



Photo: Peter Nørby

# A new membrane can extract clean water from polluted fluids

**For a number of years, the Danish company Aquaporin A/S has been developing a membrane which, using a natural protein, can extract clean water from polluted fluids such as sewage. The solution has great potential for companies throughout the world and for areas with shortages of drinking water.**

Every single person in industrialised countries uses several hundred litres of freshwater every week, and most enterprises use tonnes of clean water in their production. However, only three percent of the world's water is freshwater and large amounts of water are polluted every single day. Clean water is therefore in high demand throughout the world, and countries as well as businesses use huge resources in treating water to meet this demand.

Therefore there is enormous potential in the membrane developed by Aquaporin A/S with support from the Danish Ministry of Environment's initiative to promote eco-efficient technology. By using a natural protein known as the aquaporin, which is found in all biological cells, the membrane can filter polluted water and salt water by only allowing pure water molecules to pass through. The clean water is simply sucked out of the polluted fluid by exploiting the pressure difference arising between the clean water and the polluted water on each side of the membrane.

"We use nature's own methods of filtering water. This means that our solution can treat polluted water and salt water without using chemicals and the large amounts of energy, currently required to treat water. This is the most environmentally friendly solution to treat sewage and polluted water we have seen to date," said Jörg Vogel, the project manager at Aquaporin A/S.

## The membrane passes all tests

Aquaporin A/S has been developing the membrane for many years. When the process started, the aquaporin protein was very expensive and therefore the company began by developing very small filters that could only filter less than one litre of water an hour. Now production of the protein has improved and Aquaporin A/S are developing a membrane they call the Aquaporin Inside, which can produce 12 litres of clean water per hour.

"Aquaporin Inside is being tested regularly and it works extremely satisfactorily, with the highest retention rate on the market. Within the next few years, we expect to be able to upscale the membrane to an even larger prototype which can produce many more litres of clean water per hour and satisfy higher consumption," said Jörg Vogel.

## High demand from abroad

The potential of the new type of membrane has not gone unnoticed outside Denmark. Aquaporin A/S is already working with companies and research units in the US and Canada. The American space agency, NASA, is closely monitoring the Danish project, as the Agency wants to find a solution which can transform urine into water so that astronauts do not have to take large amounts of clean water into space. The membrane has also attracted interest in Asia and the Middle East, as Jörg Vogel explained,

"Asian and Middle Eastern countries are keen to find environmentally friendly and efficient methods of obtaining clean water, because of increasing populations and shortages of fresh water sources. Our membrane is an obvious solution because it can help reuse wastewater. Therefore we can see large future export potentials for the membrane."

## Fact box

The new system from Aquaporin A/S has been developed and tested with support from the Danish Ministry of Environment's initiative to promote eco-efficient technology. The goal was to identify the technological barriers concerning an aquaporin-containing desalination of

seawater and come up with a short-list of formulations and modules with the potential to breach those technological barriers. The project was published in March 2013. For more information visit [www.ecoinnovation.dk](http://www.ecoinnovation.dk). (only in Danish)