Concentration and Effects of Micropollutants in Wastewater

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ABSTRACT

Micropollutants are coming from urban wastewater which causes water pollution. Numerous substances are present in wastewater in very low concentrations are identified as Micropollutants. Some of them found in fishes, surface water and even in drinking water. Micropollutants mainly include Pharmaceuticals, Personal care products and Pesticides. They are major problem because they are not completely biodegradable. Micro pollutants are remaining in wastewater also after the treatments as they not get easily removed. Micro pollutants are mainly found in wastewater through manufacturing process by the disposal of unused, expired products and excreta. Pharmaceutical compounds can enter the urban sewage system by various pathways, e.g. human excretion, improper discharge, or leaching from the urban area during rainfall.

Keywords— Micropollutant, Pharmaceutical, Pesticides.

1. INTRODUCTION

Wastewater treatment plants are typically not designed to remove micro-pollutants and most of these contaminants are present in the treated wastewater and subsequently enter the receiving aquatic ecosystem. Micropollutants from Pharmaceuticals and Personal care products induce physiological effects in human at very dose. So detection of pollutants is necessary that they may adversely affect aquatic life, plants and humans. Micropollutants are not easily removed by conventional water treatment plants.

2. OBJECTIVES

1. The impact of micropollutants on the ecosystem.
2. To minimize negative impacts of micropollutants on human health and environment.
3. Finding commonly occurring micropollutants in wastewater

3. PROBLEM STATEMENT

Pharmauticals are used by human which are not efficiently removed during wastewater treatment. Minor emerging contaminants generally found in wastewater are diclofenac,ibuprofen,ketoprofen,suifamethoxazole,methylparaben,bissphenol-A,nicotine,cotinine,caffeine and 1,7-dimethylxantine.Major contaminants found in wastewater are nicotine and clarithromycin. These are major because normally these show toxicity.

4. MICROPOLLUTANTS

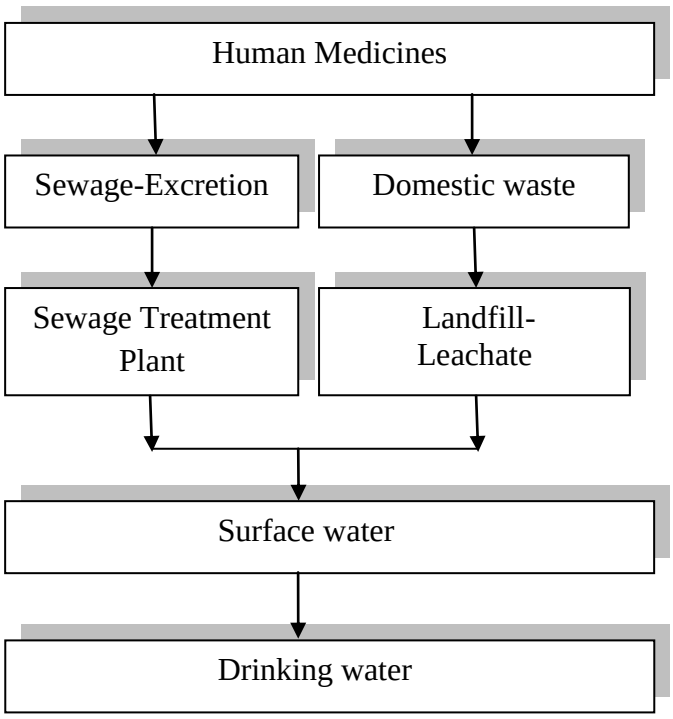

Fig-1: Sources of contamination with Pharmauticals and Personal care products

Personal care products include Disinfectants, Conservation agents, Fragrances, UV sunscreens. Pharmauticals includes agents used on blood and blood forming organs like acetylsalicylic acid and pentoxyfylline, agents for treatment of heart and circulatory diseases, dermatological drugs, antibiotics, analgesics, anti-inflators, agents used in treatment of allergy and asthma and anti-depressants. Antibiotics may exert their biological effect on natural microbial communities. Externally applied Personal care products are mostly discharged through bathing, swimming, shower waste and wasing sinks and reach the environment.

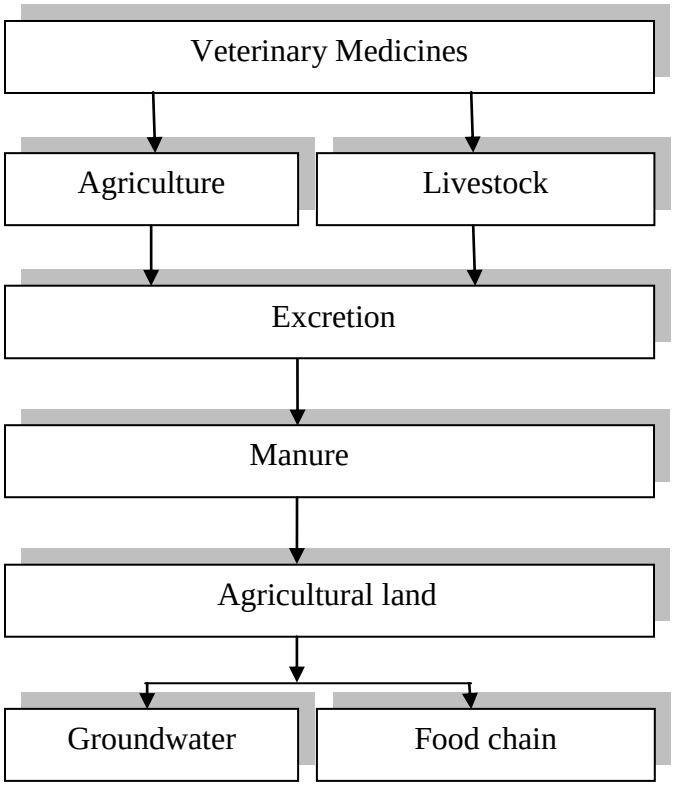

Fig-2: Sources of contamination with Pharmauticals for agriculture and livestock

5. CONCLUSION

Micropollutants such as Pharmaceuticals, Personal care products and other chemicals in wastewater are not get completely removed. Therefore it is a subject to intensive research on how to remove these compounds from wastewater. It is time for people to pay attention to the issue of micropollutants emission and even to designing to new treatment method.

REFERENCES

[1] Webber Wei-Po Lai, Yen-Ching Lin, Hsin-Hsin Tung, Shang-Lien Lo, Angela Yu-Chen Lin ”Occurrence of pharmaceuticals and per fluorinated compounds and evaluation of the availability of reclaimed water in Kinmen” Emerging Contaminants 2 (2016) 135e144.

[2] Lena Westhof a, Stephan Koster b, Margrit Reich ’Occurrence of micropollutants in the wastewater streams of cruise Ships’ Science Direct, Emerging Contaminants 2 (2016) 178e184.

[3] Edward Archer, Bruce Petrie b, Barbara Kasprzyk-Hordern b, Gideon M. Wolfaard’The fate of pharmaceuticals and personal care products (PPCPs), endocrine disrupting contaminants (EDCs), metabolites and illicit drugs in a WWTW and environmental waters’ Chemosphere 174 (2017) 437e446.

[4] Rui Dong ,Gang Yu, Yuntao Guan , Bin Wang , Jun Huang “Occurrence and discharge of pharmaceuticals and personal care products in dewatered sludge from WWTPs in Beijing and Shenzhen” Emerging Contaminants,2-2016-1/6.

[5] Victoria Osorio, Aitor Larranaga, Jaume Acena, Sandra Perez” Concentration and risk of pharmaceuticals in freshwater systems are related to the population density and the livestock units in Iberian Rivers” Science of the Total Environment-5-40(2016)267-277.

[6] Bruce Petrie, Benjamin D. Smith, Jane Youdan, Ruth Barden “Multi-residue determination of micro pollutants in Phragmites.

[7] Lena Westh of, Stephan Koster, Margrit Reich” Occurrence of micro pollutants in the wastewater streams of cruise ships” Emerging Contaminants” (2016)178-184.

[8] Anekwe Jennifer Ebele, Mohamed Abou- Elwafa Abdallah, Stuart Harrad “Pharmaceuticals and personal care products (PPCPs) in the freshwater aquatic environment” Emerging Contaminants, 2016-1-17.

[9] Melissa Rodriguez-Delgado a, Carolina Orona-Navar “Biotransformation kinetics of pharmaceutical and industrial micropollutants in groundwater by a laccase cocktail from Pycnoporus sanguineus CS43 fungi”

International Biodeterioration & Biodegradation 108 (2016) 34e41.

[10] Enrico Hamann, Pieter J. Stuyfzand "The fate of organic micropollutants during long E term/long E distance River bank filtration" Science of the Total Environment 545–546 (2016) 629–640.

[11] Marc Schwientek , Gaulle Guillet "A high-precision sampling scheme to assess persistence and transport characteristics of micropollutants in rivers" Science of the Total Environment 540 (2016) 444–454.

