DETERMINATION OF SOME CHEMICAL RESIDUES IN THE EFFLUENT OF PHARMACEUTICAL INDUSTRY AND ATTEMPT FOR TREATMENT

Submitted By

Eslam Mohamed Tawfik Mohamed

B.Sc. of Science, (Zoology/Chemistry), Faculty of Science, Ain Shams University, 2010

A thesis submitted in Partial Fulfillment
Of
The Requirement for the Master Degree
In
Environmental Sciences

Department of Environmental Basic Sciences
Institute of Environmental Studies and Research
Ain Shams University

2017

APPROVAL SHEET

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ACKNOWLEDGEMENTS

First and foremost I am extremely grateful and thankful to **Allah** Who gave me the ability and the power to finish this work.

I would like to express my sincere appreciation to Prof. Dr. Mostafa Mohamed Hassan Khalil, for

providing his best efforts in supporting and guiding me through this work, as well as

Promoting it in many ways.

I would also like to thank Prof. Dr.Taha Abd El-Azim M. A.Razek for his valuable and expert advice, constructive criticism, cooperation and suggestions, which enhanced the quality of this work.

I would like to show my appreciation to all my friends and colleagues

for their invaluable help and for debugging both my work and this thesis.

I would like to acknowledge the support I received from Ain Shams University and

Institute of environmental studies and research, administratively.

Finally, I would like to express my deep gratitude to my Family specially my parents ,my Wife and my son for their continuous encouragement and for their Unconditional love and support by any possible means, without which this work would not be possible.

Eslam Mohamed

2017

ABSTRACT

Widespread occurrence of pharmaceuticals has started to attract attention as aquatic micropollutants that might have been affecting the ecological system in trace amounts. The risks associated with their introduction into wildlife habitats is becoming an important issue for both regulators and the pharmaceutical industry, because of incomplete elimination of pharmaceuticals wastewater and their metabolites. In this work monitoring of some pharmaceutical residues in industrial wastewater such as (caffeine, paracetamol, dexamethasone and naproxen) was carried out. The identification and quantification of chemical and pharmaceutical residues was investigated using GC/MS spectrometer and liquid chromatography-based tandem mass spectrometry LC/MS/MS spectrometer with electrospray ionization (ESI) .The study recorded the presence of different types of pharmaceutical residues with different concentration levels in wastewater .The concentration level of dexamethasone in wastewater were detected at 254 ng/mL, for paracetamol at 7325 ng/mL , for caffeine at 9356 ng/mL and for naproxen at 2000 ng/mL . These concentrations representing about 500 fold higher than international safety margin of treated wastewater . Naproxen was selected (nonsteroidal anti-inflammtory drug) in the study due to when Naproxen exposed to sunlight it's converted into two related compounds these photodegradants are predicted to be more toxic than naproxen because they have lower polarity and some trials for treatment were carried out to degrades or remove naproxen using granulated activated carbon (GAC) and Sawdust (SD) with different activation types to show it's effect and the study showed that there is an effect on the treatment of naproxen for GAC by 97.4% of removal after 2 hours contact time and the kinetic calculations in this study showed that all removal reactions were first order reaction and the suitable adsorption isotherm equation for naproxen was langmuir equation and for SD by 56% of removal after 2 hours contact time and the kinetic calculations in this study showed that all removal reactions were second order reaction and the suitable adsorption isotherm equation for naproxen was langumir equation.

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