

# Student develops filter for clean water around the world

July 23 2014

---

Roughly 780 million people around the world have no access to clean drinking water. According to the World Health Organization (WHO), 3.4 million people die from water-related diseases every year. ETH student Jeremy Nussbaumer set himself the goal of making a contribution to solving this problem. Working with researchers from a group led by Wendelin Stark, head of the Functional Materials Laboratory, the 23-year-old spent a year researching a membrane filter and developing a prototype.

"What makes our DrinkPure filter unique is that you can screw it on to virtually any plastic bottle. It doesn't require a pump or a reservoir, so it's very easy to use," explains the student from the canton of Aargau. "You simply screw the filter onto a bottle containing polluted water, then you can put it straight in your mouth and take a drink." Weighing less than 100 grams, DrinkPure is considerably lighter than most other filters, and the flow pressure is so high that you can purify as much as a litre of water in a minute just by squeezing the bottle with your hand. Another benefit is that the unit is less expensive and easier to manufacture than most conventional filters. These qualities, says Nussbaumer, make the filter ideal for development aid projects.

## Three-stage filter system with special Membrane

Three filtering stages make DrinkPure one of the most reliable devices currently on the market. First, a pre-filter captures large particles such as

sand and plant fragments; the second stage consists of an activated charcoal powder that primarily removes undesirable odours and chemical contaminants; the third and most important part of the filter is a [polymer membrane](#) that removes bacteria. In fact, this membrane does its job more reliably than virtually any other [water filter](#) intended for outdoor use.

Two ETH doctoral students developed this polymer membrane and patented it three years ago. It is based on a new manufacturing process that shows great potential. It has been used in a wide range of other applications since then – for example, in a non-toxic outdoor jacket (as reported in ETH News) and its use as a battery separator is also being investigated.

## **First filters to Africa next January**

A year ago, Nussbaumer learned of the project to further develop this membrane for use in a water filter. The mechanical engineering student was so enthusiastic about the idea that after completing his bachelor's degree, he decided to postpone his master's degree for a year in order to devote himself to this project. "I was really looking forward to finally being able to do something tangible and useful. Of course, we hoped that the membrane would prove suitable for a water filter, but we never expected such excellent test results," says Nussbaumer proudly.

In order that the research team can manufacture enough filters to use in developing countries, they are looking for financial support. They will use the proceeds to purchase the tools they need to manufacture the filters. "As for what is left over, we will use 80% to produce the filter and transport it to Africa and 20% to further develop the concept," says Nussbaumer. They expect to have the first [filters](#) completed in January 2015; they will be sent to project supporters and to Africa for use in a test phase.

## Perfect for travellers and Walkers

It is still not certain whether DrinkPure will be available in future in retail stores. Alongside its suitability for development aid, the device is also perfect for travellers and walkers. "Quickly screw it on a bottle and you can take a drink from any pond or river without a second thought," explains Nussbaumer. "I'm actually not a serious walker myself, but if I were to go I would be sure to take the filter along."

Provided by ETH Zurich

Citation: Student develops filter for clean water around the world (2014, July 23) retrieved 20 March 2024 from <https://phys.org/news/2014-07-student-filter-world.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--