

# Innovative approach for decolorizing textile effluents using Yeast-Alginate Capsules



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PORTO

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## Abstract

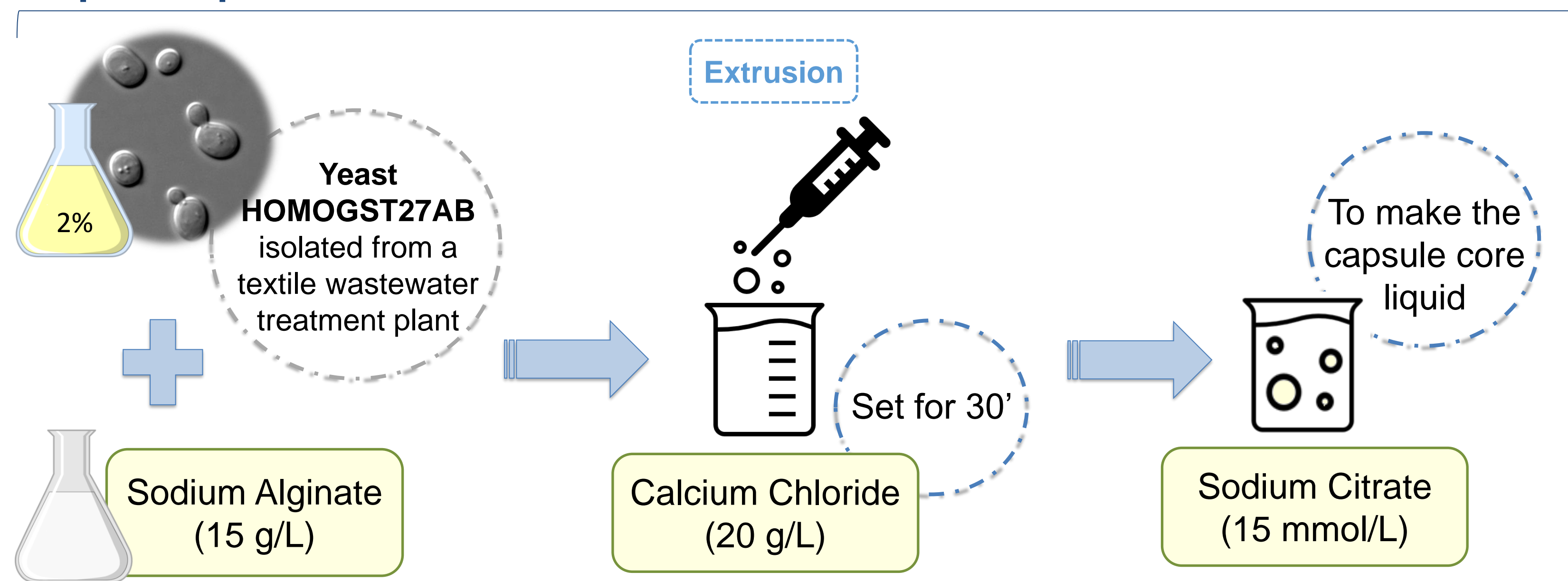
Textile industry is an economic activity that produces high volumes of effluents used in fabric processing that are discharged in the environment [1]. These discharged effluents loaded with synthetic dyes and other chemicals, are resistant to biodegradation and persistent in water, and are responsible for toxicity and mutagenic effects on the aquatic life, causing a potential risk to the aquatic ecosystems [2].

Traditionally, industry uses classic chemical methods to treat these effluents that are expensive and potentially harmful, since it could further generate large quantities of toxic by-products that are also difficult to eliminate [3].

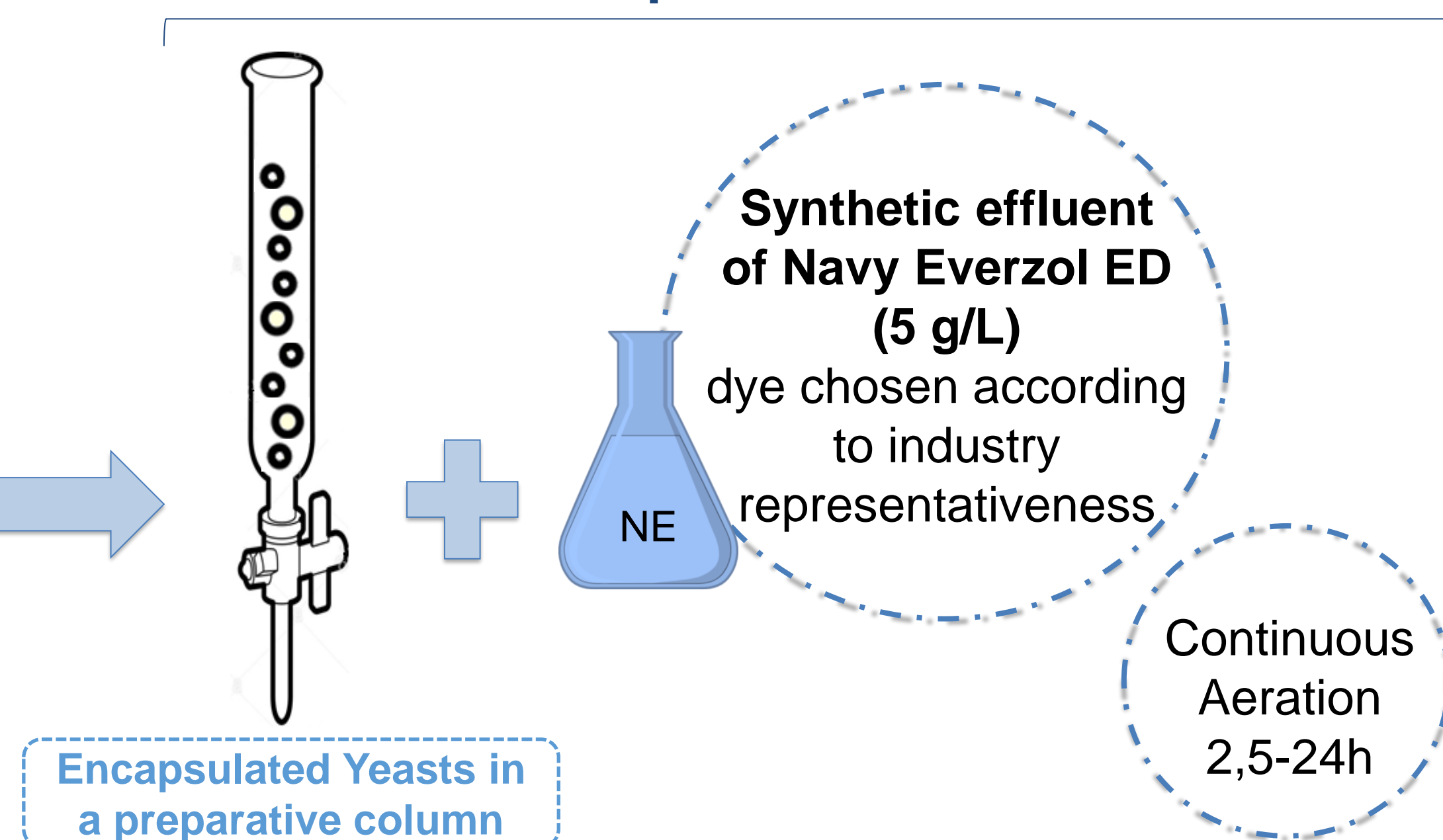
In order to aid and complement the traditional wastewater treatment, a yeast-based solution for decolorization of textile industrial wastewater is under evaluation. This research aims to develop a new and innovative biological solution for the effective decolorization of the textile effluents using alginate-calcium capsules filled with a proven decolorizing yeast.

## Methodology

### Capsules production



### Decolorization experiment



## Results



Figure 1 - Decolorization of synthetic effluent Navy Everzol ED (5 g/L) in a preparative column using alginate-calcium capsules with HOMOGST27AB yeast



Table 1 - Characterization of the decolorization cycles carried out using the yeast HOMOGST27AB capsules and synthetic effluent Navy Everzol ED (5 g/L).

Cycles	Medium	Time (h)	Descolorization (%)
1	Effluent Navy Everzol ED	14	100
2	Effluent Navy Everzol ED	24	50
Recovery	Normal Decolorization Medium (NDM)	12	-
3	Effluent Navy Everzol ED	5	100
4	Effluent Navy Everzol ED	12	50
Recovery	Normal Decolorization Medium (NDM)	12	-
5	Effluent Navy Everzol ED + Lactose	2,5	100
6	Effluent Navy Everzol ED + Lactose	2,5	100
7	Effluent Navy Everzol ED + Lactose	5	100
8	Effluent Navy Everzol ED + Lactose	5	50

**Decolorization** was effective up to 8 cycles with two intermediate recoveries in NDM and addition of lactose (20 g/L)

## References

- [1] Dellamatrice *et al.* (2017). Brazilian Journal of Microbiology. 48, 25-31.
- [2] Mahmoud, M.S. (2016). HBRC Journal. 12(1), 88-98.
- [3] Ali, H. (2010). Water, Air, & Soil Pollution. 213(1-4), 251-273.

## Conclusions

- Synthetic effluent Navy Everzol ED was still decolorized by alginate-calcium capsules loaded with yeast HOMOGST27AB after 8 cycles of decolorization;
- The method proved to be very effective, fast and with the ability to recover and reuse, making possible to carry out several cycles of decolorization.

## Acknowledgements

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