

# Occurrence and removal of organic pollutants in wastewater treatment plants of the tropical city Haikou, China

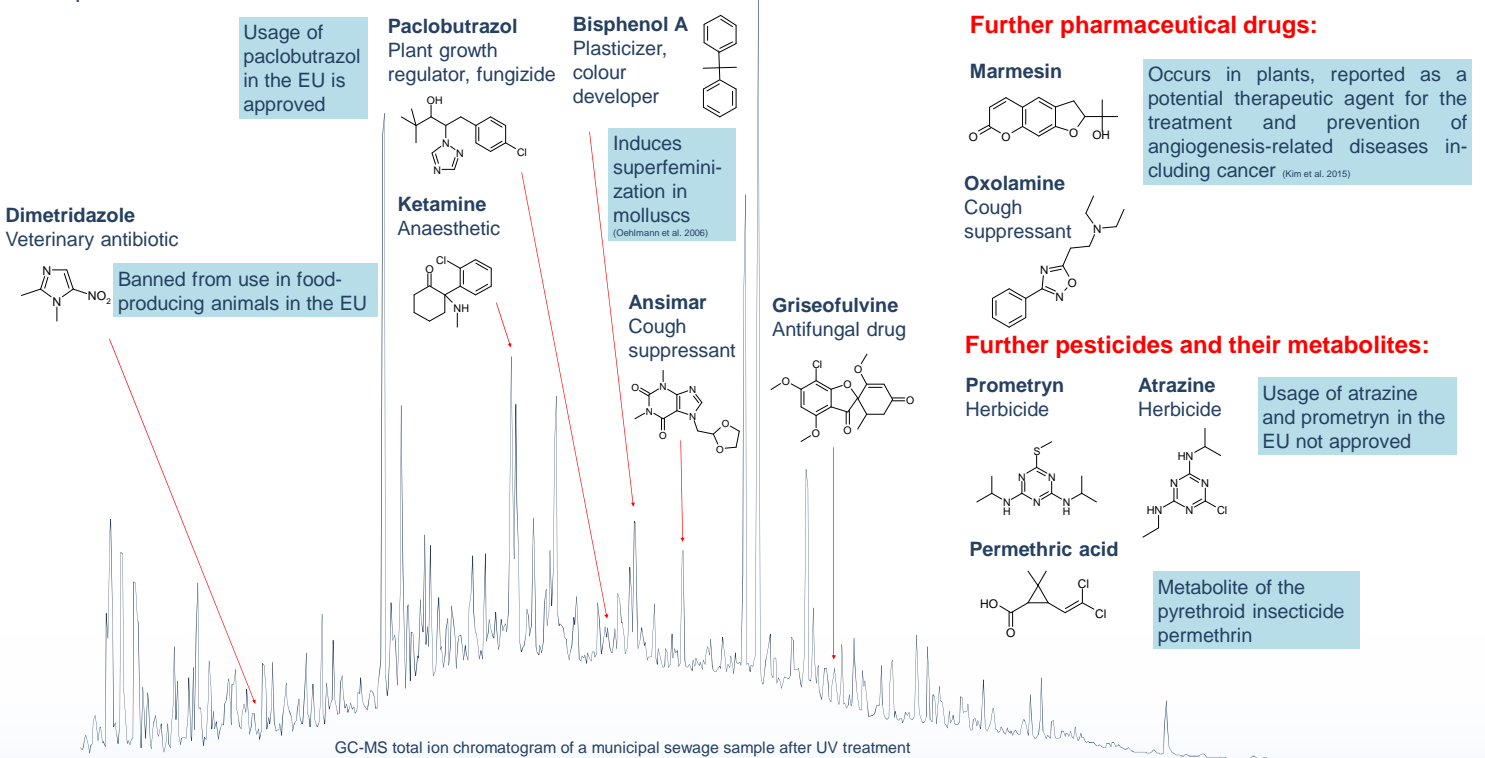
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Strongly varying water flows in wastewater treatment plants (WWTPs) impede an efficient removal of organic contaminants. This is a huge challenge for wastewater management in particular in tropical areas with their strong seasonal rainfall patterns. Haikou is the most populous city of Hainan province, a tropical island located in the South China Sea. Typhoons regularly affect Hainan Island during the hot and wet summer monsoon season.

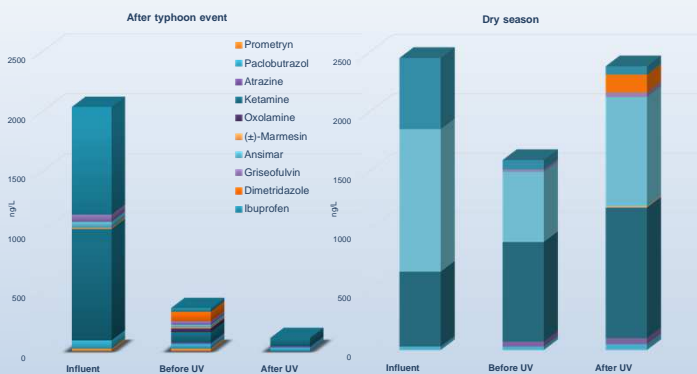
The aim of this study was a comprehensive characterization of the relevant organic pollutants in the cities' municipal wastewaters and, complementarily, an evaluation of the concentration levels before and after wastewater treatment during two seasons with different water flow regimes. The sewage samples were taken in 2015/16 shortly after a typhoon event and during the dry season in winter, respectively. Additionally, the urban coastal waters receiving the WWTP effluents were assessed.

## Identification of the relevant organic pollutants

Applying a non-target screening, around 60 relevant organic pollutants were identified in the wastewater samples. These contaminants include flame-retardants, synthetic fragrances and plasticizers that are all well-known household chemicals and have frequently been described from many world regions. In contrast, the spectrum of pharmaceutical drugs included compounds that were rarely reported as municipal wastewater constituents to date.



## Contamination levels and removal efficiencies under different flow regimes



The pollutant concentrations in the raw and treated municipal sewage during the dry season were higher than after the typhoon. High concentrations of the cough suppressant Ansimar were found during the dry season.

A higher efficiency of pollutant removal during the dry season was not observed. This was probably due to the organic matrix of the raw untreated sewage and a lower microbial activity at low temperatures during winter time.

## Contamination levels in urban surface waters

All biocides/pesticides were retrieved in the urban surface waters in the vicinity of the WWTPs, whereas only some of the pharmaceutical drugs were found. Most pollutants were detected at low concentrations.

	Freshwater samples (n=6)	Seawater samples (n=2)
Prometryn	n.d. - <10 ng L <sup>-1</sup>	n.d.
Paclitaxel	n.d. - <10 ng L <sup>-1</sup>	n.d.
Atrazine	n.d. - 10 ng L <sup>-1</sup>	n.d.
Ketamine	n.d. - 10 ng L <sup>-1</sup>	n.d.
Ibuprofen	n.d. - 1400 ng L <sup>-1</sup>	n.d.
Griseofulvine	n.d. - 10 ng L <sup>-1</sup>	n.d.

### References

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