

Laccase-functionalized nanoparticles for endocrine disruptors oxidation: from synthesis to characterization

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INTRODUCTION & AIM

Endocrine-disrupting compounds (e.g. bisphenol A) represent a major environmental and public health concern, as they persist in aquatic environments and interfere with the hormonal system even at very low concentrations (1, 2).

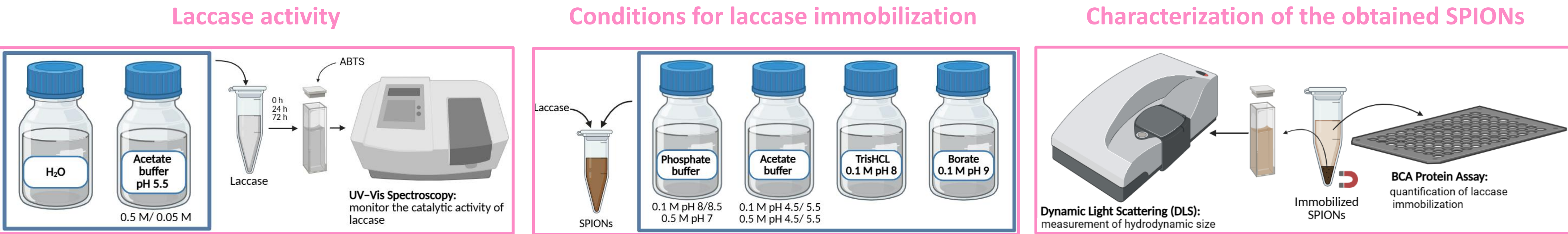
Conventional wastewater treatment methods are ineffective in removing these compounds, highlighting the need for more efficient remediation strategies (3).

Laccase-based degradation has emerged as a promising approach for the breakdown of these pollutants. However, its practical application remains limited due to the enzyme's low stability and challenges in its recovery and reuse (4).

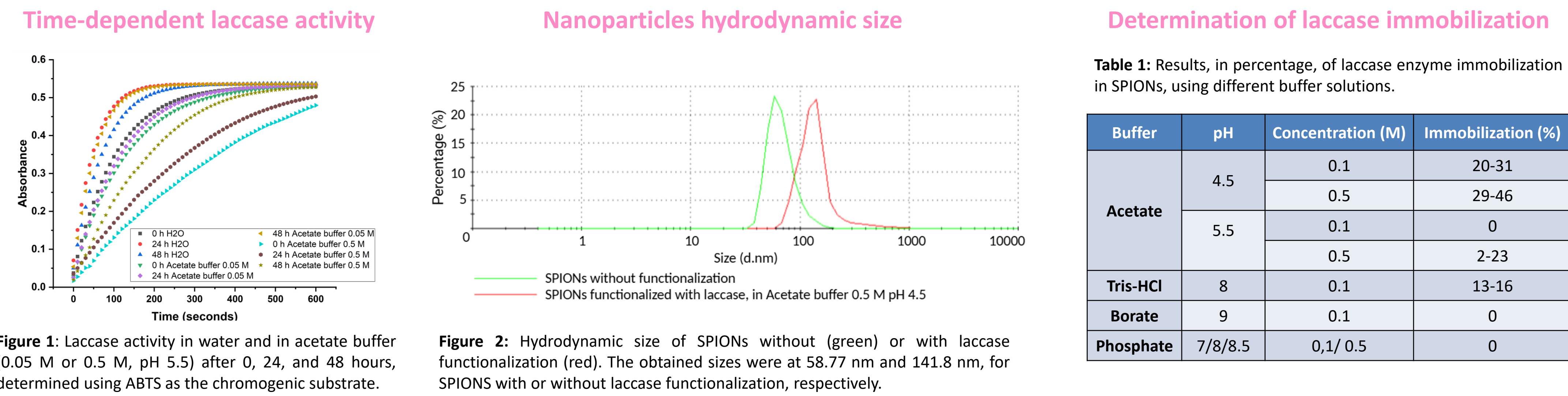
Enzyme's immobilization on **magnetic iron oxide nanoparticles (SPIONs)** enhances their stability, enables easy recovery and reuse through magnetic separation, and improves overall efficiency and sustainability in water treatment processes (4).

AIM: To develop SPIONs functionalized with laccase as an efficient and sustainable system for the removal of endocrine disruptors

METHODS



RESULTS



CONCLUSIONS

- ✓ The best buffer for preserving laccase activity was **acetate buffer at 0.5 M**.
- ✓ The **acetate buffer 0.5 M, pH 4.5** was the best option for the laccase immobilization on SPIONs
- ✓ Regarding the size of SPIONs, there was a noticeable increase in the hydrodynamic size upon laccase immobilization.

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FUTURE WORK

Future research will focus on assessing the efficiency of nanoparticles in removing endocrine-disrupting compounds. The findings will contribute for the development of sustainable water treatment technologies that integrate enzymatic degradation with nanomaterial-based recovery systems.

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