INTRODUCTION

1. The environmental occurrence of organic micropollutants, such as pesticides, pharmaceuticals, industrial chemicals and their metabolites has experience fast growing interest. Due to the high level of consumption the pharmaceutical compounds (antibiotics, hormones and anti-inflammatory) became ubiquitous in the environment;

2. The EU COM(2011) 876 final proposal for amending Directives 2000/60/EC and 2008/105/EC as regarding to priority substances in the field of water policy recommend the inclusion of new pharmaceutical compounds in the list of priority substances in the field of water policy;

3. The lack of regulation concerning to production/emission to environment and subsequent effects as endocrine disrupters had made them a proprietary environmental problem. In order to assess this new problem it is important to establish monitoring programs that allow us to know their levels in the different environmental compartments.

STRUCTURE OF SOME ANTIBIOTICS AND SEXUAL HORMONES

BEIROLAS WWTP

1. Located near Vasco da Gama bridge in Lisbon (38.788786°N: 9.0971947°E);
2. Serves a population of 215,000 inhabitants;
3. Treats a volume of 54,000 m³/day of effluents (domestic and industrial);
4. The process performed incorporates primary, secondary and tertiary treatment;
5. Discharges the treated effluent in the Tagus River (Lisbon - Portugal).

MATERIALS AND METHODS

EXTRACTION
Solid Phase Extraction (ASPEC SYSTEM)

IDENTIFICATION/QUANTIFICATION
Liquid Chromatography/Mass spectrometry (LC/MS)

CARACTERIZATION
Gas Chromatography/Mass Spectrometry (GC/MS)

RESULTS AND DISCUSSION

1. The monitoring programme covered several composite samples collected in four different phases of the effluent treatment performed in Beirolas WWTP (namely: A - influent, B - after primary treatment, C - after secondary treatment and D - effluent);
2. In order to assess the seasonal variation, four sampling campaigns were made covering a two year’s period (2010-2012).
3. The samples were collected in three different time periods of the day (respectively: 9-11h, 13-15h and 19-21h).

1. Pharmaceutical compounds are present in different phases of Beirolas WWTP at ppb levels (μg L⁻¹);
2. Sulfamethoxazole, Ciprofloxacin, Tetracycline, Penicillin G and Estriol are the most detected pharmaceuticals compounds;
3. Most of the antibiotics are removed in Beirolas WWTP (removal rates vary from 25 to 100%). However, some of them were detected in the discharge effluent to Tagus River (Penicillin, Sulfamethoxazole and Tetracycline).

CONCLUSIONS

1. The results show that some pharmaceutical compounds are not completely removed by Beirolas WWTP;
2. The production/consumption of pharmaceuticals compounds has been growing in the last years and although the levels found for this compounds are low, these contributes to increase their concentration in the environmental compartments.

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