

## Nanoparticle Impregnated Porous membranes For The Removal Of Antibiotics From Water

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### Abstract

Pharmaceuticals as emerging contaminants pose health risks to humans and all living organisms when disposed of in water streams. In the present work, we selected the ciprofloxacin HCl antibiotic as an example of contaminants of emerging concern which are commonly found in wastewater effluents. Removal of ciprofloxacin from aqueous solutions was investigated using porous polylactic acid (PLA) membranes impregnated in situ with single metal nanoparticles such as cobalt, nickel, copper or with a binary mixture thereof. Among the different employed membranes, cobalt-loaded ones exhibited the highest % removal of 80.7% followed by copper-loaded (70.9%) then nickel-loaded ones (68.7%) at pH 6.5 and initial ciprofloxacin concentration of 50 ppm. In addition, percent removal for cobalt-loaded membranes exceeded that of the unloaded ones by 1.3 times under the same employed conditions. Thus, cobalt-loaded membranes were further characterized using Fourier Transform Infrared (FTIR) Spectroscopy, Scanning Electron Microscopy (SEM), Dynamic Light Scattering (DLS) measurements and Thermogravimetric Analysis (TGA). FTIR measurements of the membranes pre- and post- adsorption indicated that PLA groups were not involved in the adsorption mechanism but rather interaction occurred onto the cobalt nanoparticles. DLS measurements showed that the zeta potential of the membranes is zero or slightly negative implying that the membranes are neutral under the employed pH. Being also neutral at this pH, ciprofloxacin HCl would not possibly interact with the nanoparticles via electrostatic interaction. The interaction, however, might involve physical adsorption followed by degradation.



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### Biography:

Hebatullah is a PhD candidate at The American University In Cairo. She is also a research assistant and teaching assistant at the same university. She was a former research specialist in one of the pharmaceutical governmental companies where she developed several products. Her master degree was in food packaging and analysis.