

Oil and grease in waste water

Determination of oil and grease in waste water using the UniversalExtractor E-800 according to Standard Methods AWWA 5520

This Short Note describes the extraction and determination of oil and grease from waste water samples following Standard Methods 5520 part D (Soxhlet Extraction Method). "Oil and grease" is defined as any material recovered as a substance soluble in the solvent [1]. Therefore, compounds with similar physical properties will be determined as well as oil and grease (e.g. sulfur compounds, organic dyes, chlorophyll).

1. Introduction

The waste water sample is acidified with hydrochloric acid and extracted using a Soxhlet extraction method on the UniversalExtractor E-800.



Figure 1: UniversalExtractor E-800

After the extract has been dried to a constant weight, the amount of oil and grease is determined gravimetrically.

This Short Note is suitable for biological lipids and mineral hydrocarbons, as well as for most industrial waste water. It is not applicable to low-boiling point fractions which vaporize below 85 °C [1].

For this Short Note distilled water was spiked with sunflower seed oil (certified reference material). A blank was determined as well.

2. Experimental

1 L water sample was spiked with sunflower seed oil. The sample was acidified with hydrochloric acid and filtrated through a muslin cloth and a filter paper covered with a Celite Hyflo Supercel suspension. Prior to extraction the filter was dried in a drying oven. The extraction was carried out on the UniversalExtractor E-800 a Soxhlet extraction method. After the extract has been dried to a constant weight, the amount of oil and grease is determined gravimetrically. A blank was determined as well.



Figure 2: Filtration flask with Buchner funnel, muslin cloth and filter.

Table 1: Parameters for extraction with UniversalExtractor E-800

Parameter	Value
Extraction method	Soxhlet
Solvent	n-Hexane
Solvent volume	150 mL
Extraction: Time Heating level	240 min 11
Rinse: Time Heating level	5 min 11
Dry: Time 1 Heating level Time 2 Heating level Time 3 Heating level	Analyte protection <input checked="" type="checkbox"/> 0 min 11 Analyte protection <input type="checkbox"/> 5 min 5 Analyte protection <input type="checkbox"/> 5 min 0

3. Results

Table 2: Blank content in water sample.

m _{Beaker} [g]	m _{total} [g]	m _{Extract} [mg]	V _{sample} [L]	Blank [mg/L]
110.7754	110.7803	4.9	0.9805	5.0
110.8154	110.8194	4.0	0.9843	4.0
110.2852	110.2900	4.8	0.9693	4.9
Mean value [%]				4.6
rsd [%]				11.27

Table 3: Oil and grease content in water sample; sample spiked with 100 mg of sunflower seed oil (blank value: 4.6 mg/L).

m _{Beaker} [g]	m _{total} [g]	m _{Extract} [mg]	m _{spike} [mg]	V _{sample} [L]	Oil and grease [mg/L]	Recovery [%]
111.1160	111.2364	120.4	116.1	0.9817	117.98	101.62
111.2416	111.3466	105.0	100.8	0.9925	101.13	100.33
111.3614	111.4693	107.9	100.5	0.9769	105.78	105.25
Mean value [%]						102.40
rsd [%]						2.50

4. Conclusion

The oil and grease content of waste water samples can be determined using the UniversalExtractor E-800 following Standard Methods AWWA 5520.

5. References

[1] Standard Methods AWWA 5520 Oil and Grease; approved by Standard Methods Committee, 2001.

For more detailed information and safety considerations please refer to the Application Note No. 374/2019.