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Test report

Preliminary test of APC vortex purification system

The Norwegian Institute for Water Research (NIVA) has, on contract basis, carried out a preliminary test of a portable APC vortex purification system for drinking water. APC vortex purification system is designed for use at the tap in order to satisfy the requirements given by the health authorities for hygienic and chemical drinking water quality.

The purification system was tested with natural surface water (colour 23-25 mg Pt/l) containing humic matter with addition of fresh municipal sewage in order to imitate a strong and acute pollution of sewage (coliform bacteria). The surface water was prefiltered through a 5 micron patron filter prior to the addition of the sewage.

The tests were carried out in 2 separate series at different points of time and by use of prototype to be sold at the Norwegian market. In each series 100 l test water was used and a water flow of 1,4-1,6 l/min was continuously pumped through the apparatus at a pressure of 3,0 kg/cm² (Test period 60-70 min.). The results of the bacteriological analysis are presented in Table 1.

Table 1. Reduction of the bacterial content in polluted surface water

Determinand:	Number of samples	Coliform bacteria pr. 100 ml		Thermotolerante coliform bacteria pr. 100 ml		Heterotroph bacteria pr. ml	
		Inlet	outlet	Inlet	outlet	Inlet	outlet
Series 1.	6						
Mean		4080	1	718	1	16800	33
% Removal			99.97		99.84		99.8
Series 2.	6						
Mean		1467	2	365	0	30300	122
% Removal			99.85		100		99.6

Coliform bacteria (mainly faecal bacteria) were almost completely removed, though the test water had been strongly polluted with bacteria. The number of bacteria normally present in water (heterotroph bacteria) was reduced to a satisfactory level for drinking water.

The content of dissolved organic matter, measured as colour and TOC, was reduced by more than 50%. The results are presented in Table 2.

Table 2. Reduction of organic material in the test water measured as colour and total organic carbon (TOC)

Determinand:	Number of samples	Colour, mg Pt/l		TOC, mg C/l	
		Inlet	Outlet	Inlet	Outlet
Series 1.	6	Inlet	Outlet	Inlet	Outlet
Mean		23.1	11.5	3.8	1.8
% Removal			50.4		53.1
Series 2.	6	Inlet	Outlet	Inlet	Outlet
Mean		22.8	13.3	3.8	1.7
% Removal			41.6		56.2

A separate investigation with addition of chloroform to surface water, containing humic matter, showed that this type of chlororganic contamination was reduced with more than 99%.

The conclusion after preliminary laboratory testing is that ozonation, UV-radiation and activated carbon filtration removed faecal bacteria almost completely, even with test water strongly polluted with sewage. The content of humic matter was reduced by more than 50 % under optimal testing conditions.

This short-time test demonstrates the probability that the APC vortex purification system produces drinking water which satisfies the requirements, given by the health authorities, with respect to hygienic and chemical quality, even if the water source is relatively strongly polluted with municipal sewage.

Yours sincerely

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