

# Mitigating Emerging Contaminants: Lettuce Root-Based Magnetic Nanocomposites for residual antihypertensive removal in water



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Laboratório de Materiais Poliméricos e Biossorbentes

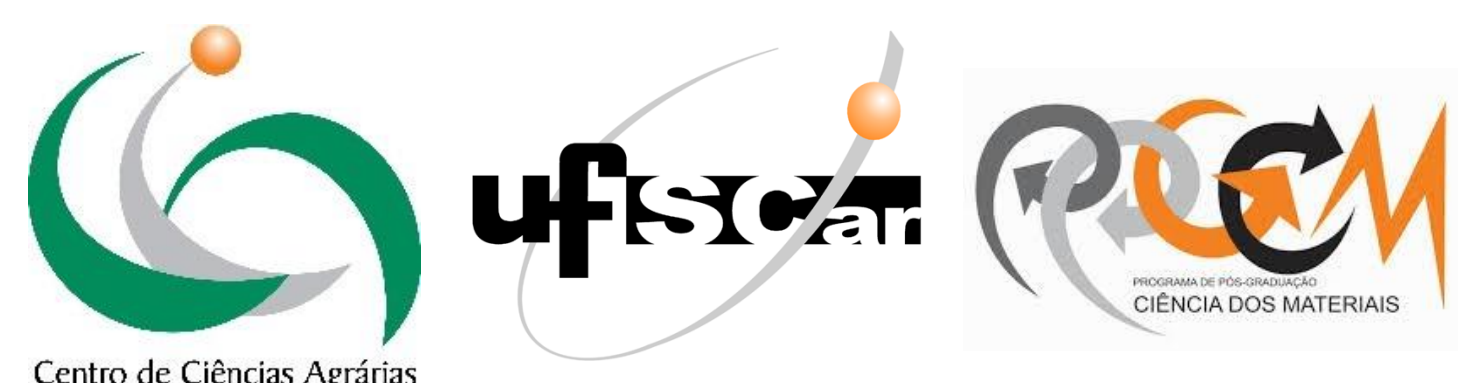
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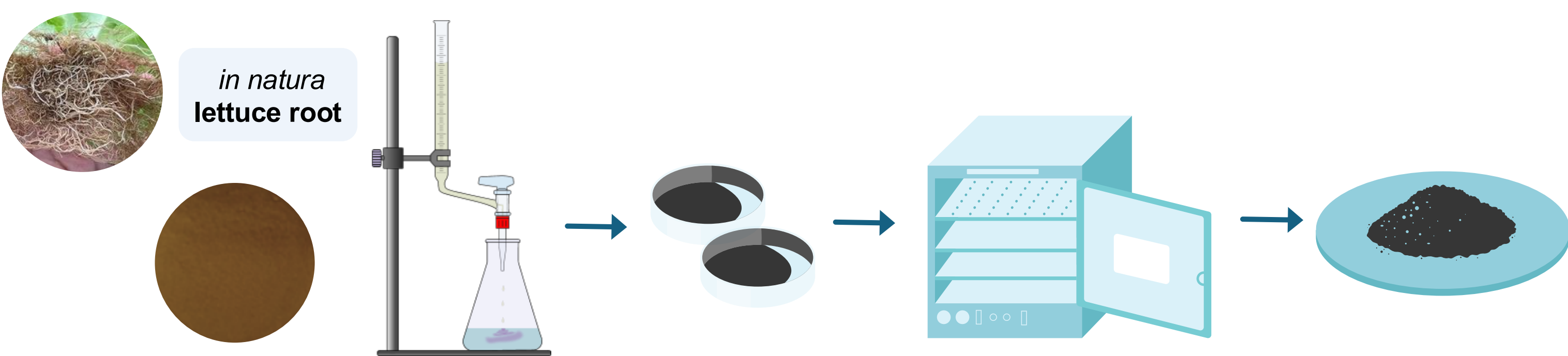
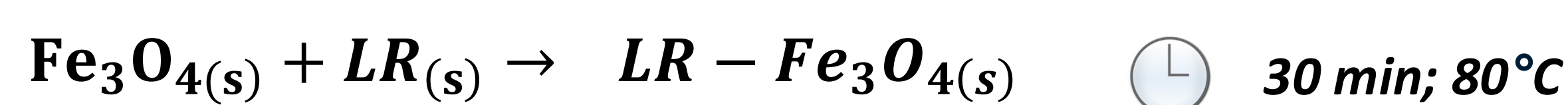
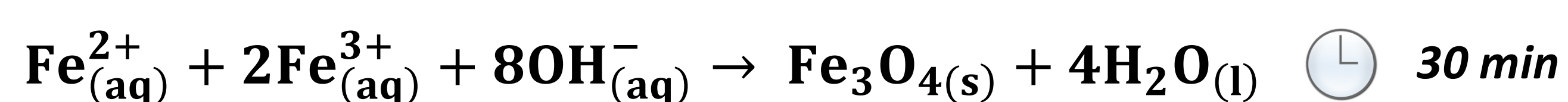


## Introduction

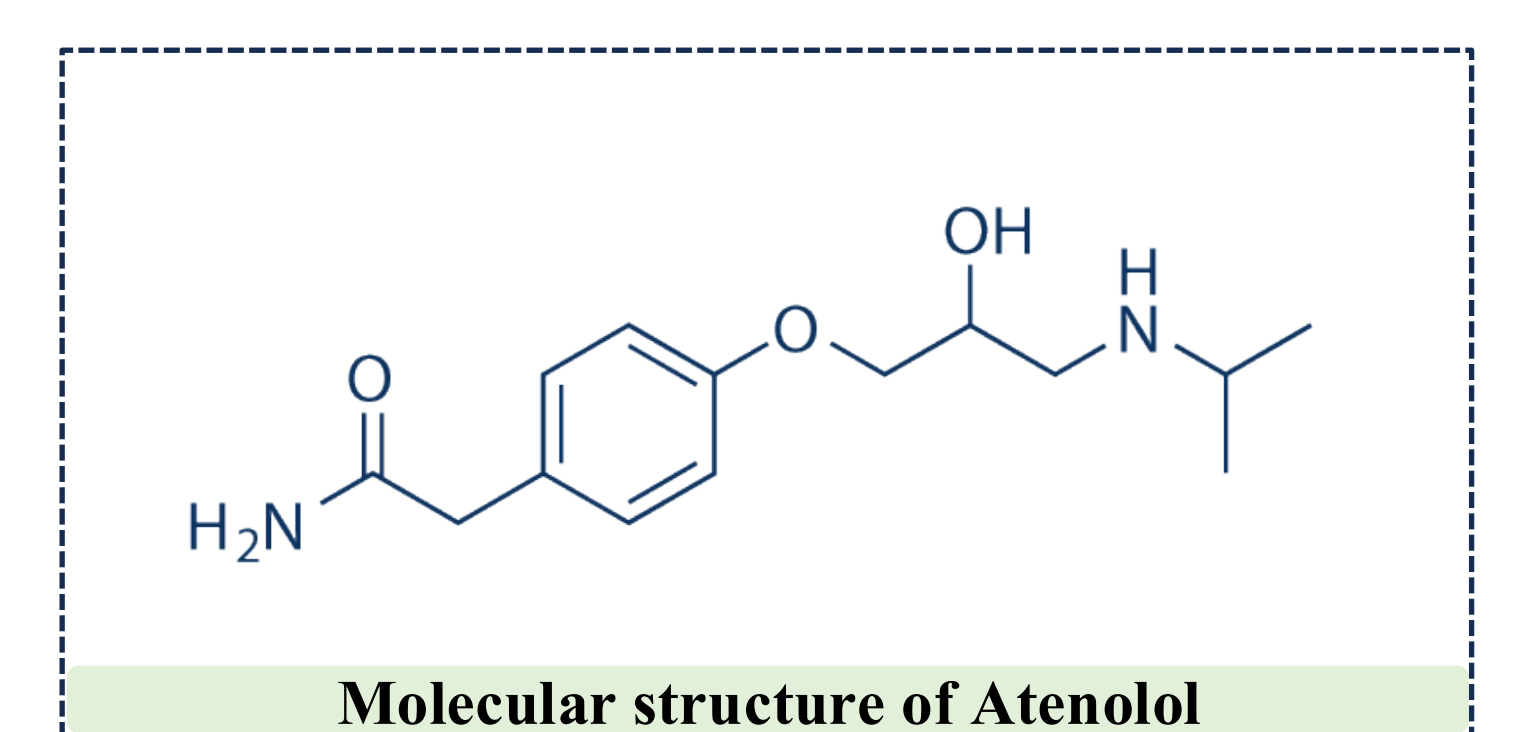
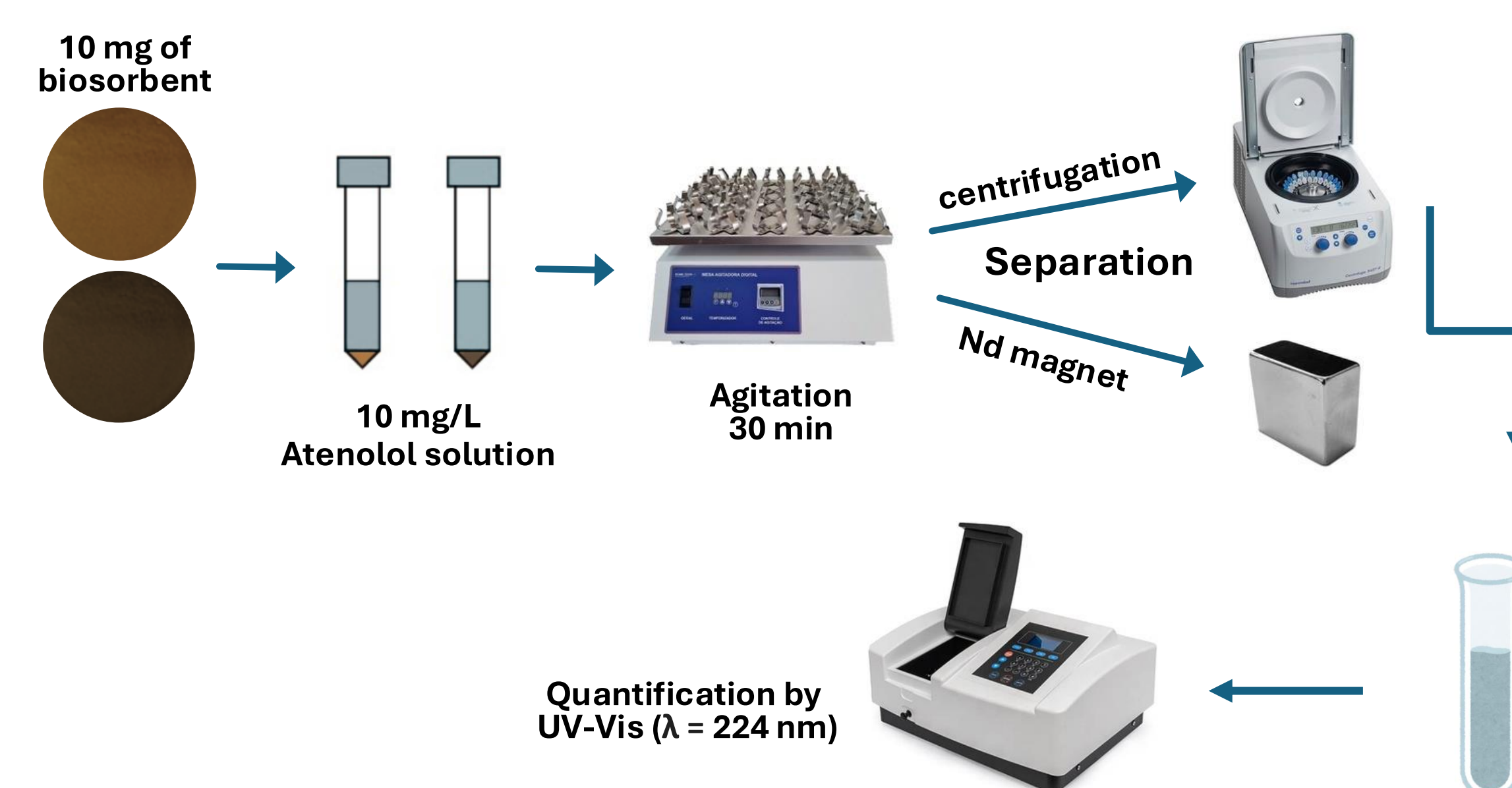


## Material and Methods

### Synthesis of magnetite nanoparticles (NP) and nanomodified lettuce root (LR-NP)



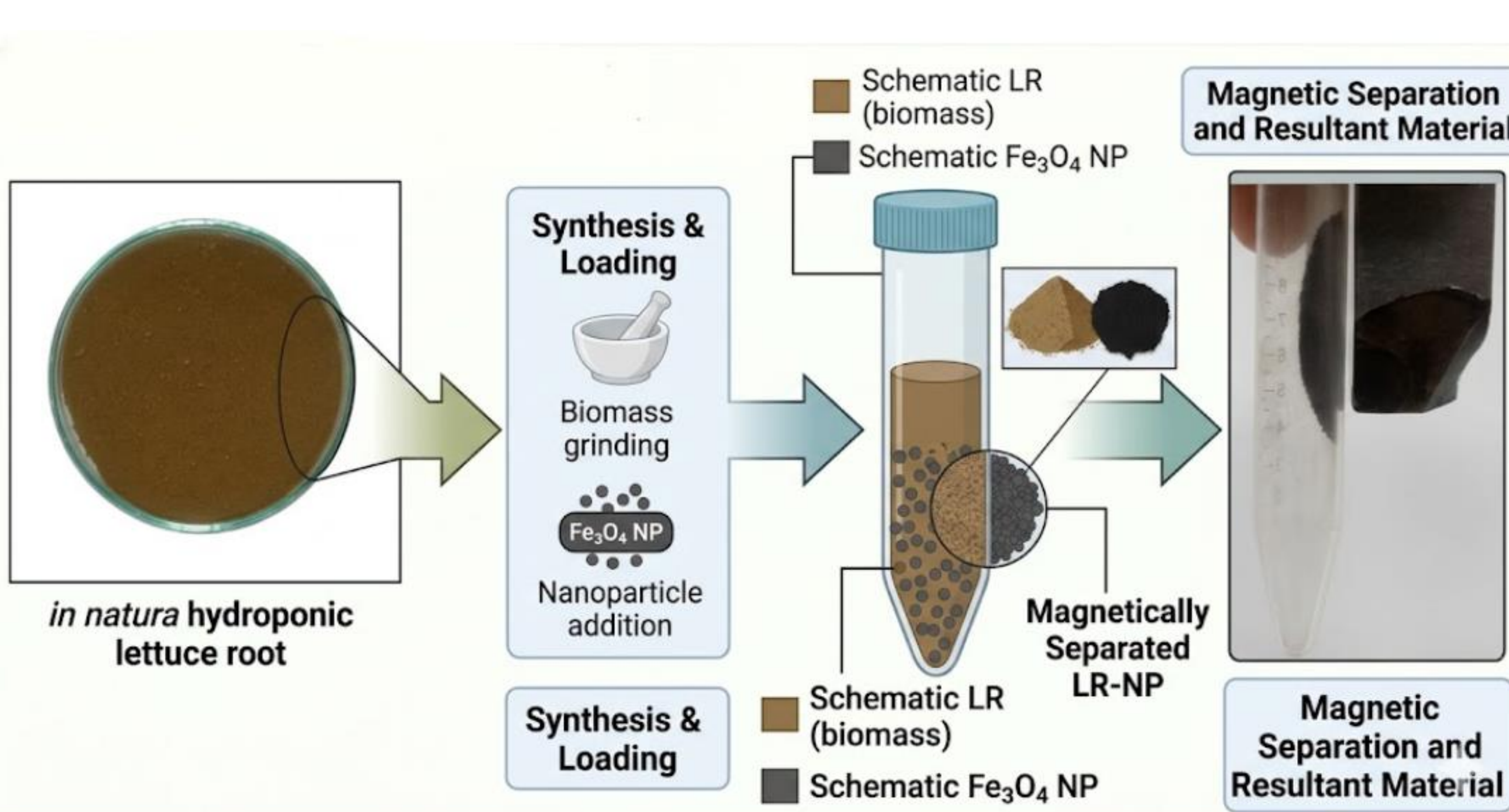
### ATL sorption procedure by LR and LR-NP



Parameter	Range/Condition
Solution pH	6 – 10
Contact time (kinetics)	15 – 60 min
Biosorbent dosage	1.0 – 2.5 g/L
Drug initial concentration	10 – 175 mg/L

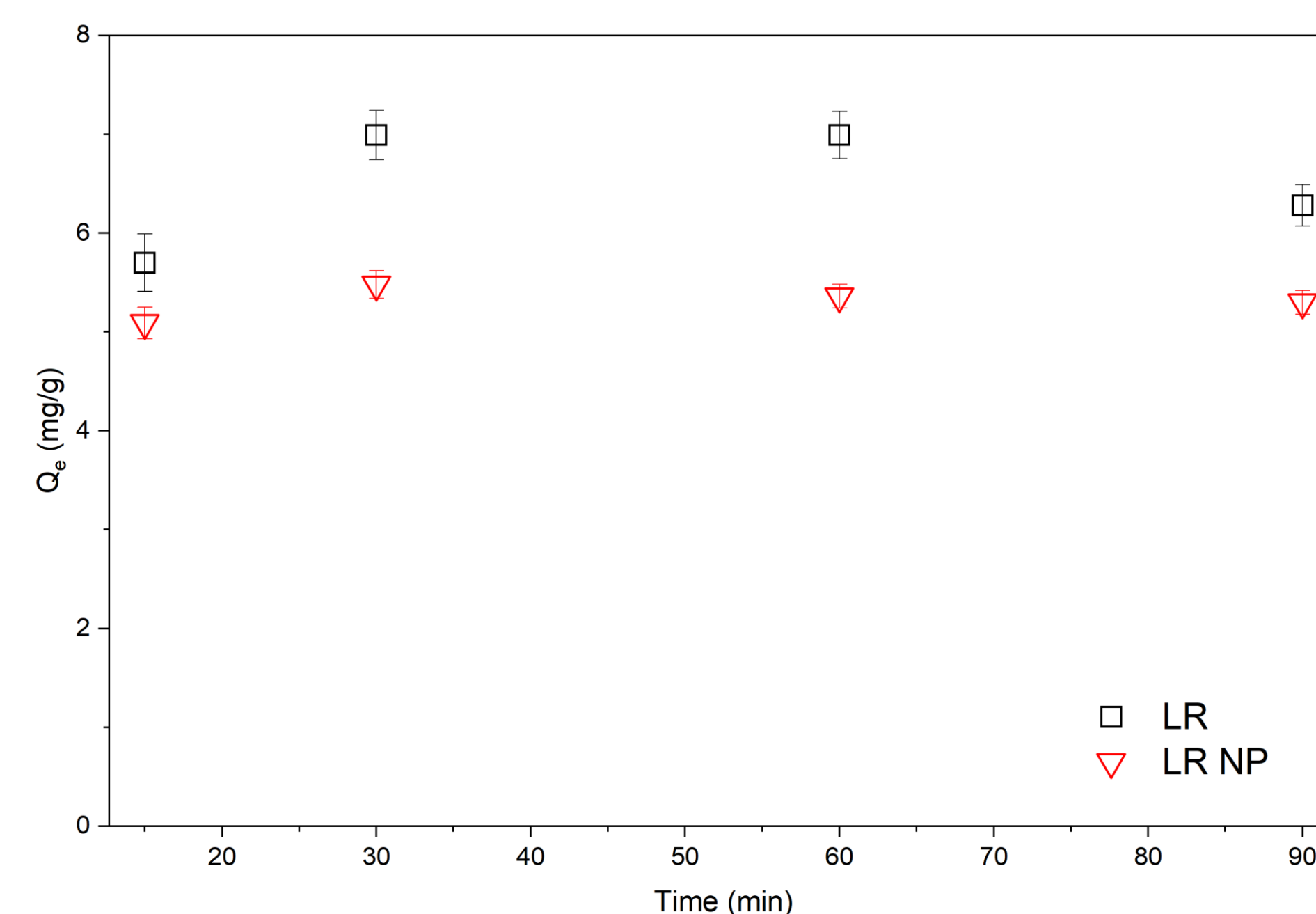
## Results and Discussion

### Effect of LR magnetization: LR-NP

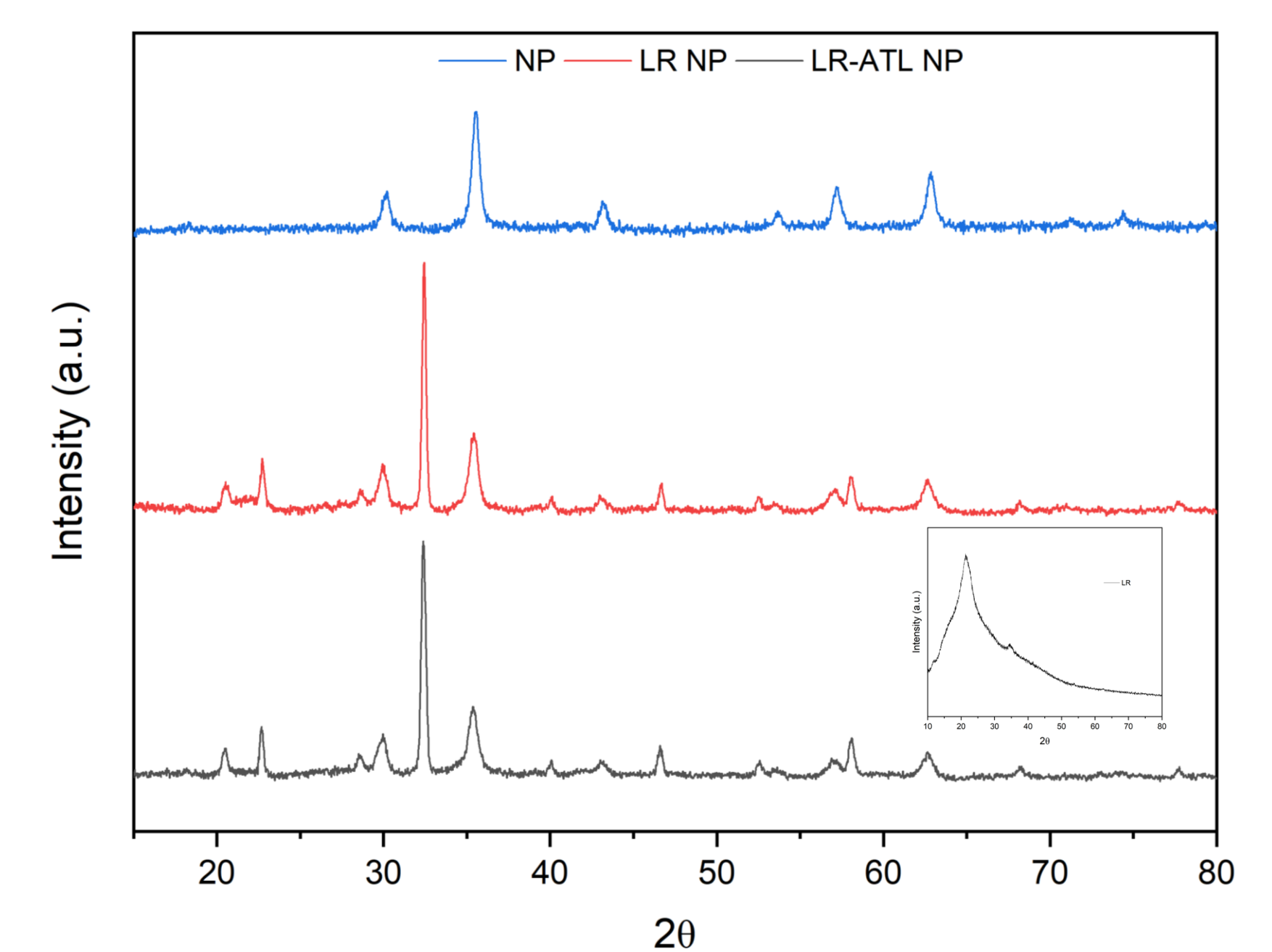


Evaluated parameter	Analysis of the obtained results
Solution pH	Favorable sorption at all investigated pH values (6-10)
Equilibrium time	30 min
Biosorbent dosage	Highest efficiency observed in 1.0 g/L
Experimental sorption capacity (SC <sub>exp</sub> )	61.78±2.95 mg/g (LR) 83.06±3.69 mg/g (LR-NP)

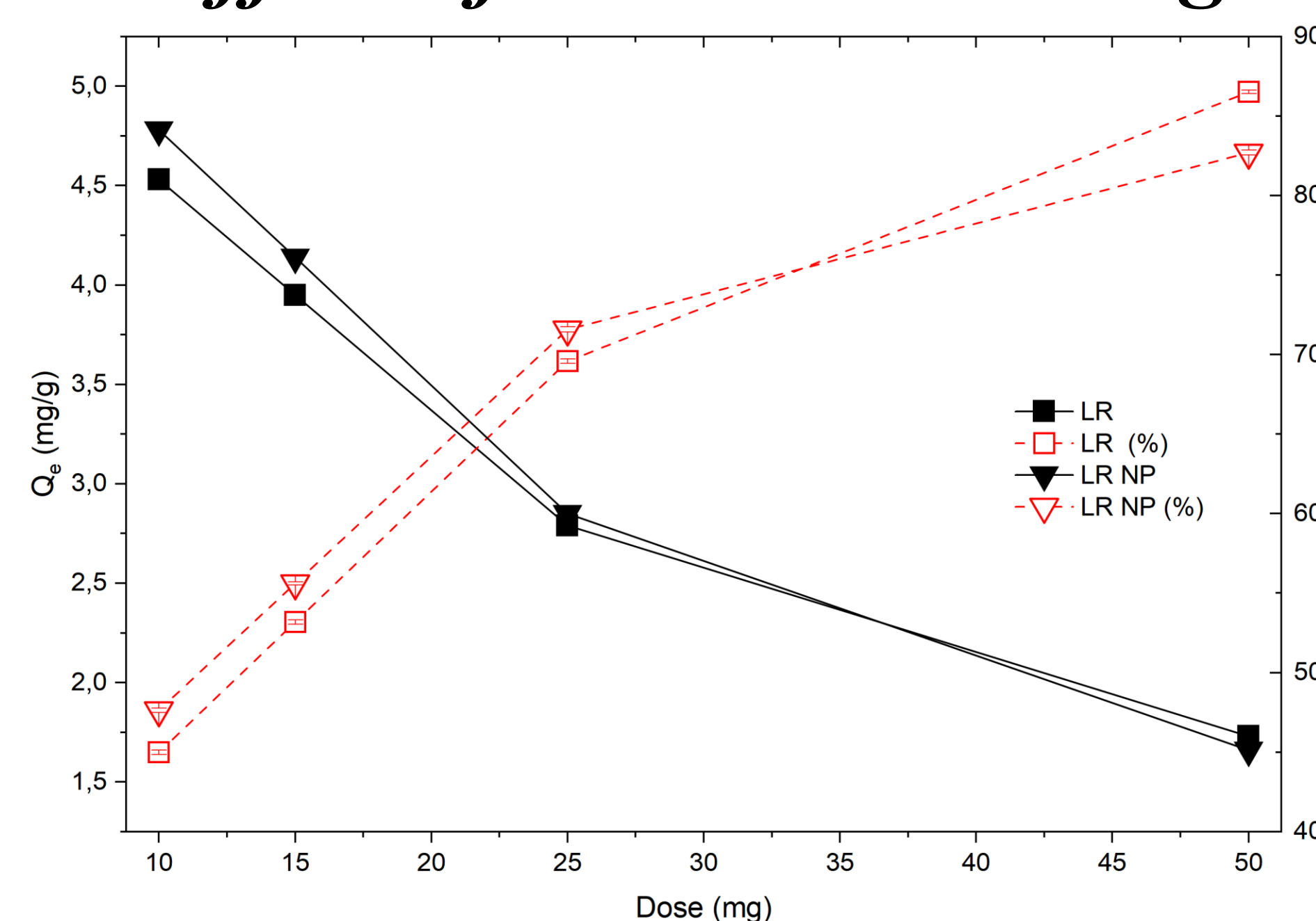
### Kinetics studies



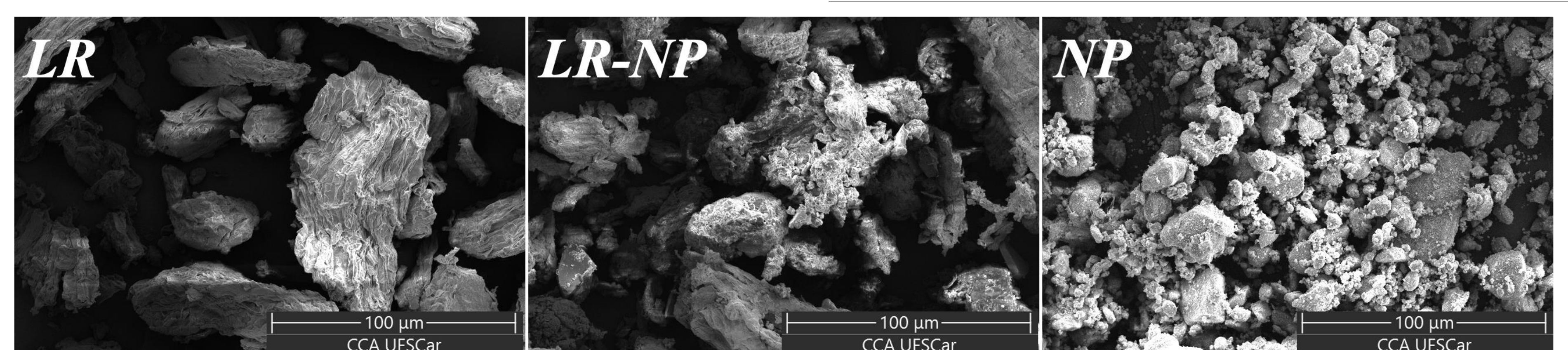
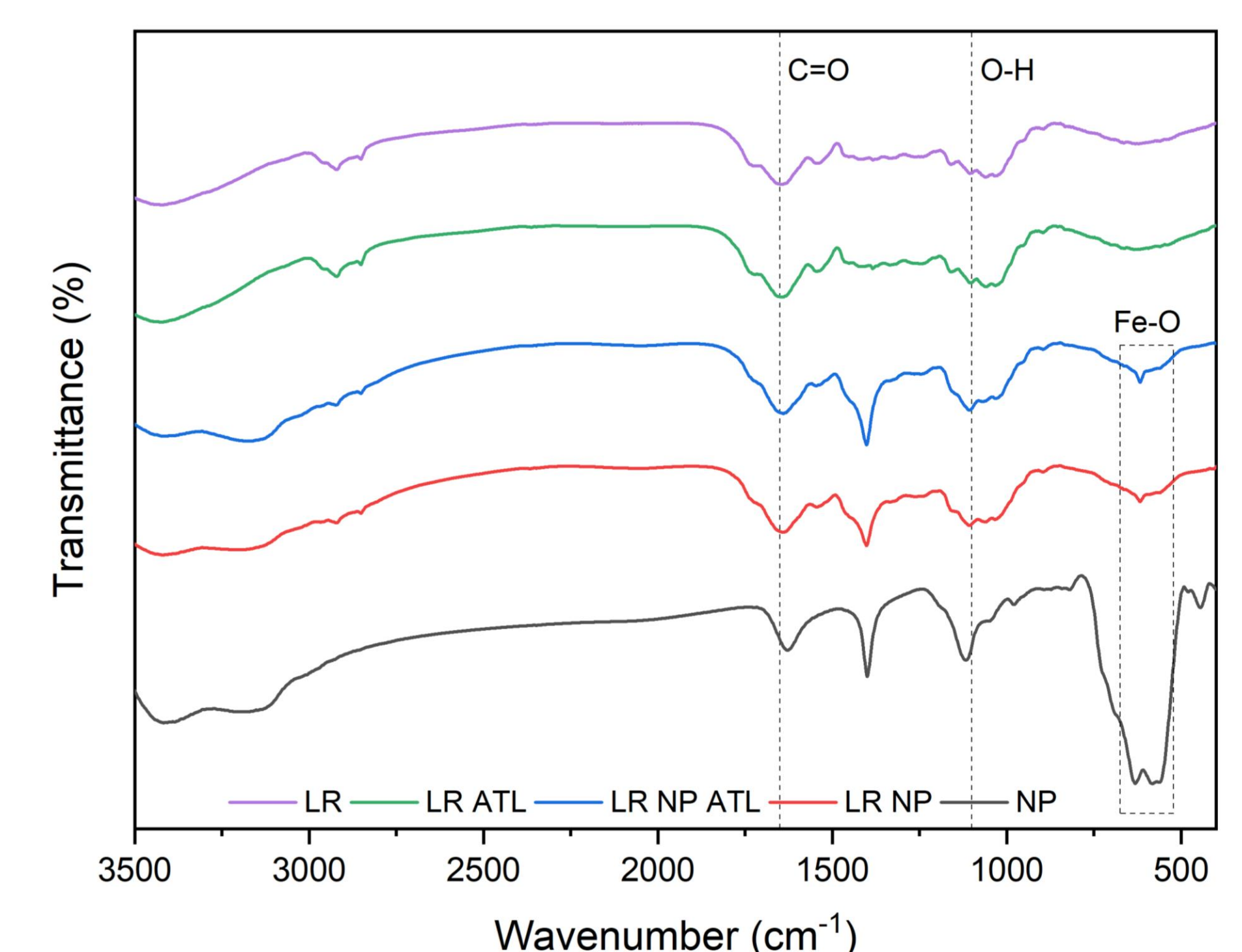
### XRD



### Effect of biosorbent dosage



### FTIR



## Conclusions

Lettuce root-based materials, especially the magnetic LR-NP, are efficient and sustainable for atenolol removal, offering high adsorption, rapid equilibrium, and easy separation. Their use valorizes agricultural residues, supports circular economy, and enables low-cost water treatment solutions.

## Acknowledgments

