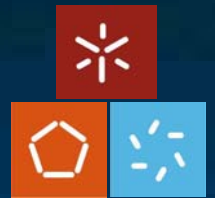


Reductive biological treatment of textile effluents

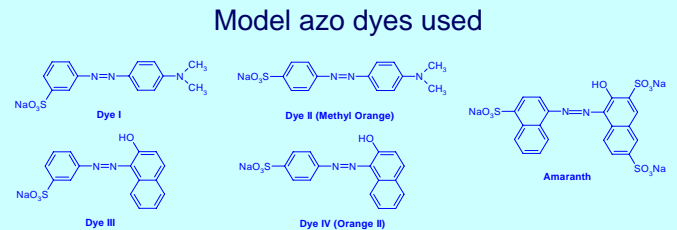


Patrícia A. Ramalho¹, Sandra Paiva¹, Artur Cavaco-Paulo², Margarida Casal¹, M. Helena Cardoso¹, M. Teresa Ramalho³

¹ Biology Department, ² Textile Engineering Department, ³ Chemistry Department, University of Minho, Braga, PORTUGAL
patramalho@bio.uminho.pt

THE BEGINNING

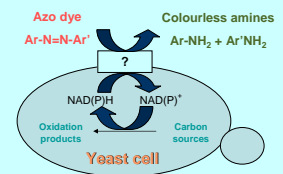
- Collection of soil contaminated with dyes
- Growth in rich medium to select microorganisms
- Isolation of yeasts in selective medium
- Growth of yeasts in YEPD-agar medium with model azo dye
- Identification of yeasts with better decolourising activity



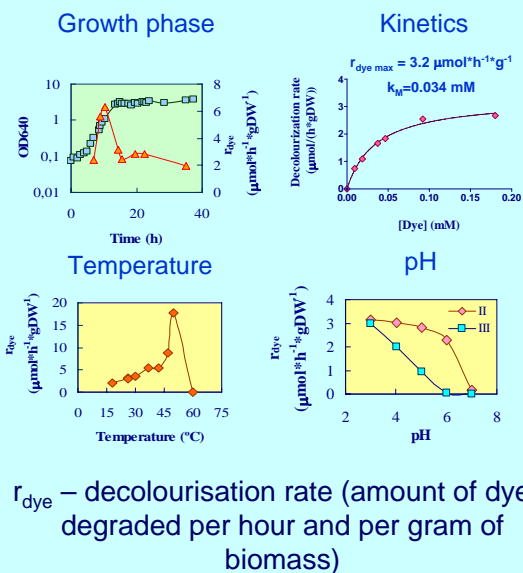
FACTS ABOUT AZO DYE DECOLOURISATION BY INTACT YEAST CELLS



- Reduction of the azo dye to colourless amines
- Unspecific and non-inducible activity
- Impermeant substrates
- Extracellular reduction

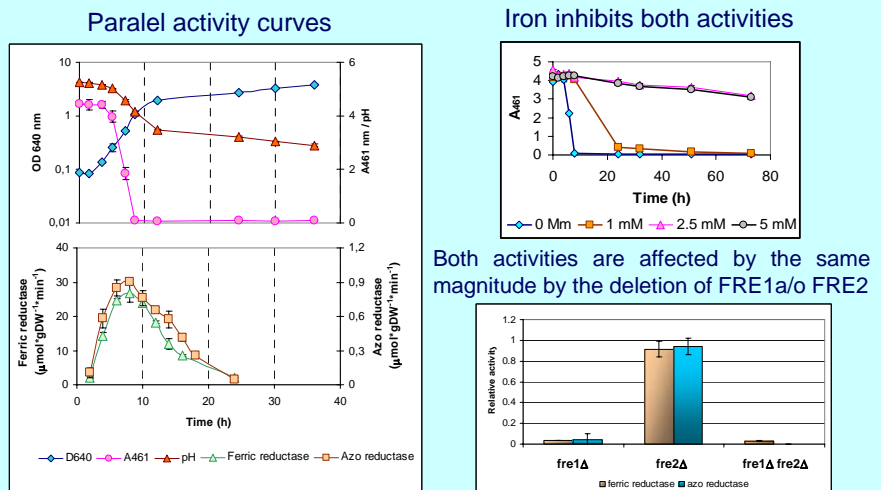


THE DECOLOURISATION PROCESS BY INTACT YEAST CELLS



THE ENZYME SYSTEM

Since dye does not enter the cell we decided to look in the plasma membrane for redox systems. In yeast the **ferric reductase system** is well characterized and reduces iron to enter the cell. Could this system be responsible for the azo reductase activity?



CONCLUSIONS

- Yeasts are able to reductively decolourize azo dyes in acid effluents
- It is needed an external carbon source, that can be ethanol or glucose
- Oxygen is needed in limited conditions; under anoxic or forced aeration there is no decolourisation
- The amines produced are used as carbon and nitrogen sources – the complete mineralization can be achieved
- The enzyme system responsible for the major part of this activity is the plasma membrane ferric reductase
- Dye is not toxic nor affects growth and its structure affects decolourisation
- Degradation connected to growth
- Activity detected only in intact cells