

# Chitosan/graphene oxide/vanillin@TiO<sub>2</sub> for the removal of nonsteroidal anti-inflammatory pharmaceutical compound (Diclofenac) from wastewaters

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It is a well-known fact that, the covid-19 pandemic has led to overconsumption of non-steroidal anti-inflammatory drug (Ferreira et al, 2022). The consequence of the pandemic was the accumulation of nsaid in wastewater in different areas of the planet and endangers human health and general the balance of the ecosystem worldwide. For this reason, the removal of nsaid from wastewater is necessary. To date, many techniques for the removal of pharmaceutical contaminants have been reported. Adsorption is a simple, sustainable, cost-effective, and environmental-friendly technique for wastewater treatment, among all other existing technologies. (Rashid et al, 2021)

To solve this problem, the composite chitosan/graphene oxide/vanillin@TiO<sub>2</sub> have been synthesized. Chitosan (Chi) is a natural cationic polymer, non-toxic, biodegradable, which offers excellent properties in combination with vanillin, because chitosan derivatives are more effective and low toxicity adsorption materials (Yadav et al, 2023).

Vanillin (Van) is a natural and non-toxic organic compound and it has -CHO group, which interactive with NH<sub>2</sub> group of chitosan via Schiff base (Eghbali, 2023).

The modified chitosan shows even better adsorption properties if combined with the extensive specific surface of graphene oxide (GO) and TiO<sub>2</sub>, which is low toxic and biocompatible.

Graphene oxide (GO) is material that widely used in the treatment of water or wastewater containing pollutants because of their high surface areas, excellent mechanical strength, and adaptability to different functional groups (Naveen Chandra Joshi et al, 2022).

Therefore, in this present poster, a synthesized compound Chitosan/graphene oxide/vanillin@TiO<sub>2</sub> which has a high adsorption capacity against diclofenac. All of materials are characterised via FT-IR, SEM, XRD and BET. Furthermore, experiments under continuous flow carried out for determination of optimal condition of pH, temperature and contact time. All of this result is very important to study and isothermal kinetics for the adsorption evaluation. To sum up, Chitosan/graphene oxide/vanillin@TiO<sub>2</sub> can use in industries or public organization for nsaid removal of wastewater.

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