

# Acquisition of environmental occurrence of pharmaceuticals by a database

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## Introduction

In the last decades many pharmaceuticals and their residues (PhaR) were detected in the environment (Daughton and Ternes, 1999) and lots of research projects deal with them today. Most projects focus on very specific aspects and do not combine different scientific areas involved like chemistry, biology, pharmaceuticals & pharmacology, wastewater management, process engineering, and agriculture. Therefore, attempt of this research is to collect available information of PhaR in a database to reach better understanding for a wide range of them under different aspects.

## Database

Data of PhaR and related information are collected via a literature screening and then fed directly into the database. An outline of the database's structure and its different sub-themes is given in Figure 1. A detailed description how database works within and between its parts is given in Hammer et al. (2005).

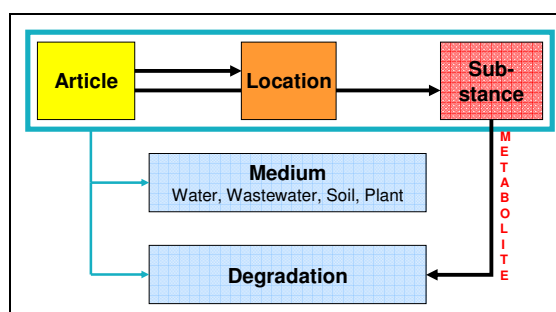


Figure 1: Sketch of database's structure

## Results and discussion

The database contains data of approx. 300 PhaR determined in articles about their appearance in the environment. 50 of the substances are metabolites. The database clearly reflects the emission paths of PhaR: consumption of humans, sewage, WWTP, secondary effluent, surface-, and groundwater. Quantitative consumption aspects are less important than properties of pharmaceuticals as polarity for resulting concentrations in the aquatic environment. Amount of PhaR differ clearly among media: they are in the range of mg/l in yellowwater, in µg/l range in raw wastewater and WWTPs effluent, while they exhibit ng/l in surface- and groundwater. In drinking water only clofibric acid, β-sistosterol, ibuprofen, bezafibrate, and diclofenac were detected (between 1-50 ng/l) so far. Additionally, it was proved that consumed PhaR are no relevant aspect to consider when arguing for or against risk of certain PhaR. Pharmacokinetic activities (resorption and renal excretion) have the major impact and change PhaR concentration in yellowwater and thus indirectly in household wastewater.

## Conclusion

By combining the sources of information focus shifts away from a small group of PhaR towards a wider perspective. The database is a useful tool to screen a wide range of PhaR, to gather their properties, and to present their overall behaviour. This screening is a unique approach in the field of research on PhaR in the environment.

## References

Daughton, C. and Ternes, T. (1999). Pharmaceuticals and personal care products in the environment: agents of subtle change? *Environmental Health Perspectives*, 107[6], 907-938.

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