Analysis of the Atrazine removal from drinking water by Filbec-Nano™ carbon filtration cartridge

1 Customer:

FILBEC GmbH
Edisonstraße 22
68309 Mannheim
Germany
HRB 733224
Ust-IdNr.: DE324934854

2 Description of the measurement setup and sampling method

The **Atrazine** was chosen as a representative of group **of pesticide** contaminants of drinking water.

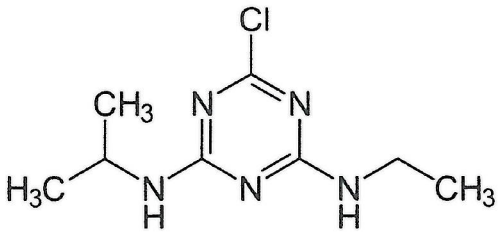

Fig. 1. Atrazine chemical structure

The measurement setup is depicted on the fig. 2 below. The sampling procedure utilized the standard tap drinking water. The water was filled into 250 l container and contaminated with defined dosage of Atrazine to achieve the targeted concentration of 5 µg/l. The contaminated water was continuously homogenized by circular pump. The water was fed through the tested filter Filbec-Nano™ by pressure-controlled feeding pump at pressure 4 bar and targeted throughput 200 l/hour (approx. 3.3 l/min). The water samples for concentration analysis were extracted on the filter inlet and outlet simultaneously at defined values of total throughput in order to calculate the absorption efficiency. After the 250 l (container emptying) the procedure was repeated to examine the absorption efficiency during the expected lifetime of the filter cartridge.

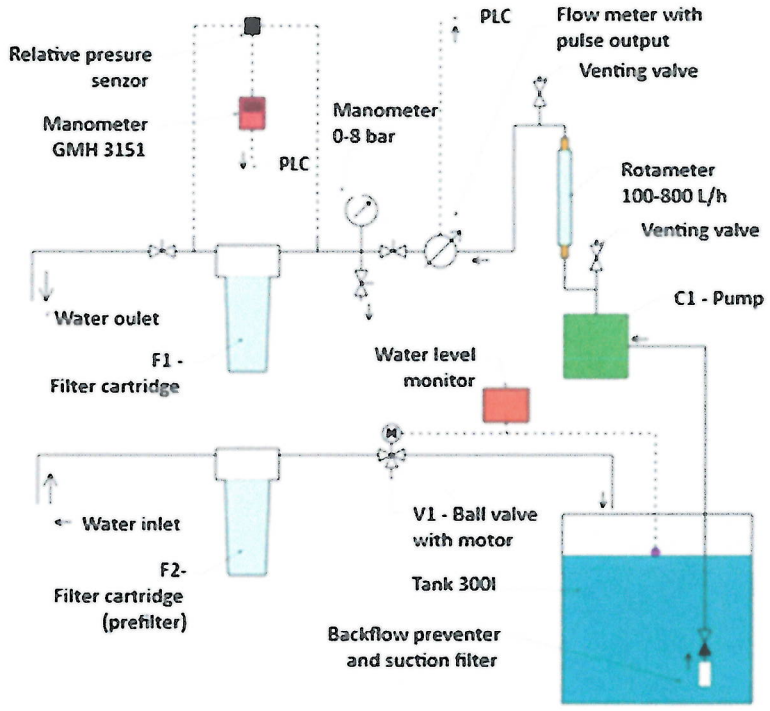

Fig. 2. Scheme of the measurement setup

3 Description of the analytical method

The concentration of Atrazine in the sampled water probes were measured by High-performance liquid chromatography HPLC/MS using AB Sciex 3200 QTRAP device equipped with Dionex Ultimate 3000. The results of performed analyses are concluded in the table below.

4 Measurement results

Total volume [l]	Atrazine concentration [µg/l]	
	Before filter	Behind filter
50	5.32	Under detection limit
250	5.26	Under detection limit
500	5.64	Under detection limit
800	5.07	Under detection limit
1000	5.16	Under detection limit
1250	4.69	Under detection limit

Table 1. Concentration of analyzed samples

5 Resume

Concentration limit for pesticides in drinking water is 0.5 µg/l (EU standard (Council Directive 98/83/EC (adopted in Directive (EU) 2020/2184 [1])) on the quality of water intended for human consumption)). The concentration of the Atrazine **contaminant behind the filter Filbec Nano™ was in all measurements lower than detection limit** of the analytical method (0.3 µg/l).

6 References

1. Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption; https://eur-lex.europa.eu/eli/dir/2020/2184/oj

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Analysis of the Ibuprofen removal from drinking water by Filbec-Nano™ carbon filtration cartridge

1 Customer:

FILBEC GmbH
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Germany
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Ust-IdNr.: DE324934854

2 Description of the measurement setup and sampling method

The **Ibuprofen** was chosen as a representative of **medical drug residues** of drinking water.

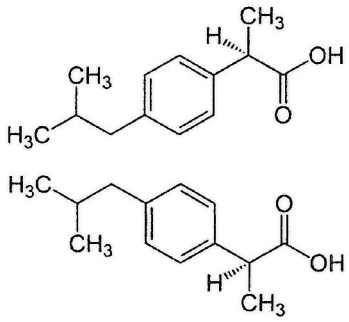

Fig. 1. Ibuprofen chemical structure

The measurement setup is depicted on the fig. 2 below. The sampling procedure utilized the standard tap drinking water. The water was filled into 250 l container and contaminated with defined dosage of Ibuprofen to achieve the targeted concentration of 50 µg/l. The contaminated water was continuously homogenized by circular pump. The water was fed through the tested filter Filbec-Nano™ by pressure controlled feeding pump at pressure 4 bar and targeted throughput 200 l/hour (approx. 3.3 l/min). The water samples for concentration analysis were extracted on the filter inlet and outlet simultaneously at defined values of total throughput in order to calculate the absorption efficiency. After the 250 l (container emptying) the procedure was repeated to examine the absorption efficiency during the expected lifetime of the filter cartridge.

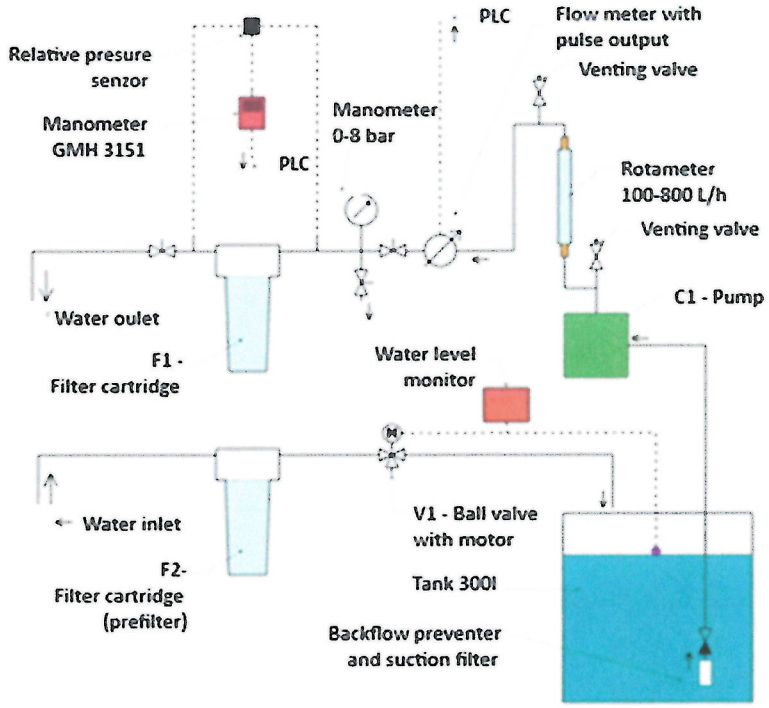

Fig. 2. Scheme of the measurement setup

3 Description of the analytical method

The concentration of Ibuprofen in the sampled water probes were measured by High-performance liquid chromatography HPLC/MS using AB Sciex 3200 QTRAP device equipped with Dionex Ultimate 3000. The results of performed analyses are concluded in the table below.

4 Measurement results

Total volume [l]	Ibuprofen concentration [µg/l]	
	Before filter	Behind filter
250	46	Under detection limit
500	49	Under detection limit
1000	43	Under detection limit
1250	43	Under detection limit
1500	44	Under detection limit

Table 1. Concentration of analyzed samples

5 Resume

The concentration of the **Ibuprofen** contaminant behind the **filter Filbec Nano™ was in all measurements lower than detection limit of the method** (5 µg/l). The concentration limit for drinking water is not quantified by EU standard (Council Directive 98/83/EC (adopted in Directive (EU) 2020/2184 [1])).

6 References

1. Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption; https://eur-lex.europa.eu/eli/dir/2020/2184/oj

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Analysis of the Cu^{2+} removal from drinking water by Filbec-Nano™ carbon filtration cartridge

1 Customer:

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Germany
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2 Description of the measurement setup and sampling method

The Cu^{2+} was chosen as a representative of group of **heavy metal** contaminants of drinking water.

The measurement setup is depicted on the fig. 1 below. The sampling procedure utilized the standard tap drinking water. The water was filled into 250 l container and contaminated with defined dosage of $CuSO_4$ to achieve the targeted concentration of 1.5 mg/l Cu^{2+} ion. The contaminated water was continuously homogenized by circular pump. The water was fed through the tested filter Filbec-Nano™ by pressure-controlled feeding pump at pressure 4 bar and targeted throughput 200 l/hour (approx. 3.3 l/min). The water samples for Cu^{2+} concentration analysis were extracted on the filter inlet and outlet simultaneously at defined values of total throughput in order to calculate the absorption efficiency. After the 250 l (container emptying) the procedure was repeated to examine the absorption efficiency during the expected lifetime of the filter cartridge.

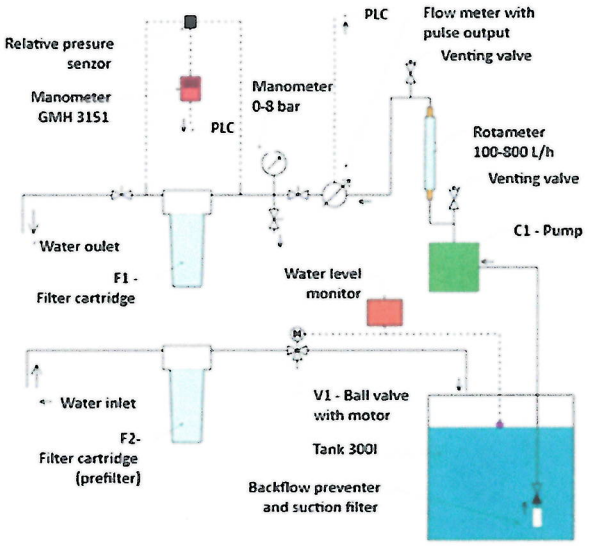

Fig. 1. Scheme of the measurement setup

3 Description of the analytical method

Samples of the water were diluted to standard measurable concentrations and measured by inductively coupled plasma optical emission spectrometry (ICP OES), OPTIMA 2100 DV from Perkin Elmer. The results of performed analyses are concluded in the table below.

4 Measurement results

Total volume [l]	Concentration Cu^{2+} [mg/l]		Concentration limit in drinking water [mg/l]
	Before filter	Behind filter	
50	1,43	0,04	2,00
250	0,83	0,05	
500	1,09	0,05	

Table. 1 Concentration of analyzed samples

5 Resume

The Filbec-Nano™ filtration cartridge exhibited such an efficient degree of removal of Cu^{2+} that the final concentration (0,05 mg/l) was significantly below the EU Concentration limit of Cu^{2+} standard, which is 2,00 mg/l. Concentration limit of Cu^{2+} is 2,00 mg/l (EU standard - Council Directive 98/83/EC on the quality of water intended for human consumption (adopted in Directive (EU) 2020/2184 [1])). Concentration Cu^{2+} in water filtered with Filbec Nano™ **was in all measurement results below 0.05 mg/l.**

6 References

1. Directive (EU) 2020/2184 of the European Parliament and of the Council of 16 December 2020 on the quality of water intended for human consumption; https://eur-lex.europa.eu/eli/dir/2020/2184/oj

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