

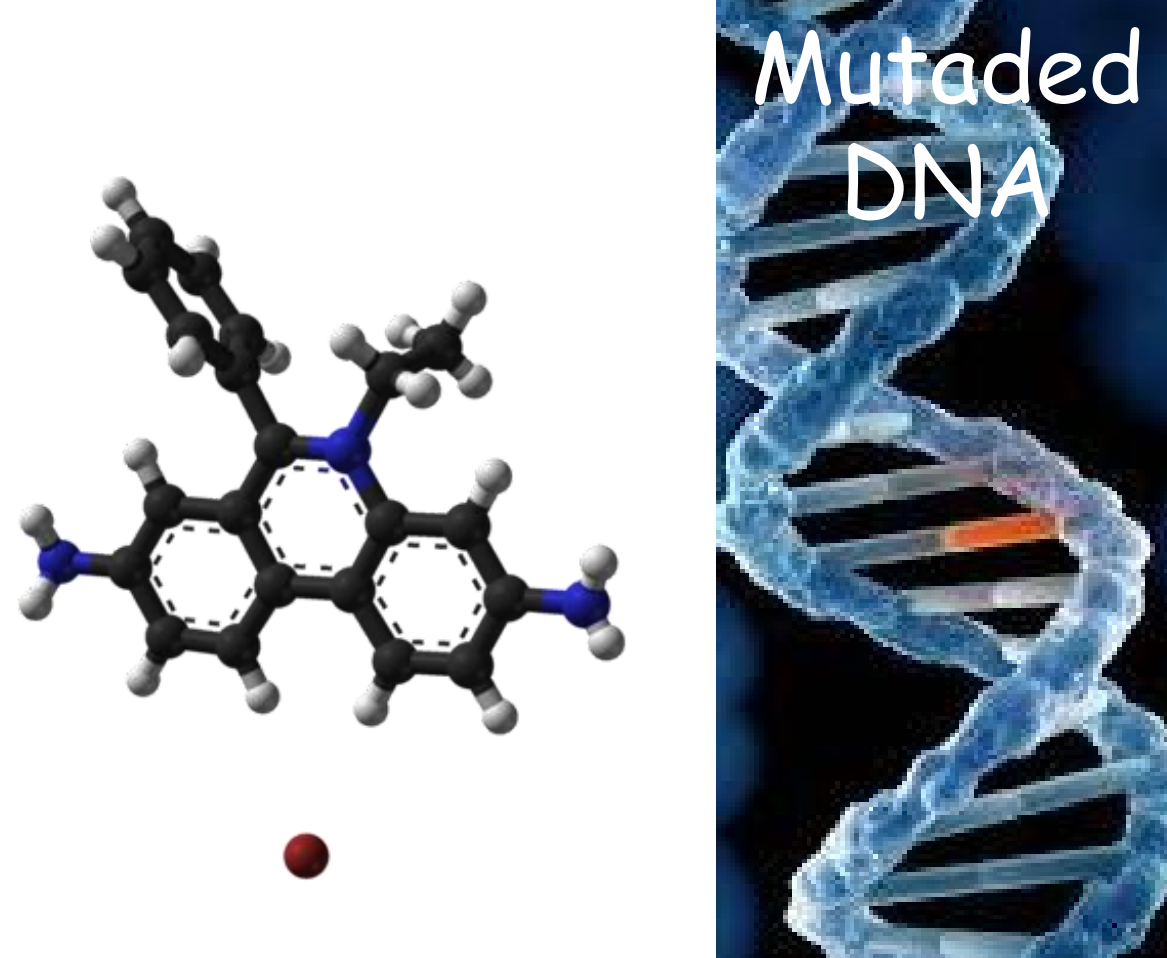
REMOVAL OF ETHIDIUM BROMIDE FROM AQUEOUS WASTE USING ADVANCED OXIDATION PROCESSES VIA HETEROGENEOUS PHOTOCATALYSIS

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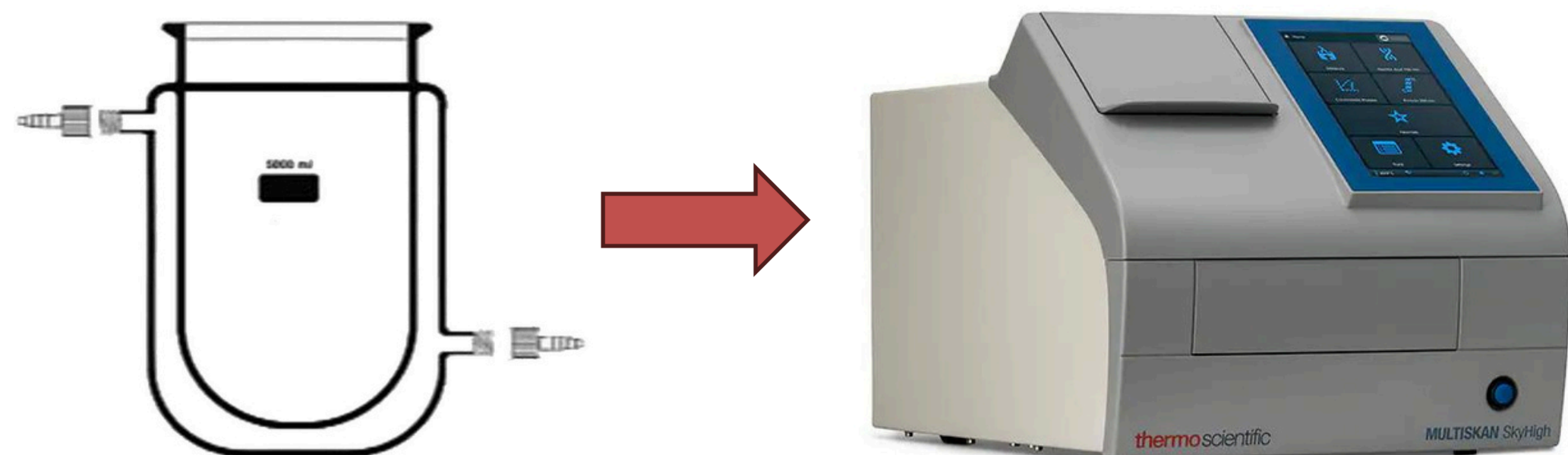
INTRODUCTION & AIM

Ethidium bromide (EB) is an intercalating agent in molecular biology for the visualization of nucleic acids in agarose gels.



Objective: To establish an experimental methodology for the removal of EB in laboratory wastewater through heterogeneous photocatalysis

METHOD



Process variables			Output variables
pH	T	[O]	%ERD kapp
4	20	0	
10	40	2	T1/2

RESULTS & DISCUSSION

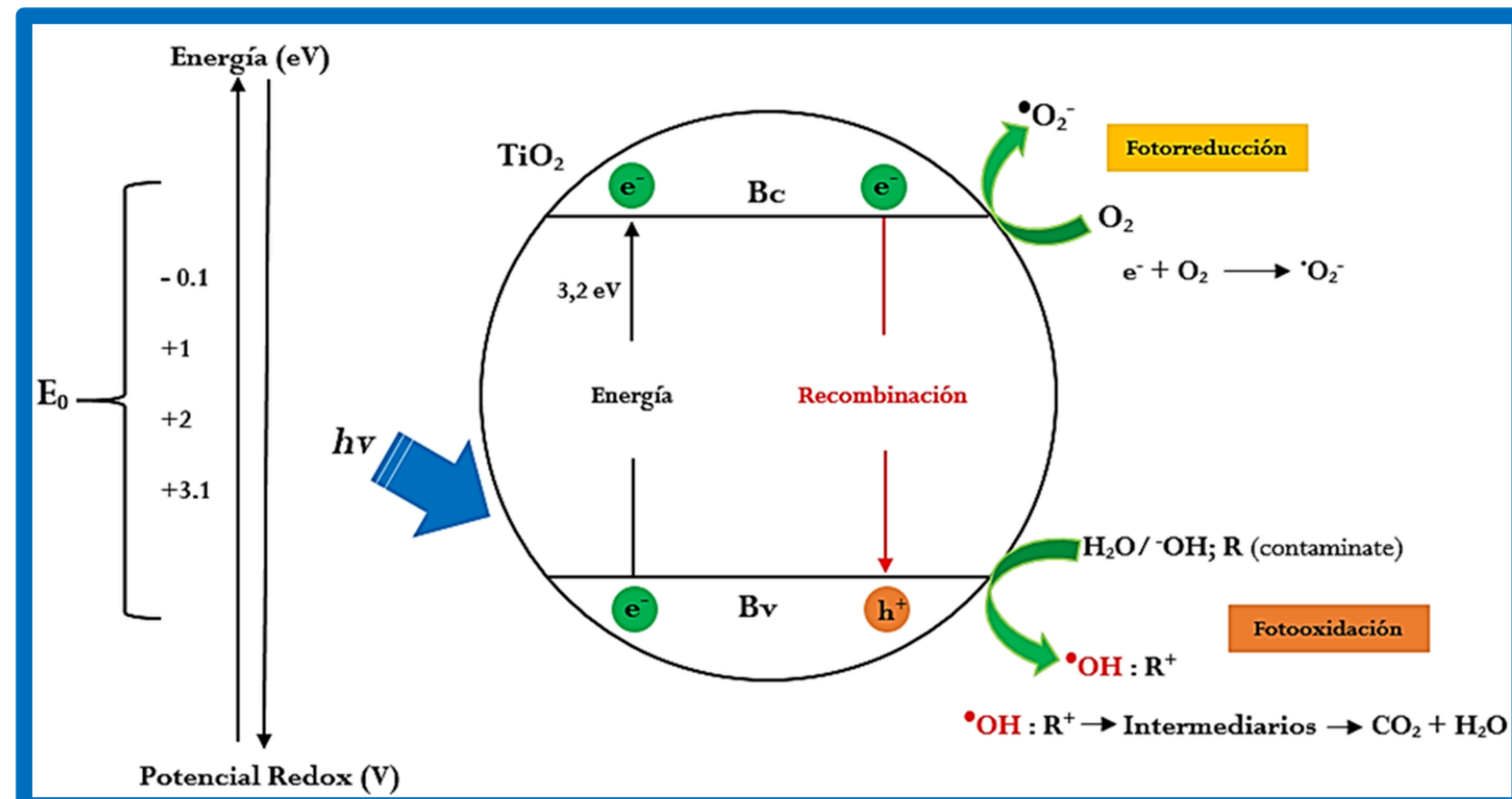


Figure 1. Indirect mechanism of heterogeneous photocatalysis.

A radiation-activated semiconductor generates highly reactive radicals (OH^\bullet , $\text{O}_2^{\bullet-}$, H^+) capable of breaking aromatic bonds and eliminating contaminants.

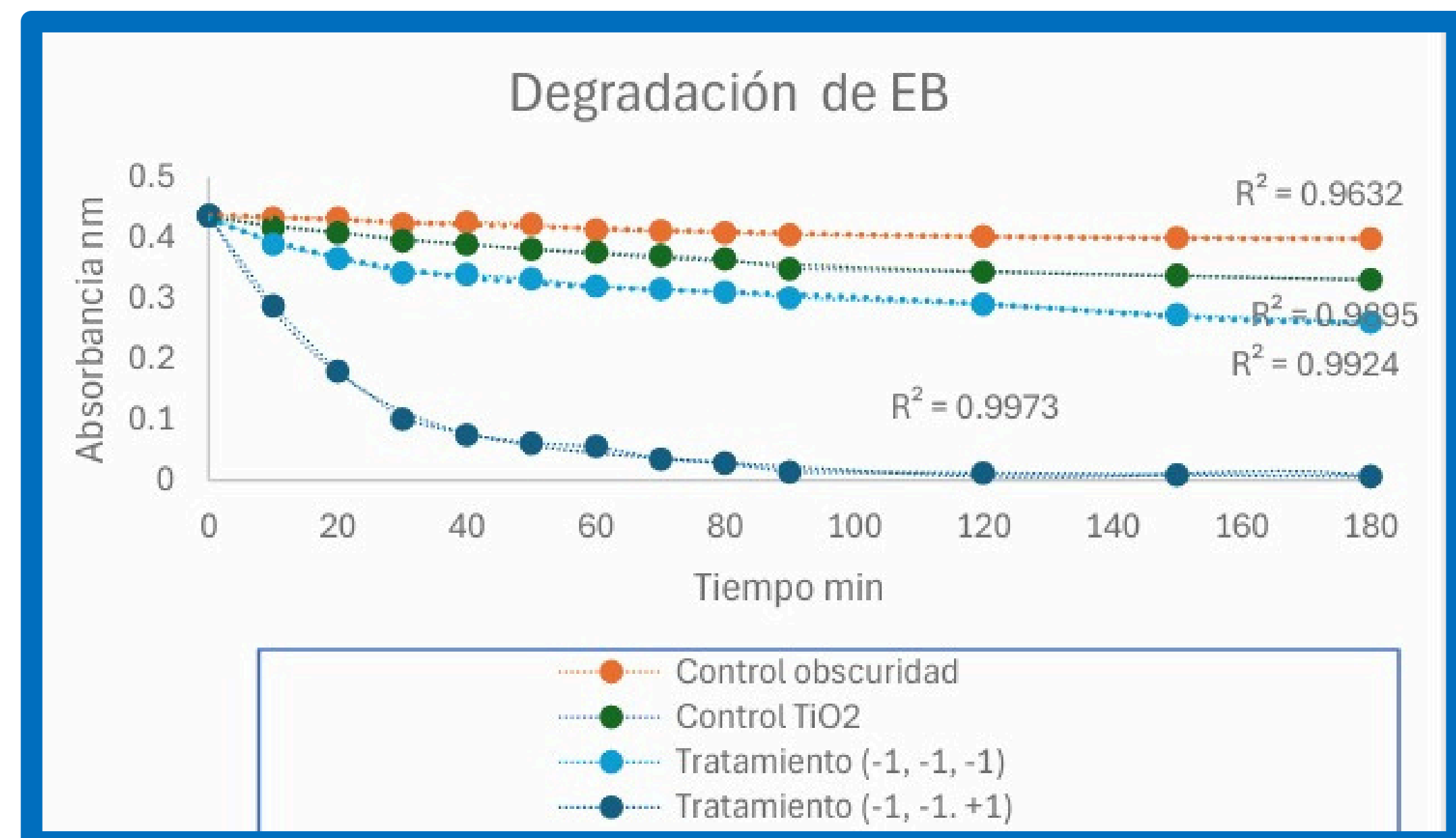


Figure 2. Kinetics of the EB degradation reactions in treatments T1 (pH 4, 20°C, without oxidant) and T2 (pH 4, 20°C, with 2 ppm of oxidant), and the controls in darkness and with TiO₂.

CONCLUSION

In treatment T1, a degradation of 99.9% has been achieved in 2 hours of reaction. It is expected to achieve removals greater than 80% in reasonable operational times, with kinetic constants on the order of 10^{-3} min^{-1} . Likewise, it is essential to consider the minimization of by-products, the evaluation of mineralization (TOC/BOD), and the transition toward continuous or scalable systems.

FUTURE WORK / REFERENCES

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[3]. Balderas-León, I.; Silva-Jara, J.M.; López-Álvarez, M.Á.; Ortega-Gudiño, P.; Barrera-Rodríguez, A.; Neri-Cortés, C. Degradation of Malachite Green Dye by Solar Irradiation Assisted by TiO₂ Biogenic Nanoparticles Using Vaccinium corymbosum Extract. *Sustainability* 2024, 16, 7638. <https://doi.org/10.3390/su16177638>