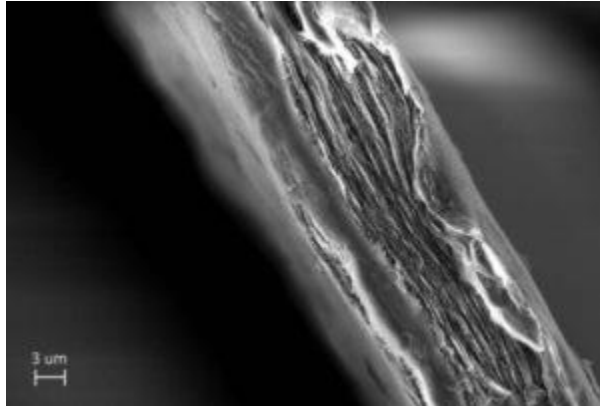


# Paper-Thin Filter Removes Viruses from Water

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Uppsala University scientists have developed a way to filter viruses out of water.

A simple paper sheet made by scientists at Uppsala University can improve the quality of life for millions of people by removing resistant viruses from water. The sheet, made of cellulose nanofibers, is called the melle-feuille filter as it has a unique layered internal architecture resembling that of the French puff pastry melle-feuille (English translation thousand leaves).

‘With a filter material directly from nature, and by using simple production methods, we believe that our filter paper can become the affordable global water filtration solution and help save lives. Our goal is to develop a filter paper that can remove even the toughest viruses from water as easily as brewing coffee’, says Albert Mihranyan, Professor of Nanotechnology at Uppsala University, who heads the study.

Access to safe drinking water is among the UN’s Sustainable Development Goals. More than 748 million people lack access to safe drinking water and basic sanitation. Water-borne infections are among the global causes for mortality, especially in children under age of five, and viruses are among the most notorious water-borne infectious microorganisms. They can be both extremely resistant to disinfection and difficult to remove by filtration due to their small size.

Today we heavily rely on chemical disinfectants, such as chlorine, which may produce toxic by-products depending on water quality. Filtration is a very effective, robust, energy-efficient, and inert method of producing drinking water as it physically removes the microorganisms from water rather than inactivates them. But the high price of efficient filters is limiting their use today.

‘Safe drinking water is a problem not only in the low-income countries. Massive viral outbreaks have also occurred in Europe in the past, including Sweden, continues Mihranyan referring to the massive viral outbreak in Lilla Edet municipality in Sweden in 2008, when more than 2400 people or almost 20% of the local population got infected with Norovirus due to poor water. ‘ Cellulose is one of the most common filtering media used in daily life from tea-bags to vacuum cleaners. However, the general-purpose filter paper has too large pores to remove viruses. In 2014, the group has described for the first time a paper filter that can remove large size viruses, such as influenza virus.

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