The Optimization of Degradation of Azo Dyes via Saccharomyces cerevisiae

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Azo dyes are commonly used in the textile industry, and are a major constituent of textile factory waste. However, azo-linkages remain non biodegradable, and are highly toxic, linked the neurosensory damage in aquatic biota and cancer. While previous studies show various yeasts and bacteria are able to cleave azo-dye linkages, several have been found to have negative effects on wildlife, and are difficult or costly to culture. Saccharomyces cerevisiae, is a possible biosorbent of dyes, and has potential to degrade azo dyes. This study contains three purposes: 1) confirm Saccharomyces Cerevisiae as a possible decolorizing agent of azo dyes 2) experiment with the Active Dry Yeast form of S. Cerevisiae as a degrading agent, in comparison to the wild strain, and 3) observe the mechanisms underlying degradation via S. Cerevisiae. Experimentation confirmed S. Cerevisiae as a possible degrading agent of azo dyes, decolorizing the dyes on average >70%(analyzed using spectrophotometry). Furthermore Active Dry Yeast was proven a more efficient degrading agent than the S. Cerevisiae wild strain, able to decolorize Reactive Red 2 by >65 % within 4 minutes. Finally, the suspected mechanism S. Cerevisiae used to degrade Reactive Red 2 was observed to be both bioaccumulation and biosorption due to the characteristics analyzed during experimentation; however, further studies delving into the cellular enzymatic activity is recommended to confirm that both bioaccumulation and biosorption are present.

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