

## Área:ANA

(Inserir a sigla da seção científica para qual o resumo será submetido. Ex: ORG, BEA, CAT)

## Bioinspired polymeric blends of DNA, Chitosan, Pectin and Carrageenan for sustainable dye removal from water

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### Highlights

- Sorption/removal studies of dyes were performed using polymeric blends at different contacts time and concentration
- Experimental optimization of sorption/removal parameters is essential for improving the remediation of emerging pollutants in aqueous media
- Polymeric blends show potential as alternative sorbent materials for the decontamination of dye-contaminated water

### Resumo/Abstract

Sorption/removal processes are effective for remediating emerging pollutants in aqueous media. This study evaluated how the amount of adsorbate and available surface area affect sorption efficiency. The kinetics of methylene blue adsorption onto polymeric blends were examined under controlled conditions (1440 min, 20 °C, 100 rpm, pH 7.2, 100 mg adsorbent). The influence of the initial dye concentration on the equilibrium capacity of DNA/Carrageenan, DNA/Chitosan, and Chitosan/Pectin blends was also assessed. Some results are presented in figure 1.

Time (min)	DNA/Carrageenan			DNA/Chitosan			Chitosan/Pectin		
	%R	pH	Temperature	%R	pH	Temperature	%R	pH	Temperature
120	95,2			68,9			45,0		
240	96,7			59,6			52,0		
480	97,0	7,2	20°C	68,9	7,2	20°C	56,0	7,2	20°C
960	97,2			72,7			58,9		
1440	97,6			75,9			59,6		

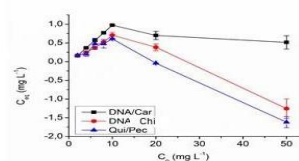


Figure 1: Removal efficiency and effect of the starting dye concentration on the equilibrium capacity of AM in DNA/Carrageenan, DNA/Chitosan, and Chitosan/Pectin blends.

The polymeric blends showed a significant increase in sorption capacity and pollutant removal under optimized experimental conditions. After 1440 minutes, the removal efficiencies reached 97.3% for DNA/Carrageenan, 75.9% for DNA/Chitosan, and 59.6% for Chitosan/Pectin. The efficiency decreased over time due to the partial saturation of active sites. A pH of 7.2 favored dye removal, enhanced by hydrogen bonding interactions between the adsorbent and the pollutant. As shown in figure 1, a linear adsorption behavior was observed up to a concentration of 10 mg L<sup>-1</sup>, with equilibrium capacities ( $q_e$ ) of 0.974 mg g<sup>-1</sup> (DNA/Car), 0.705 mg g<sup>-1</sup> (DNA/Chi), and 0.609 mg g<sup>-1</sup> (Chi/Pec).

### REFERENCES

[1] VILELA, P. B.; et al.T. Journal of Environmental Chemical Engineering, v. 7, 2019.

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