



The impact of initial pH value and H₂O₂ on the efficiency of glyphosate photocatalytic degradation in aqueous suspension using simulated solar irradiation



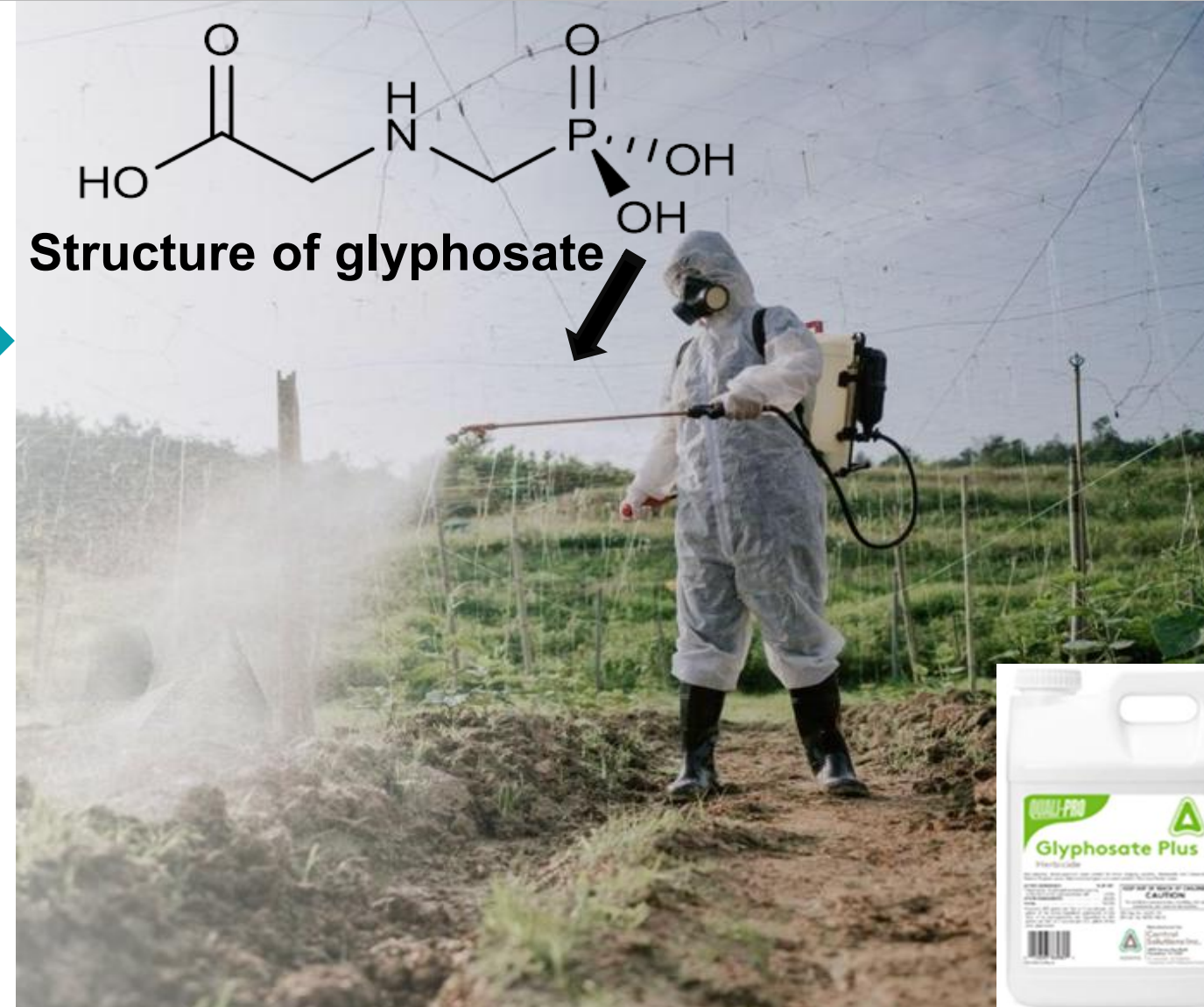
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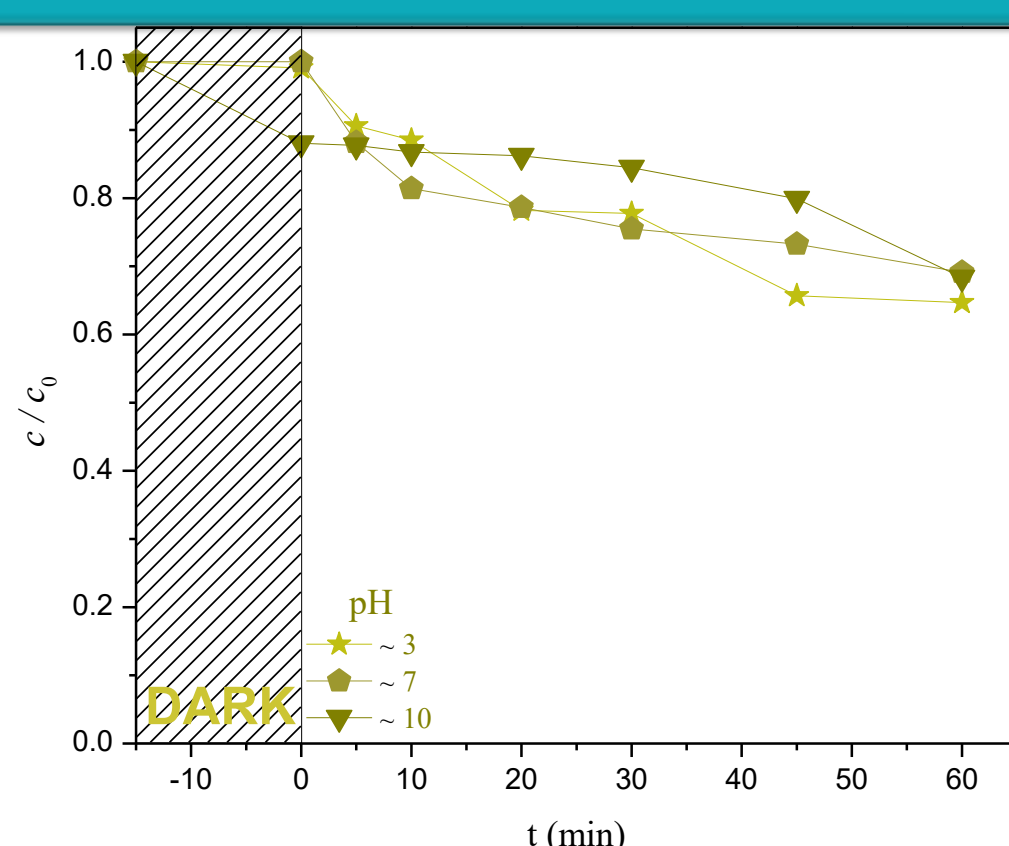
INTRODUCTION

The growing production and extensive use of herbicides have resulted in their frequent detection in various environmental compartments. N-(phosphonomethyl)glycine (**glyphosate, GLY**) is one of the most widely used herbicides worldwide. Due to its persistence in aquatic environments and its numerous documented negative effects on ecosystems, as well as potential risks to human health, it is considered a highly concerning organic pollutant. Therefore, it is essential to develop efficient and sustainable methods for its removal from water [1].

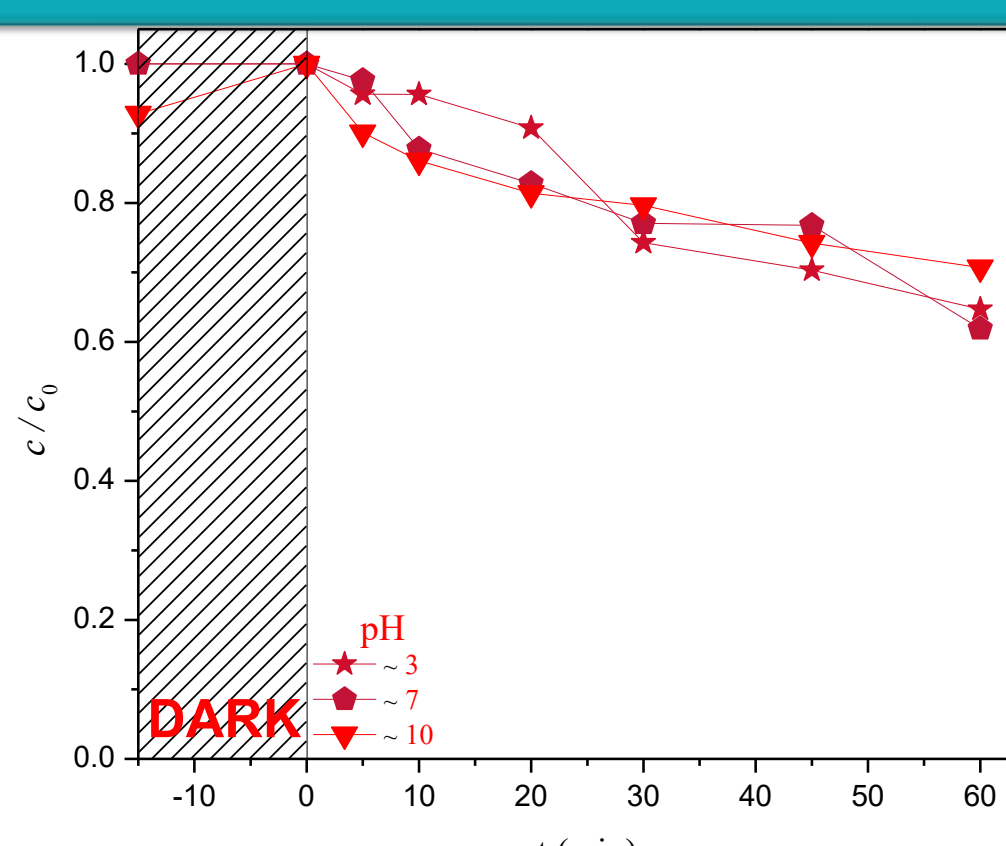


Among the promising approaches, heterogeneous photocatalysis is a green method characterized by simplicity, environmental friendliness, and the use of renewable energy, which, through simulated solar irradiation and semiconductor materials, such as TiO₂ photocatalyst, successfully degrades organic pollutants in water [2].

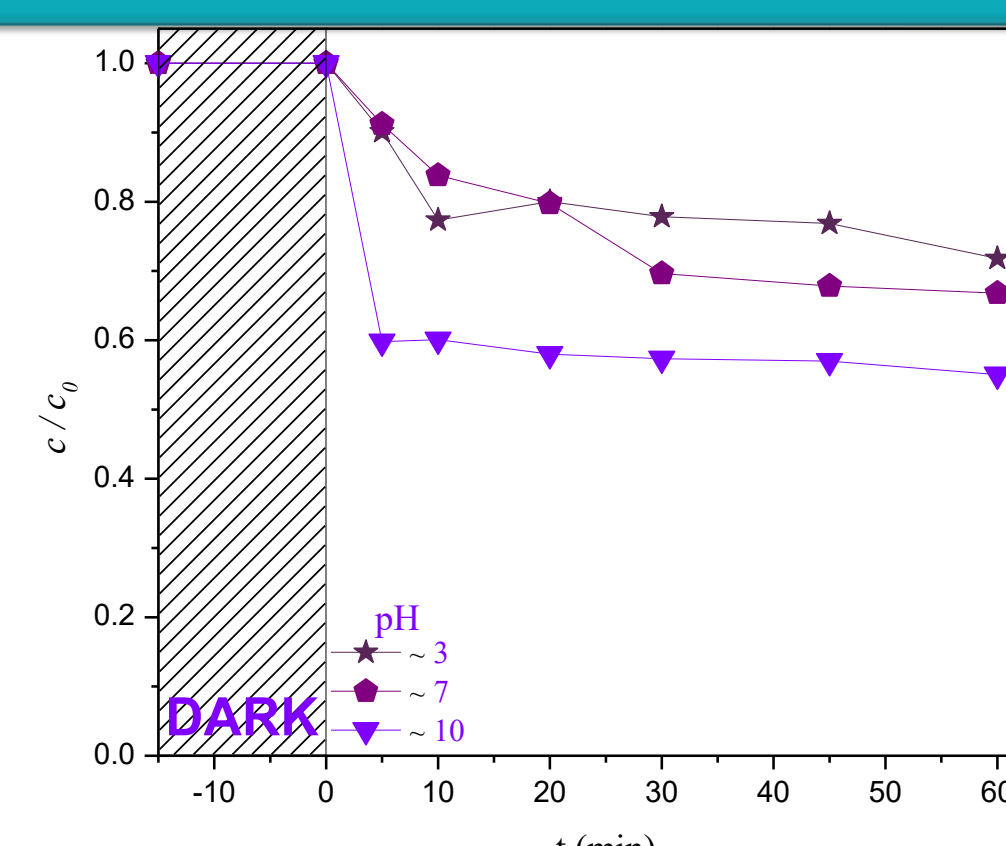
RESULTS & DISCUSSION



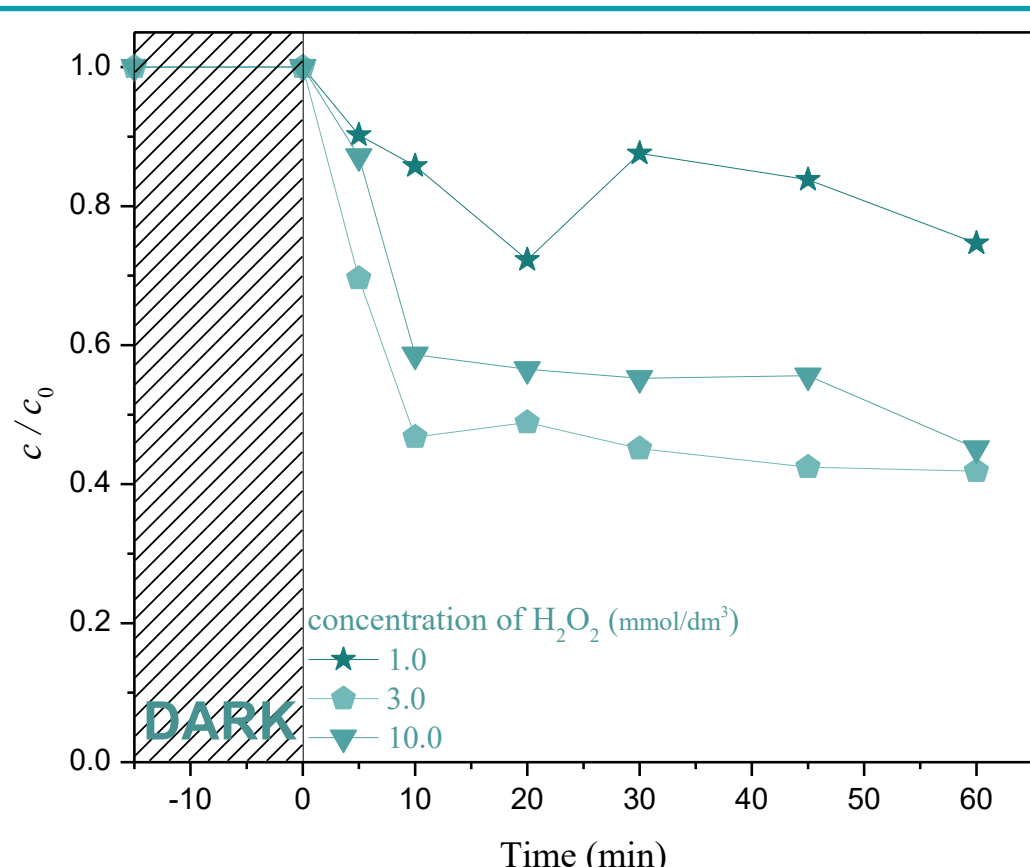
The effect of the initial pH value of TiO₂ suspension (0.5 mg/cm³) on the efficiency of GLY (0.05 × 10⁻³ mol/dm³) photocatalytic degradation under SSI



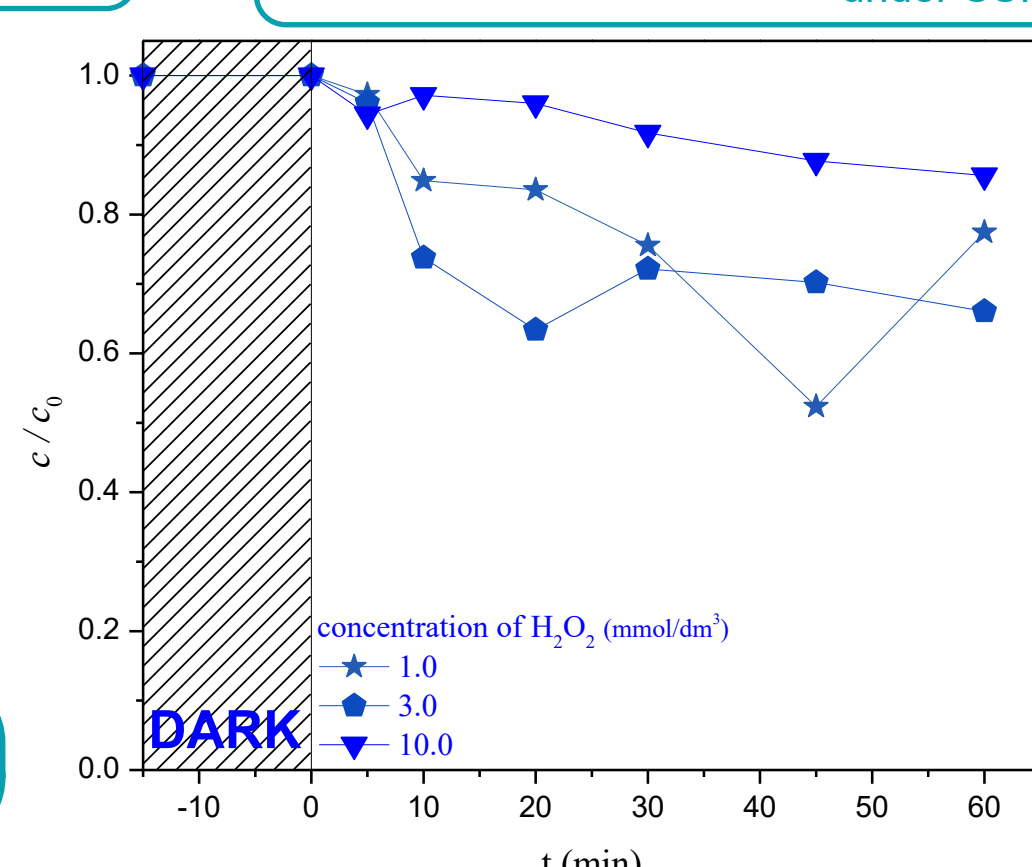
The effect of the initial pH value of TiO₂ suspension (1.0 mg/cm³) on the efficiency of GLY (0.05 × 10⁻³ mol/dm³) photocatalytic degradation under SSI



The effect of the initial pH value of TiO₂ suspension (2.0 mg/cm³) on the efficiency of GLY (0.05 × 10⁻³ mol/dm³) photocatalytic degradation under SSI



The effect of the initial H₂O₂ concentration on the efficiency of the photocatalytic degradation of GLY (0.05 × 10⁻³ mol/dm³), with TiO₂ (0.5 mg/cm³) and pH ~3, under SSI



The effect of the initial H₂O₂ concentration on the efficiency of the photocatalytic degradation of GLY (0.05 × 10⁻³ mol/dm³), with TiO₂ (2.0 mg/cm³) and pH ~10, under SSI

- ❖ When the effect of the initial pH value of the suspension was investigated, the highest removal efficiency was achieved in basic medium with catalyst loading of 2.0 mg/cm³, when 58% of GLY was removed after 60 min of irradiation.
- ❖ The most efficient system, after 60 min of irradiation, was with 3.0 mmol/dm³ H₂O₂, when 59% and 44% of GLY was removed in basic and acidic medium.

CONCLUSION

- ✓ From the obtained results it can be concluded that the photocatalytic degradation of GLY is strongly influenced by both of investigated factors (initial pH and H₂O₂ concentration).

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the financial support of the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (Grant No. 451-03-33/2026-03/ 200125 and 451-03-34/2026-03/ 200125).

REFERENCES

- [1] S. Klátyik et al., *Environ. Sci. Eur.* 36 (2024) Art. No. 22.
- [2] X. Li et al., *Water Sci. Technol.* 88(6) (2023) pp.1495–1507.