



Early Warning & cost-effective ozone polishing from the effluent of a MBR process can prevent disease and infection spreading!

Mr. Sudhir Chowdhury, CEO, co-founder & innovator, sudhir@aqu-q.se,

Mrs. Ulla Chowdhury, Director, co-founder & innovator, ulla@aqu-q.se, www.aqua-q.se.

Micro-pollutants

Different pharmaceutical residues like anti-depressive, neuroleptics, sedatives, heart medicines, and cytostatic etc that humans consume, the residues go out as human urine & faeces. Pathogens like bacteria, parasites and viruses comes from human faeces too. Different heavy metals, microplastics, pesticides and many other organic & inorganic chemical compounds comes from industry which are difficult to disintegrate and not easy to treat due to its complexity and much more. These pollutants are very tiny, not visible to human naked eye and need tiny host micro particles to stick to, to move forward in water. These are commonly called as **micro-pollutants**. To add to that **infected Covid-19 virus particles** originating from human faeces are the latest **micro-pollutants** in wastewater effluent which are of global concern.



Early Warning system for water

Early Warning system defined by the **United Nations' International Strategy for Disaster Reduction (ISDR)** must contain the following components: Monitoring and warning service, Risk knowledge, Dissemination and communication, and Response capability.

Market-changing, cost-effective, Early Warning & sampler, AQUATRACK® coupled with novel ozone polishing without GAC filter.



Aqua-Q a Swedish SME with outstanding applied research achievements, has developed a novel cost-effective technical solution **AQUATRACK®** an Early Warning and automatic Sampling system. It optically monitors in real-time movement of micro-pollutants and creates real-time fingerprint of water and always gives reliable communication & information of changes in water fingerprint, automatically captures water sample at the time of contamination and warns the operator of the treatment plant ahead of time to act and mitigate the danger.

AQUATRACK® is patented, EU-ETV verified (Environmental Technology Verification), TRL 8-9, fulfils all the requirements of ISDR + novel real-time automatic sampling of water at the time of contamination, recognised by IWA (International Water Association) as the best market changing innovation and was awarded **gold prize 2018 at Tokyo**.

Knowing the contamination and sampling is not enough, Aqua-Q developed a cost-effective ozone polishing (oxidising) process to remove micro-pollutants and pathogens simultaneously in water.

The core philosophy behind **AQUATRACK®** is to provide **real-time correct water samples** for different analysing methods to understand the value and benefits of Real-time **sampling** the key for correct analysing results.



Water sampling challenges

Surveillance and sampling of Covid-19 contaminated water sample is the greatest challenge globally today in the wastewater treatment plants and is expected to be in drinking water plants in future. Many scientists all over the world are now experimenting to find solution for correct water sampling methods.

The founders of Aqua-Q, Ulla & Sudhir Chowdhury, realised 2003 the value of real-time sampling and started a research project funded by **Svenskt Vatten**. That project idea has led to the present developed prototype **AQUATRACK®** which needs funding, partnership to reach TRL-9 and beyond, licensee sought.

Present market offerings to gather statistics

Current practice offering in the market are, random, grab, collective (3-5-day), flow proportional statistical sampling or lab weighing methods to analyse the water quality and contaminants in it to get statistical results **from a snapshot**. These analysing result fail to address the fundamental issues to understand real time happenings in water infrastructure and in water treatment process and never reflect to any microbiological or chemical activity in real-time. **Change is needed.**

Removal of pharmaceutical residues & pathogens

MBR effluent always contains pharmaceutical residues. The tables below illustrate some outstanding efficiency results obtained by **Aqua-Qs ozone polishing without GAC filter**.

Substance	Mode of action	Before ozone ng/L	After ozone ng/L
Diclofenac	Anti-inflammatories	601	<14
Furosemide	Diuretics	957	<11
Hydrochlorothiazide	Antihypertensives	1660	<2.8
Ibuprofen	Anti-inflammatories	71	<10
Naproxen	Anti-inflammatories	37	<4.6
Ramipril	Antihypertensives	<5.6	<5.6
Warfarin	Anticoagulants	6,9	<4.9
Atenolol	Antihypertensives	120	<3,7
Amlodipine	Antihypertensives	<3,6	<3,6
Bisoprolol	Antihypertensives	32	<5,2
Caffeine	Stimulant	17	<15
Carbamazepine	Sedatives	265	<2,1
Citalopram	Antidepressants	216	<6,5
Fluoxetine	Antidepressants	8,8	<6,0
Ketoprofen	Anti-inflammatories	68	<7,2
Metoprolol	Antihypertensives	585	<6,6
Oxazepam	Sedatives	402	6,6
Paracetamol	Anti-inflammatories	28	<11
Propranolol	Antihypertensives	68	<4,4
Ranitidine	Antiacid	72	<21
Risperidone	Antipsychotic	<22	<22
Sertraline	Antidepressants	<6,5	<6,5
Simvastatin	Lipid-regulating	<8,3	<8,3
Terbutaline	Asthma medication	13	<2,4

Analysed at IVL Stockholm (←) lowest quantifiable limit (LOQ, S/N=10)

Samples	RT	30°C	37°C	Organic carbon (mg/l)	Color at 410nm
Control	13*10 ²	16*10 ²	15*10 ²	12,5	0,008
Treated 1	0	0	0	10	0,005
Treated 2	0	0	0	10,5	0,004
Treated 3	0	0	0	10	0,005

Key words:

Real time Surveillance, Micro-pollutants, Automatic dynamic sampling, On-line monitoring, Early warning, Real-time sampling, Bacteria, Parasites, Virus, Pharmaceutical Residues, ECS, treated wastewater, MBR effluent, Drinking water, Safety & Security of water, First responders, Irrigation.

Clean & Safe reuse of reclaimed water is a resource



Winner 2016



Winner 2017



Winner 2018