



Distribution of *in vitro* (anti-)androgenicity in the river Wurm near Aachen (North Rhine-Westphalia, Germany)

By Aliaksandra Shuliakevich

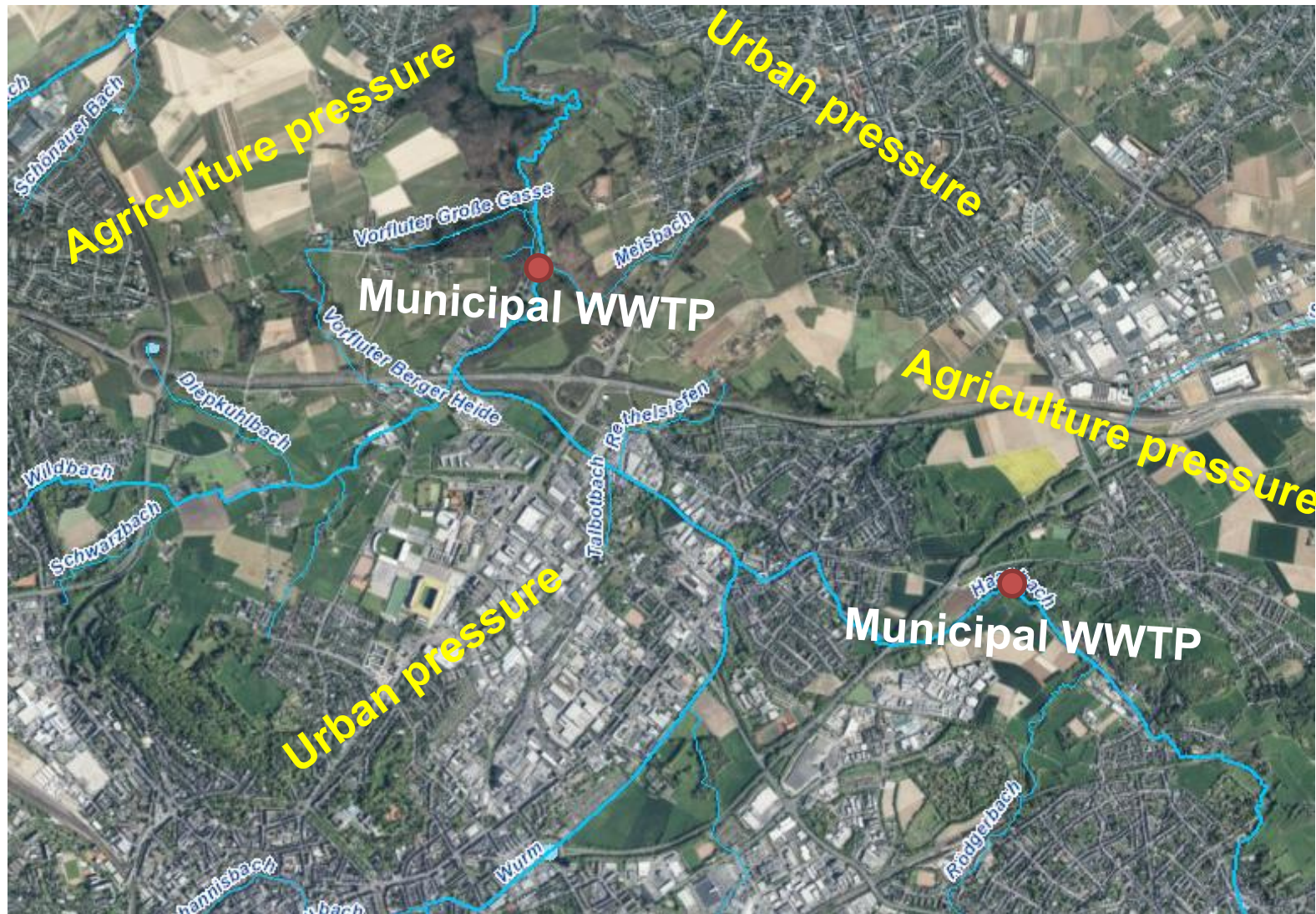
Coauthors: Katja Lisa Schroeder, Yvonne Mueller, Sophie Oster,
Svenja Karnatz, Sabrina Schiwy, Henner Hollert

Overview of the sampling area

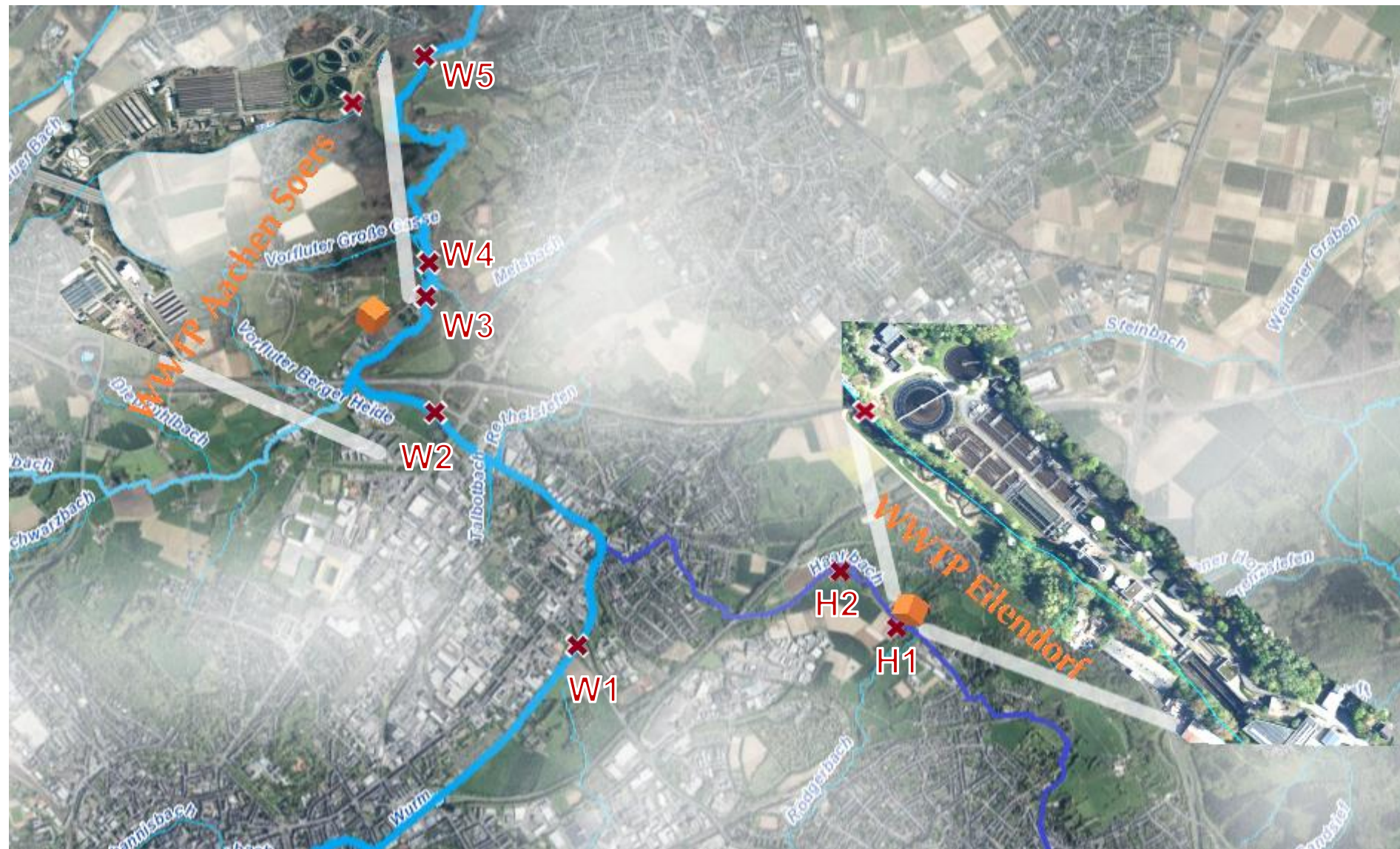


<https://www.elwasweb.nrw.de/elwas-web/index.jsf> 30.08.2018 15:00

Overview of the sampling area



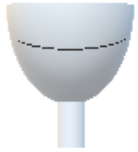
Sampling sites



Samples preparation

Water samples

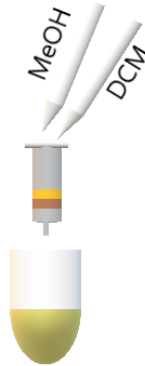
2500 mL



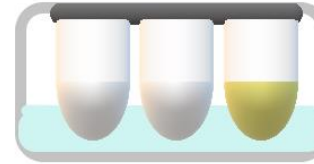
Filtration



Concentration



Elution



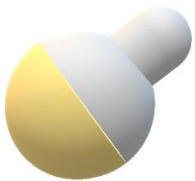
Evaporation



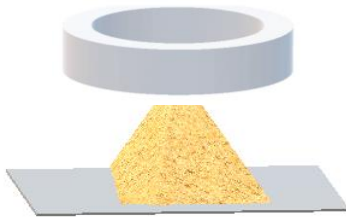
2500 mL / 1 mL DMSO

Resolving in DMSO

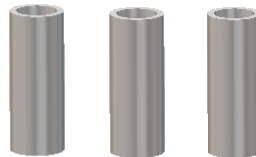
Sediment samples



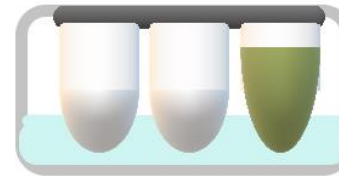
Freeze-drying



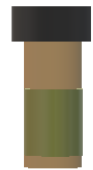
Sieving (2mm)



Pressurized Solvent Extraction



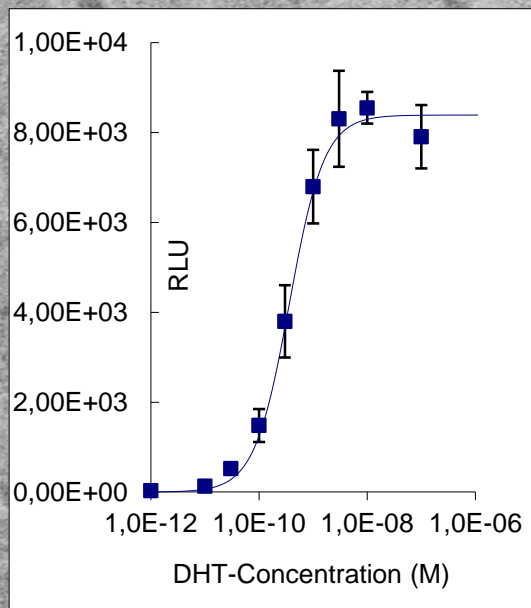
Evaporation



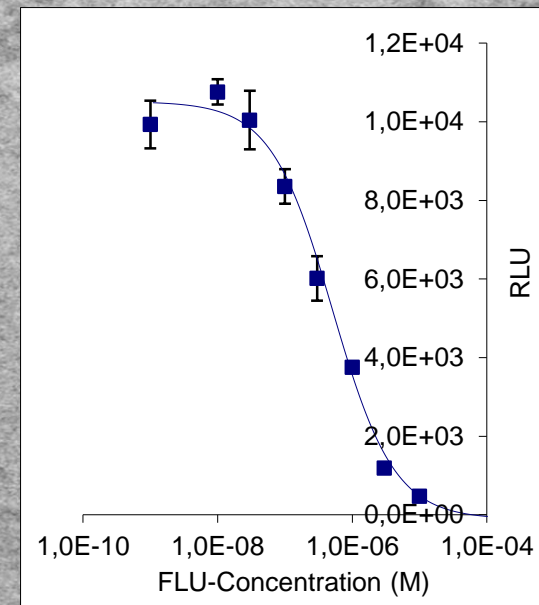
25 g SEQ / 1 mL DMSO

Resolving in DMSO

- (Anti-)AR Calux[®] with the U2OS-human cell line
- Testing of water and sediment extracts



Compared to Dihydrotestosterone (DHT)



Compared to Flutamide (FLU)

Background picture. Source: Schroeder K. L. (2018): An assessment of (anti-)androgenic activity at the wastewater treatment plant Aachen Soers as well as of sediments from the catchment area of the recipient water. Bachelor thesis.

(Anti-)androgenic activity within the WWTP Eilendorf

Sampling site	Androgenic activity, [pg DHT-EQ/ml]	Elimination, [%]	Anti-androgenic activity, [ng FLU-EQ/ml]	Elimination, [%]
ZKA-E (influent)	11.23 - 283.63		45.2 - 1560	
AKA-E (effluent)	-	100	20.1 - 30.2	0.1 - 67

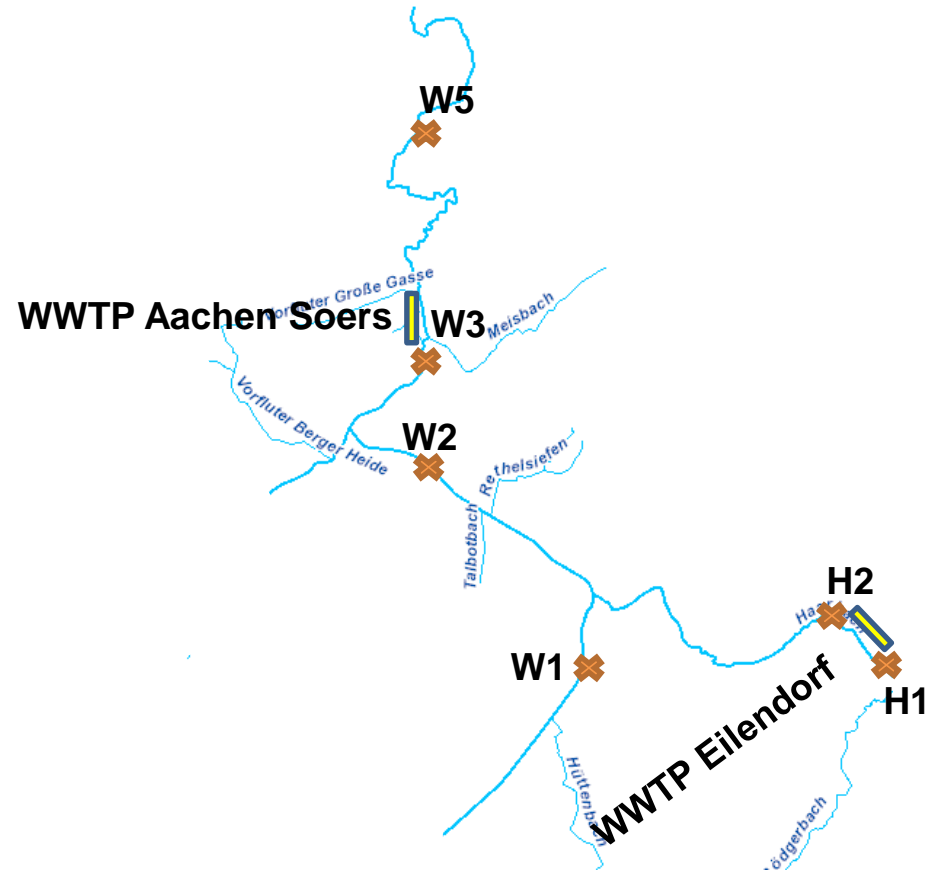


Distribution of anti-androgenic activity in the river Wurm

Sampling site	Water, [ng FLU-EQ/ml]	Sediment, [µg FLU-EQ/g]
H1	33.5 - 47.9	1.3 - 6.7
H2	26.4 - 33.7	7.1 - 14.5
W1	26.7 (n=1)	3.6 - 19.0
W2	23.4 - 60.7	4.5 - 18.6
W3	33.6 - 61.5	4.9 - 7.9
W5	9.9 - 76	3.0 - 14.1

*

No androgenic activity!



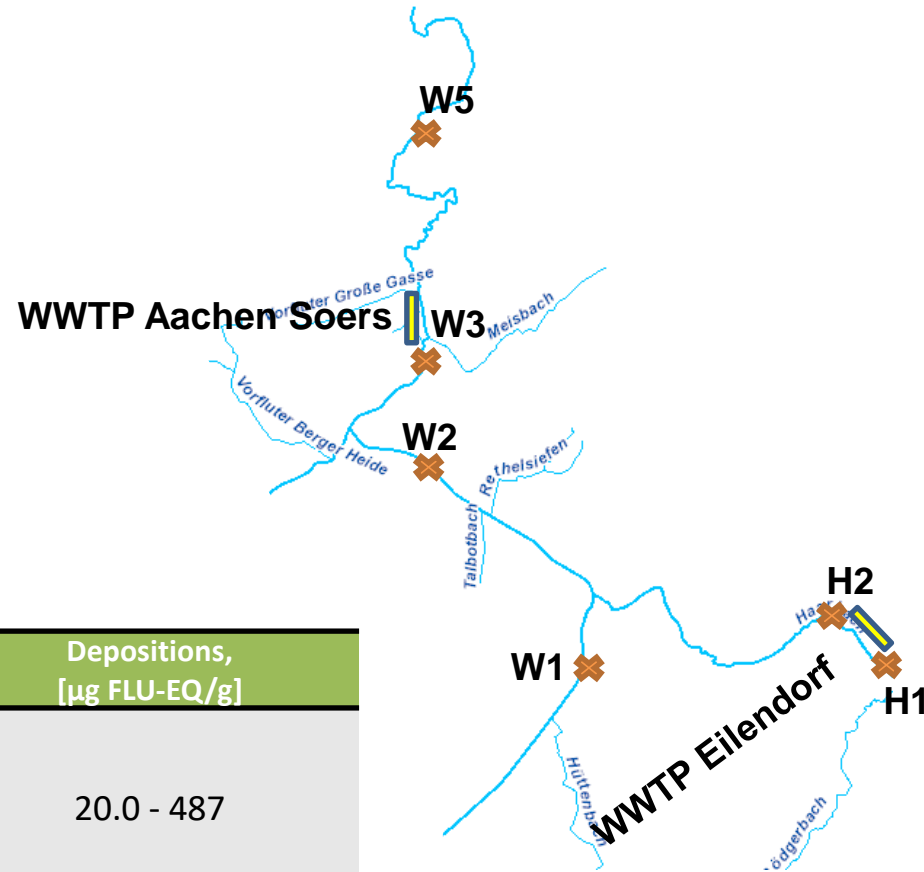
*significance evaluated by one-way ANOVA with Bonferroni' multiple comparisons test; p<0.05

Distribution of anti-androgenic activity in the river Wurm

Sampling site	Water, [ng FLU-EQ/ml]	Sediment, [µg FLU-EQ/g]
H1	33.5 - 47.9	1.3 - 6.7
H2	26.4 - 33.7	7.1 - 14.5
W1	26.7 (n=1)	3.6 - 19.0
W2	23.4 - 60.7	4.5 - 18.6
W3	33.6 - 61.5	4.9 - 7.9
W5	9.9 - 76	3.0 - 14.1

*

No androgenic activity!



Sampling site	Water, [ng FLU-EQ/ml]	Depositions, [µg FLU-EQ/g]
Rain-water spillway basin of the WWTP Aachen Soers	30.2 - 73.3	20.0 - 487

*significance evaluated by one-way ANOVA with Bonferroni' multiple comparisons test; p<0.05

<https://www.elwasweb.nrw.de/elwas-web/index.jsf> 30.08.2018 15:00

Thank you for your attention!



Applicant:



Funding:

Ministerium für Klimaschutz, Umwelt,
Landwirtschaft, Natur- und Verbraucherschutz
des Landes Nordrhein-Westfalen



Cell providing:



Project partners:





Supplementary material

Sample	Water extracts		Sediment extracts
	ER α Calux, [ng E2-EQ/ml]	Anti-ER α Calux, [ng TAM- EQ/ml]	
H1	0.3	40.4	28.7
H2	0.1	29.5	70.0
W1	0.1	26.7	57.0
W2	0.4	43.5	78.7
W3	0.2	38.0	48.0
W4			53.0
W5	0.2	56.8	59.3
AKA-E	<LOQ	90.2	
ZKA-E	43	23.8	
Rainwater spillway basin		46.7	



Sampling site	Anti-AR activity, [μg FLU-EQ/g]	TOC, [%]
SED_H1_VOR	3.9	1.2
SED_W3_VOR	6.1	0.6
SED_W5_VOR	6.6	0.6
SED_W1_VOR	10.2	2.4
SED_W2_VOR	10.4	0.7
SED_H2_VOR	11.2	1.6