Evaluation of a Fungal Strain On a Microbial Fuel Cell for Wastewater Treatment with the Presence of Azo-Dye Colorants

J.E Velez[a], C.I Sanchez[b], P.E. Zapata[c], M.C. Avendano[d], J. Soler[e], M. Yepes[f], E.Arias[g], C. Correa [h], S. Gonzalez [i].

Universidad Nacional de Colombia, Sede Medellin.

Medellin, Colombia

Water pollution and industrial growth are an unavoidable relationship until now, even the every more stronger legislation has not been enough to diminish the problem, the norm evasion and the increase of human population has been in part responsible of that fail. Another problem is the high cost of decontaminate, sometimes this causes a norm evasion or a financial penalty to a company, in this sense, one of the biggest and expensive problems of wastewater treatment, is the remotion of highly toxic and recalcitrant compounds for example the Azo-Dye colorants type (Fig. 1). (1)

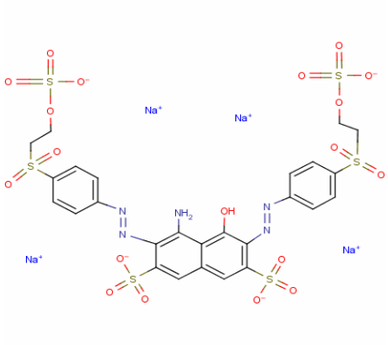

Figure 1. Remazol Black B (Taken from: http://www.guidechem.com/products/17095-24-8.html) (5).

The presence of phenolic structures, and the sulphonic acid groups makes this molecule highly resistant to natural degradation and very soluble (2) which for textile industry is a major problem since the most of ambiental regulations around the world punishes water coloration.
A treatment for this problem is not only expensive but difficult, one of the traditional strategies consist in the biological degradation with fungi or bacteria the latter has problems with the production of toxic or mutagenic compounds (3), for that reason the main purpose of this work is to evaluate the power generation of native fungal strains of Medellin, Colombia in order to treat the colorant contamination of wastewater using a single chamber microbial fuel cell (MFC). The energy production of this devices could reduce the costs of water treatment processes and improve the energy efficiency of an industry with the additional benefit of pollutants remotion (i.e. COD remotion)(4).

Keywords— Microbial Fuel Cells (MFC), wastewater, , treatment, Azo-Dye, native fungal strains.

References

(1) V.K. Gupta. *Journal of Environmental Management*, **90(**8): 2313-2342. (2009).

(2) C.I. Pearce, J.R. Lloyd, J.T. Guthrie. *Dyes and Pigments.* **58**(3):179-196. (2003)

(3) A. Zille. *Lacase reactions for textile applications.* PhD Thesis. Universidade do Minho. (2005)

(4) B. Logan, *Microbial Fuel Cells,* p. 7, Wiley, Hoboken, New Jersey (2008)

(5) *Suppliers Manufactures*. N.p., n.d. Web. 16 Nov. 2012. <http://www.guidechem.com/products/17095-24-8.html>.