TITLE: BIOSORPTION OF THE REACTIVE DYE BLUE HEGN 135% USING WASTE BEER YEAST

AUTHORS: FREITAS, M. P. A.; RAMPAZZO, V.; STAFUSSA, A. P.; MACIEL, G. M.

INSTITUTION: FEDERAL TECHNOLOGICAL UNIVERSITY OF PARANÁ, CURITIBA, PR (HEITOR ALENCAR FURTADO ST, 5000, CEP 81280-340, CURITIBA - PR, BRAZIL)

ABSTRACT:

Textile dyes can be toxic to various organisms. Therefore the removal of dyes from wastewater is a major challenge. Thus, several techniques have been studied to solve this problem. The aim of this study was to evaluate the potential of *Saccharomyces cerevisiae*, exhausted from the fermentation process of beer production, as a biosorbent of the reactive dye blue HEGN 135% in aqueous solutions. The effect of chemically modifying the yeast biomass for biosorption was studied by acid and alkaline pre-treatments. Zinc sulfate was added to the dye solution in order to investigate the interaction between the dye and inorganic ions and evaluate the efficiency of dye removal by the biosorbent in the presence of a common salt present in textile wastewaters. Other process parameters such as pH and dye concentration in solution were also studied. In Erlenmeyer flasks, an amount of 0.25 g of yeast biomass was added to 25 mL of dye solution. The flasks were agitated at 130 rpm, 25 ^{o}C, and samples were removed in specific time intervals until 240 min of contact time. Separation of biomass from solution was carried out by centrifugation at 6000 rpm for 10 minutes. Best removal of the dye was achieved with yeast biomass pre-treated with HCl, in a dye solution of pH 3,0. According to the contact time, the equilibrium was reached at 60 minutes. The kinetic model that best represented the data was the pseudo-second order, with R^2 of 0.999 and close values of q_t 4,83 and q_e 5,12. Freundlich isotherm model described well the data, with R^2 of 0.947, and the value calculated for 1/n was 0.569, which demonstrated the heterogeneity of the biomass surface. In the presence of $ZnSO_4$ the removal rate was only 3% lower than the treatment without the presence of the salt. Therefore, the waste biomass of *S. cerevisiae* showed to be an efficient and potential alternative for the removal of a reactive blue dye from aqueous solutions.

Keywords: *Saccharomyces cerevisiae*, biosorption, textile wastewater.