



Online controlled in-situ disinfection of bank filtrate for drinking water supply at the Ganga River in India

Drinking water

A s::can chlori::lyser is monitoring the residual chlorine concentration of a completely solar driven drinking water disinfection system. The system produces chlorine through inline electro-chlorination using River Bank Filtrate from the Ganga River.

AUTARCON

Parameters monitored:

- Free available chlorine
- ORP
- Flow rate
- Chlorine production rate

Facts & Figures

Company:
AUTARCON GmbH

Location:
Haridwar, India

Application:
Drinking water

s::can Partner:
GWU-Umwelttechnik GmbH



Key Products installed:
chlori::lyser

Background

In Haridwar drinking water is supplied using River Bank Filtrate (RBF) abstracted from wells installed along the Ganga River banks. The bank filtration itself substantially improves the water quality. However, the water still contains a considerable numbers of pathogens. In order to achieve drinking water quality and to assure safe water conditions for distribution and transport, the water needs to be disinfected.

Unfortunately, chlorine is not commonly available and the quantity to be added continuously varies with the changing conditions of the water source. Furthermore, the power supply at the wells is fluctuating and often no electricity is available at all. These challenges have prevented a reliable supply of safe drinking water for Haridwar.

In order to achieve drinking water quality and solve the challenge of chlorine dosing, AUTARCON, the university HTW-Dresden, and the municipal water supply agency Uttarakhand Jal Sanstan (UJS) have implemented a "SuMeWa|SYSTEM". This drinking water treatment station was developed by AUTARCON and does the following:

1. Pumps water from the well
2. Disinfects the water by producing a small quantity of chlorine in-situ from the natural very low chloride content of the bank filtrate (see figure 1)
3. Safely stores the water for the drinking water supply
4. Monitors water quality and system operation through online sensing

This process does not require any addi-

tion of chemicals. The station is completely powered by solar PV energy and thus operates also energetically self-sufficiently and can also be implemented nearly everywhere - all that is required is a freshwater source and sunshine. Maintenance requirements are reduced to a monthly check of the system.

The chlorine production process is controlled online and can be adapted to the given source water conditions. All that was required to do this was an online reading of the free available chlorine content of the water.

s::can's solution

In order to assure that the correct amount of chlorine is produced, a chlori::lyser was integrated into the setting to monitor free available chlorine (FAC). The sensor was installed for a period of three months and the reading frequently confirmed with the DPD1 Method. The reading was further checked by an online ORP sensor. The long term goal is to use the chlori::lyser as an internal control unit for the water treatment system.

The test pilot has proven that the sensor can be reliably applied for the purpose of drinking water quality monitoring and can even serves as a control parameter for the SuMeWa|SYSTEM. The readings have been sufficiently fast and precise for the purpose given here.



"I was surprised about the easy installation as well as the fast and reliable sensor reading. The sensor also works reliably under very harsh environmental conditions."

Philipp Otter M.Sc., Research Coordinator AUTARCON GmbH

Process schematic

Water treatment system implemented in Haridwar

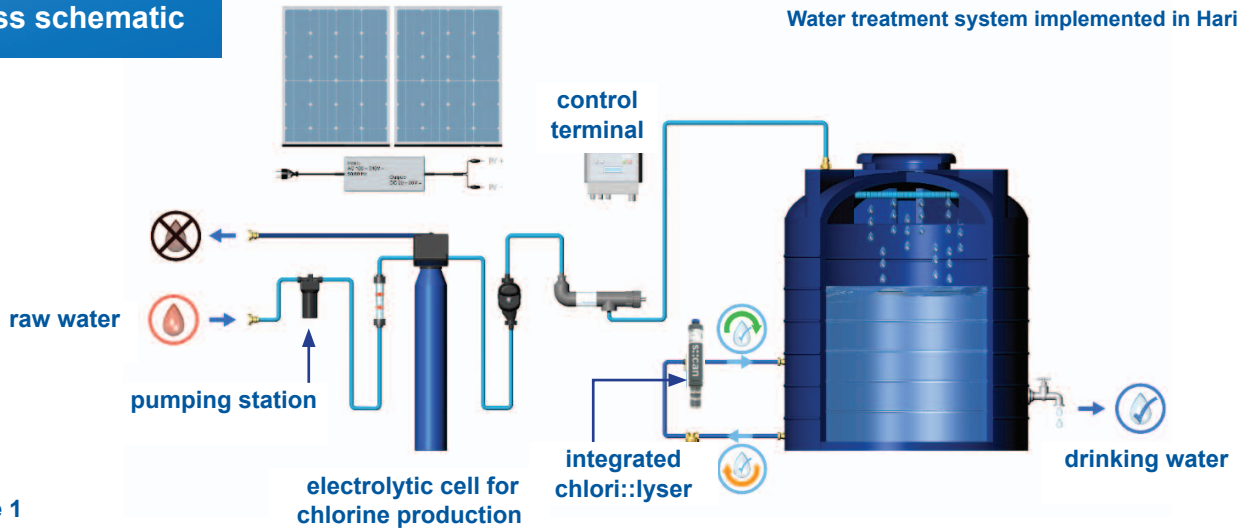
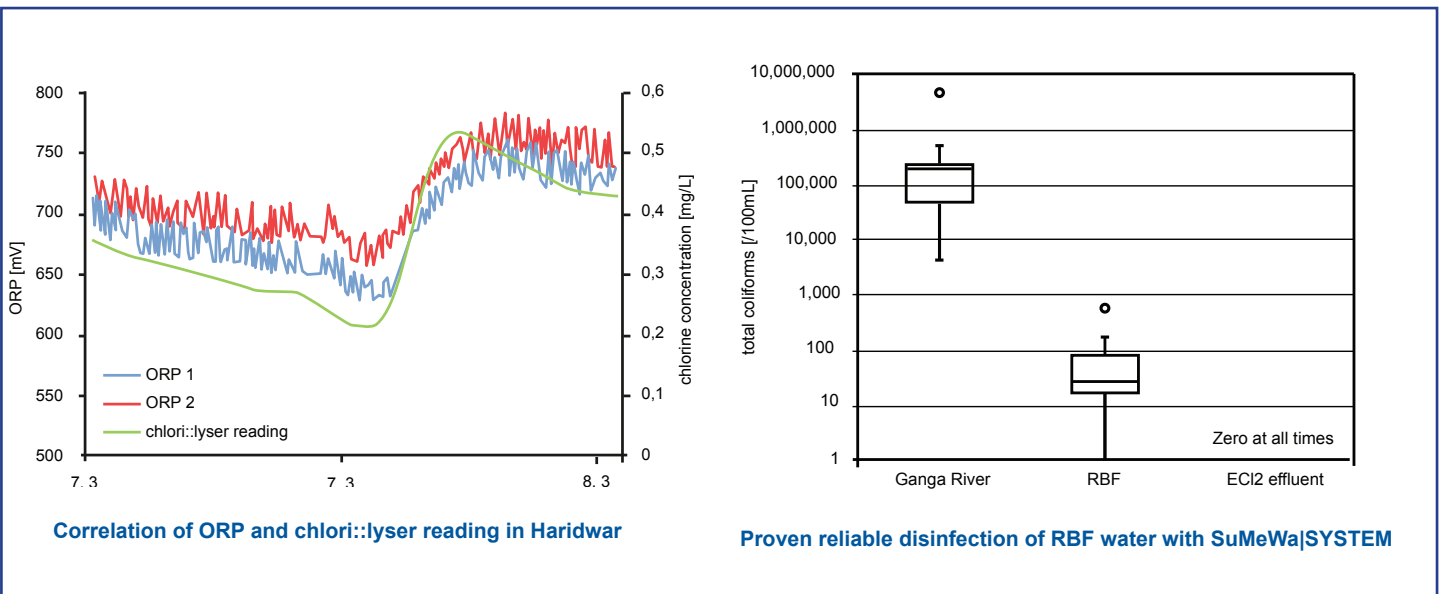
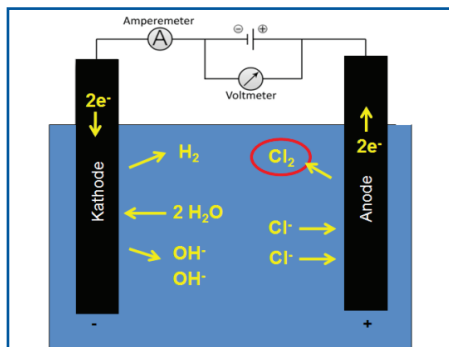


Figure 1



chlori:lyser monitors free or total chlorine - mounted in a flow cell setup. Due to the membrane covered amperometric measuring principle, flow and pH fluctuations of the water do not influence the measurement result. Additionally, the integrated temperature compensation and the special, third electrode eliminates potential interferences. Maintenance is only necessary once a year.



The SuMeWa|SYSTEM (from sun meets water) produced by AUTARCON was designed for the treatment of surface waters to remove turbidity and in situ disinfection by means of solar driven electro-chlorination. In this process the natural chloride content of the water is converted to chlorine gas using dimension stable titanium electrodes coated with iridium and ruthenium oxides.



AUTARCON GmbH develops and implements self-sufficient drinking water treatment solutions that operate chemically free and comply with WHO guidelines. The stations are fit for the operation under the most challenging conditions in the remotest regions, where they remove pathogens, turbidity, iron, arsenic and manganese from contaminated water sources.

More information: www.autarcon.com