Supplementary Material Data

Table S1. Physical parameters of natural clinoptilolite.

SiO_2	wt.%	78.0
Al_2O_3	wt.%	13.0
CaO	wt.%	2.10
Na_2O	wt.%	0.14
K_2O	wt.%	4.20
MgO	wt.%	1.13
Fe_2O_3	wt.%	1.22
Impurities	wt.%	0.21
Surface area	m^2/g	25

Tablo S2. Experimental optimization parameters.

Factors	**Levels**
A-Flow rate (L/min)	0.4, 0.6, 0.8
B-Temperature (^oC)	30, 60, 90
C- Filtered substance concentration (MB,) (mg/L)	5, 10, 15
C- Filtered substance concentration (LAS) (mg/L)	50, 100, 150
C- Filtered substance concentration (Oil) (%)	1, 2, 3

Table S3. Synthetic gray water contents and concentrations.

Synthetic Gray Water Contents	**Concentrations (mg/L)**
MP	200
SSM	100
LAS	50
Glycerol	200
MB	20
Phosphate	20
Nitrate	20

Table S4. Zone diameters formed by filters with gram positive and negative bacteria.

Membrane	Zone diameter (mm) (*S.Aureus*) +	Zone diameter (mm) (*E.Coli*) -
PVDF	-	0.5
PVDF-1wt.%Clp	2	2
PVDF-2wt.%Clp	2	2
PVDF-3wt.%Clp	1	2
PVDF-4wt.%Clp	1	2

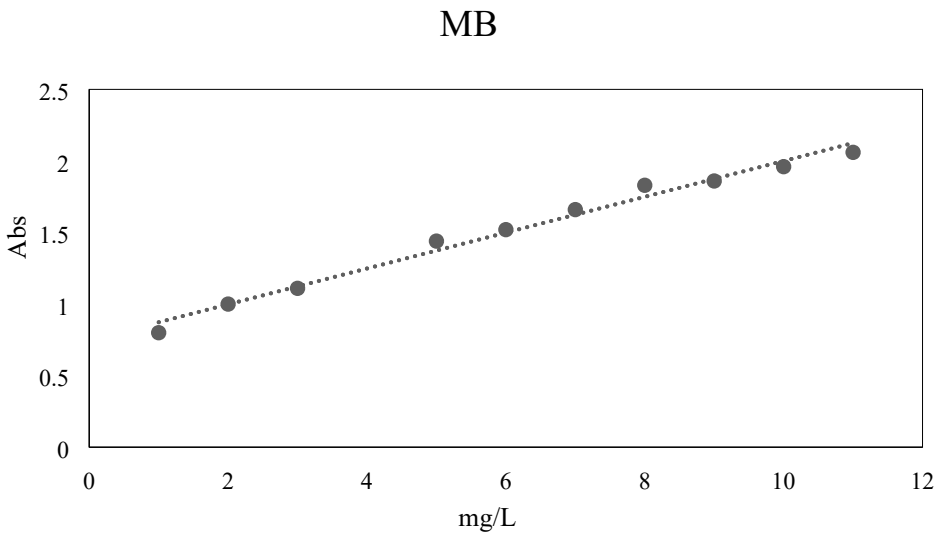

Figure S1. Methylene blue (MB) calibration graph.

LAS Determination

In this analysis, a 50-ml sample was taken into a separatory funnel. 1 drop of phenolphthalein indicator was added to the solution, and 1N sodium hydroxide was added until the medium became basic (pink color appeared). Next, we added 1N sulfric acid solution until the medium became neutral and the pink color vanished. 5 mL of chloroform and 12.5 mL of methylene blue were added and shaken vigorously for 30 seconds and waited for at least 10 minutes. The resulting lower phase was taken into the second separation funnel. This procedure was repeated twice more. 25 mL of washing solution was added to the solution collected in the second separatory funnel. Shaken vigorously for 30 seconds and waited for at least 10 minutes. The resulting subphase was transferred to a 50-mL flask and completed with chloroform to the marker line. In the UV-Vis spectrophotometer (Shimadzu 1280), concentrations were read directly according to the calibration curves with the help of the UV-Probe program against

chloroform blank solution at 652 nm wavelength. Rejection percentage was calculated from the concentration difference.

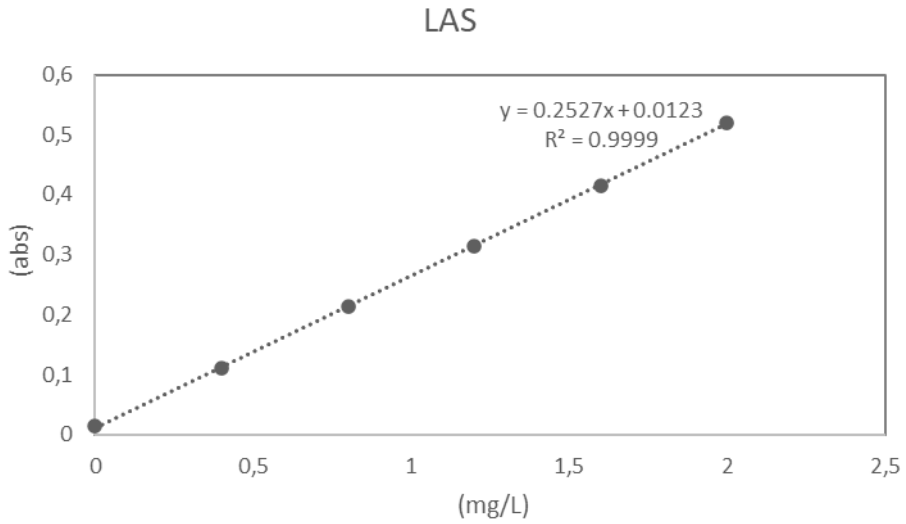

Figure S2. Linear alkyl nenzene sulfonate (LAS) calibration graph.

COD Determination

To prepare the potassium dichromate-mercury sulfate solution, 33.3 g of mercury sulfate ($HgSO_4$) was dissolved in 700 mL of distilled water and 167 mL of concentrated H_2SO_4 (1.84 g/mL). To the cooled solution was added 10.216 g $K_2Cr_2O_7$ (dried at 105 ^oC for two hours). This solution was made up to 1 L with distilled water. To prepare a sulfuric acid-silver sulfate solution, 10.12g silver sulfate (Ag_2SO_4) was dissolved in 1 L H_2SO_4 (1.84 g/mL). The solution was prepared one day before use and stored in a colored bottle. Potassium hydrogen phthalate (KHP) stock COD solution was prepared by dissolving 0.425 g of KHP, brought to constant weight at 120 ^oC, in distilled water and added to 500 mL. Standard solutions were prepared to correspond to the range of 100-1000 COD. While preparing the sample, 1.5 mL of potassium dichromate-mercury sulfate solution, 3.5 mL of sulfuric acid-silver sulfate solution and 2.5 mL of the solution to be measured COD were added. The prepared solutions were heated in a thermoreactor at 150 ^oC for two hours.

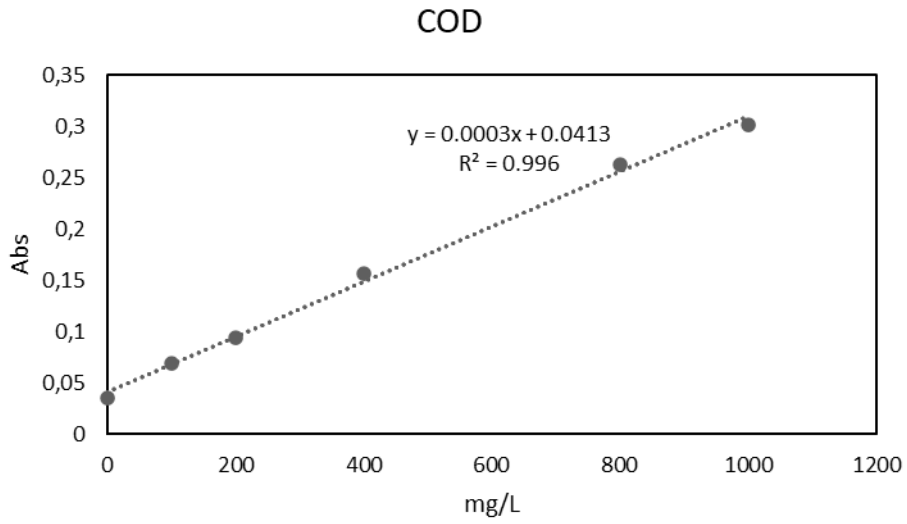

Figure S3. Chemical oxygen demand calibration graph.

Turbidity Determination

To prepare Solution I, 1g hydrazine sulfate ($(NH_2)_2H_2SO_4$) was dissolved in purified water in a 100 flask. It was completed up to the mark line and shaken well. To prepare solution II, 10g hexamethylene tetra amine ($(CH_2)_6N_4$) was dissolved in 100 fl. It was completed up to the mark line and shaken well. To prepare the stock solution, 5 mL solution I and 5 mL solution II were mixed well in a 100 flask. It was kept at 25 ^oC for 24 hours. It was completed with distilled water up to the mark line and mixed thoroughly. For the preparation of the standard solution, 25 mL of the stock solution was taken and diluted to the mark in a 100 parts balanjugate and mixed thoroughly. A calibration graph was generated from the standard solutions.

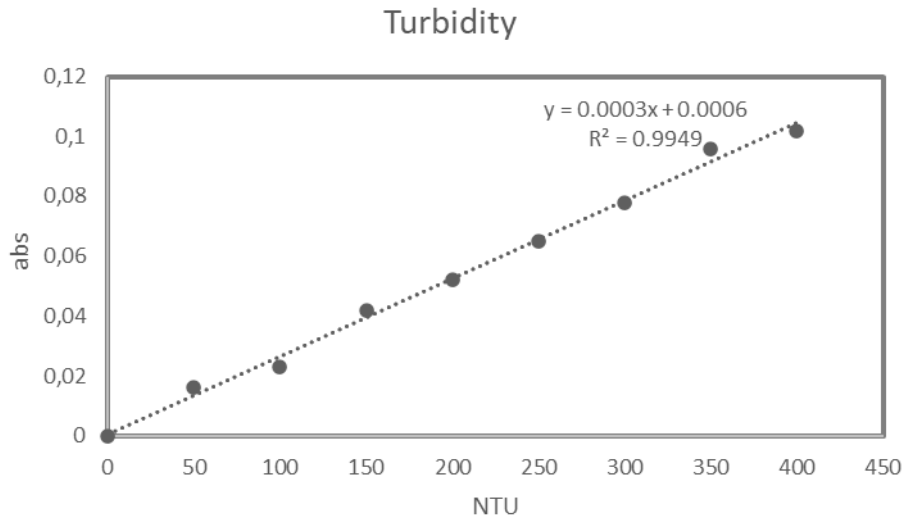

Figure S4. Turbidity calibration graph.

Table S5. Results of MB rejection.

Run	A:Flow rate (L/min)	B:Temperature (°C)	C: Concentration (mg/L)	Rejection (%)
1	0.6	90	10	98
2	0.6	30	10	99.8
3	0.4	90	15	98.3
4	0.6	60	10	98.3
5	0.4	90	5	98.6
6	0.6	60	10	98.4
7	0.8	90	5	97.8
8	0.6	60	10	98.4
9	0.8	30	15	99.5
10	0.4	60	10	98.9
11	0.4	30	5	99.9
12	0.4	30	15	99.8
13	0.8	30	5	99.5
14	0.8	90	15	97.2
15	0.6	60	15	98.2
16	0.6	60	5	98.7
17	0.8	60	10	97.9

Table S6. ANOVA analysis of MB rejection according to the second-order model.

Source	Sum of Squares	df	Mean Square	F-value	p-value
Model	9.98	9	1.11	66.32	< 0.0001
A-Flow rate	1.30	1	1.30	77.48	< 0.0001
B-Temperature	7.40	1	7.40	442.18	< 0.0001
C-Concentration	0.2250	1	0.2250	13.45	0.0080
AB	0.1800	1	0.1800	10.76	0.0135
AC	0.0050	1	0.0050	0.2989	0.6015
BC	0.0800	1	0.0800	4.78	0.0650
A^2	0.0048	1	0.0048	0.2860	0.6094
B^2	0.5614	1	0.5614	33.56	0.0007
C^2	0.0002	1	0.0002	0.0096	0.9246
Lack of Fit	0.1104	5	0.0221	6.63	0.1363
Error	0.0067	2	0.0033	0.0067	2

Table S7. Results of oil rejection.

Run	A:Flow Rate (L/min)	B:Temperature (°C)	C:Concentration (mg/L)	Rejection (%)
1	0.8	90	3	97.9
2	0.6	60	2	98.4
3	0.6	60	3	98.2
4	0.6	30	2	98.9
5	0.4	30	3	99.1
6	0.4	90	3	98
7	0.4	60	2	98.7
8	0.6	60	1	99.2
9	0.8	90	1	98.9
10	0.6	60	2	98.5
11	0.8	30	3	98.9
12	0.4	90	1	99.4
13	0.8	30	1	99.4
14	0.8	60	2	98
15	0.6	60	2	98.4
16	0.4	30	1	99.95
17	0.6	90	2	98.1

Table S8. ANOVA analysis of oil rejection according to the second-order model.

Source	Sum of Squares	df	Mean Square	F-value	p-value
Model	5.44	9	0.6043	50.30	< 0.0001
A-Flow rate	0.4202	1	0.4202	34.98	0.0006
B-Temperature	1.56	1	1.56	129.88	< 0.0001
C-Concentration	2.26	1	2.26	187.82	< 0.0001
AB	0.0028	1	0.0028	0.2341	0.6433
AC	0.0703	1	0.0703	5.85	0.0461
BC	0.1378	1	0.1378	11.47	0.0116
A^2	0.0010	1	0.0010	0.0836	0.7808
B^2	0.0769	1	0.0769	6.40	0.0393
C^2	0.3655	1	0.3655	30.43	0.0009
Lack of Fit	0.0774	5	0.0155	4.65	0.1866
Error	0.0067	2	0.0033		0.0067

Table S9. Results of LAS rejection.

Run	A:Flow rate	B:Temperature	C:Concentration	Rejection

	(L/min)	(°C)	(mg/L)	(%)
1	0.4	30	50	92
2	0.8	30	150	69
3	0.4	90	150	73
4	0.8	90	150	61
5	0.6	60	50	71
6	0.4	30	150	83
7	0.6	30	100	71
8	0.8	60	100	64
9	0.6	60	100	66
10	0.4	90	50	79
11	0.6	60	100	64
12	0.8	30	50	75
13	0.6	60	100	65
14	0.6	60	150	64
15	0.8	90	50	64
16	0.4	60	100	80
17	0.6	90	100	60

Table S10. ANOVA analysis of oil rejection according to the second-order model.

Source	Sum of Squares	df	Mean Square	F-value	p-value
Model	1226.40	9	136.27	273.74	<0.0001
A-Flow rate	547.60	1	547.60	1100.07	< 0.0001
B-Temperature	280.90	1	280.90	564.30	< 0.0001
C-Concentration	96.10	1	96.10	193.05	< 0.0001
AB	2.00	1	2.00	4.02	0.0851
AC	4.50	1	4.50	9.04	0.0198
BC	4.50	1	4.50	9.04	0.0198
A^2	123.99	1	123.99	249.08	< 0.0001
B^2	0.2457	1	0.2457	0.4935	0.5050
C^2	14.21	1	14.21	28.54	0.0011
Lack of Fit	1.48	5	0.2969	0.2969	0.8815
Error	2.00	2	1.0000		

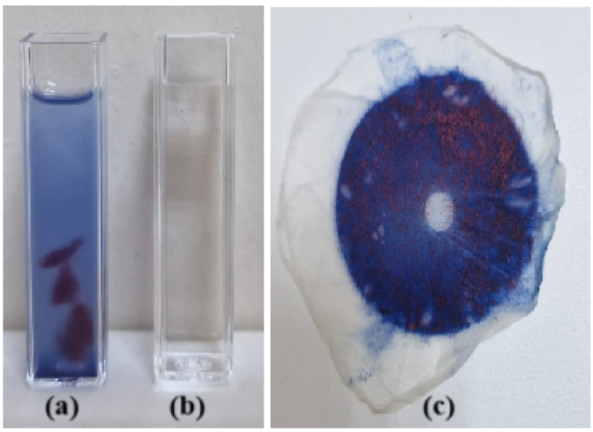

Figure S5. Image of synthetic gray water before filtration (a), after filtration and membrane after filtration (c).