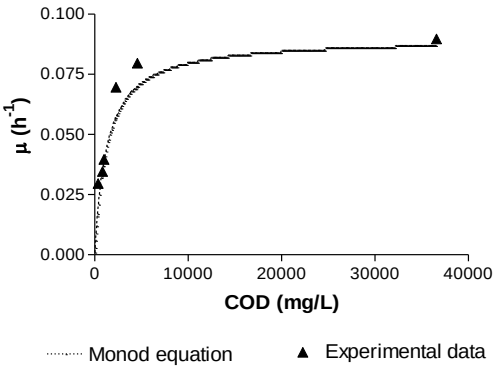

Fig.1 Experimental specific growth rate fitted to the Monod equation.

As shown in figure 2, the model has a determination coefficient (R^2) with the experimental data of 0.9541. This represents an appropriate fit to the experimental values.

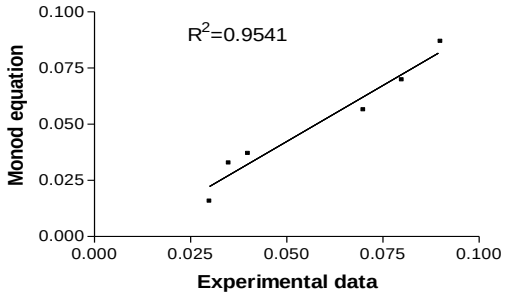

Fig. 2 Linear regression of the experimental data and the predicted values (μ).

Since the incubation conditions were determined in order to promote fungal growth over bacteria, we can compare these kinetic parameters ($\mu_{máx}$ = 0.09 h^{-1}; $Y_{x/s}$=0.23) with those reported in literature for different fungal species. For example, *Aspergillus awamori* ($\mu_{máx}$ = 0.28 h^{-1}; $Y_{x/s}$=0.31) (4) or *Penicillium chrysogenum* ($\mu_{máx}$ = 0.103 h^{-1}; $Y_{x/s}$=0.445) (5).

Conclusions. The model applied to the mixed culture is appropriate according to the value of R^2 (0.9541), and the coherence of the kinetic parameters with those reported in literature.

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