

# **Comparative study on the biological elimination of diclofenac and its elimination by nano-adsorbents in pharmaceutical factories**

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**Abstract Introduction and objective:** Effective removal of low concentrations of diclofenac wastewater due to the short duration of storage in the refinery should be done on a timely basis. Currently, it has been found that highly iver and rapid reactions to microfibers removal, such as advanced oxidation processes (AOPs), are effective. However, this may lead to the formation of potentially harmful side effects. In principle, biological techniques, in comparison with oxidation technologies, can be more robust and cost effective in eliminating microfibers. Therefore, the aim of this study was to compare the biological elimination of diclofenac and its removal by nanoparticles in the pharmaceutical sewage of pharmaceutical factories. **Methods:** In this research, a sample was taken from the soil around the pharmaceutical factories to isolate the decomposing bacteria of diclofenac. Then, with the aid of microbial and molecular methods, the strain that had the most degrading effect on this drug was identified. Then, after biosynthesis of silica base nanoparticles, effects of the bacteria and the nanoparticles on decomposition of diclofenac were investigated through UV-vis method. **Results:** In general, the results showed that both bacteria and nanoparticles were able to decompose diclofenac. Also, the highest level of decomposition for nanoparticles and bacteria was almost equal and observed at a concentration of 20 and 40 mg/ml, which were 64% and 64.9%, respectively. **Conclusion:** In conclusion, it can be concluded that the use of nano-adsorbents and also the identification of the ability of different bacteria to remove harmful drug compounds contaminated wastewater is an effective solution.

**Keywords :** Keywords: Wastewater, Biodegradation, Diclofenac, Silica base nanoparticle

