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Laboratory evaluation of the performance of an Aquadyne Membrane Filtration Unit.

Aim

To evaluate the filtration efficiency of an Aquadyne Membrane Filtration Unit using a water sample contaminated with *Escherichia coli*.

Method

A 10 L sample of ¼ strength Ringers solution at 22 C was contaminated with *E. coli*, from a batch grown culture in nutrient broth, to give a final concentration of more than 10⁹ cell per 100 ml. This was subjected to filtration through an Aquadyne hand-pumped membrane filtration unit and samples of filtrate collected after at least 6 L of filtrate had been produced. Duplicate samples of filtrate and duplicate samples of the unfiltered contaminated water were subjected to serial dilutions and counted by the Membrane Filtration Method using membrane lauryl sulphate broth medium, and incubated for 18h at 44C before counting.

Results

Table 1 shows that counts of *E. coli* in the contaminated water were extremely high, more than 10⁹ per 100 ml, a concentration which is far greater than that of many contaminated surface waters (10⁴ to 10⁶/100 ml, personal communication of the author). After filtration, neither of the filtered samples showed any evidence of *E. coli*, giving a minimum removal efficiency of 9-log removal.

Conclusion

On the evidence of the tests conducted on this Aquadyne unit, the high removal efficiency of *E. coli* indicates that the filter should be capable of removing very substantial quantities of pathogenic microorganisms present in untreated water supplies.

Table 1. Enumeration of *E. coli* in contaminated water before and after filtration through an Aquafilter membrane filter unit.

<i>Contaminated Water</i>	<i>AFC6</i>	<i>AFC5</i>	<i>AFC4</i>	<i>AFC3</i>	<i>AFC1</i>	<i>AFC2</i>
Sample Dilution	10 ⁻⁸	10 ⁻⁸	10 ⁻⁷	10 ⁻⁷	10 ⁻⁶	10 ⁻⁶
CFU on plate	8	8	101	109	>201	>201
E-Coli CFU/ 100ml	8.00E+08	8.00E+08	1.01E+09	1.09E+09	TNTC	TNTC
Contaminated Water Average CFU/100ml	8.00E+08		1.05E+09		TNTC	
Filtrate (treated water)						
	<i>AF1</i>	<i>AF2</i>				
Sample Dilution	10 ⁰	10 ⁰				
CFU on plate	0	0				
E-Coli CFU/ 100ml	<1	<1				
Filtrate Average CFU/100ml	<1					
Removal Efficiency						
	Log Reduction					
Compare (AFC3 , AFC4) with (AF1, AF2)	>9 Log Removal					

TNTC = too numerous to count

CFU = colony forming units

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