Technology

Slices of wood can filter bacteria and microplastics from water

Water filters made from untreated wood can remove more than 99 per cent of particles, taking out many harmful bacteria and microplastics

By Matthew Sparkes

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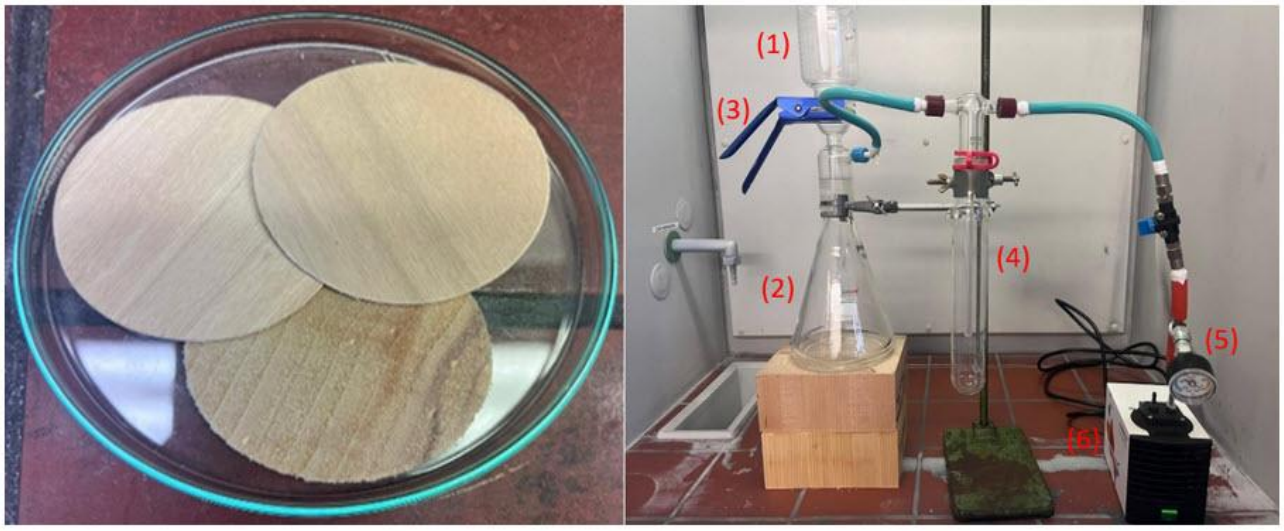
Douglas fir wood can be turned into a water filter (Janet Horton / Alamy Stock Photo)

Slices of wood can act as water filters that remove bacteria and microplastics with more than 99 per cent efficiency, potentially offering a cheap way to protect people from water-borne illnesses.

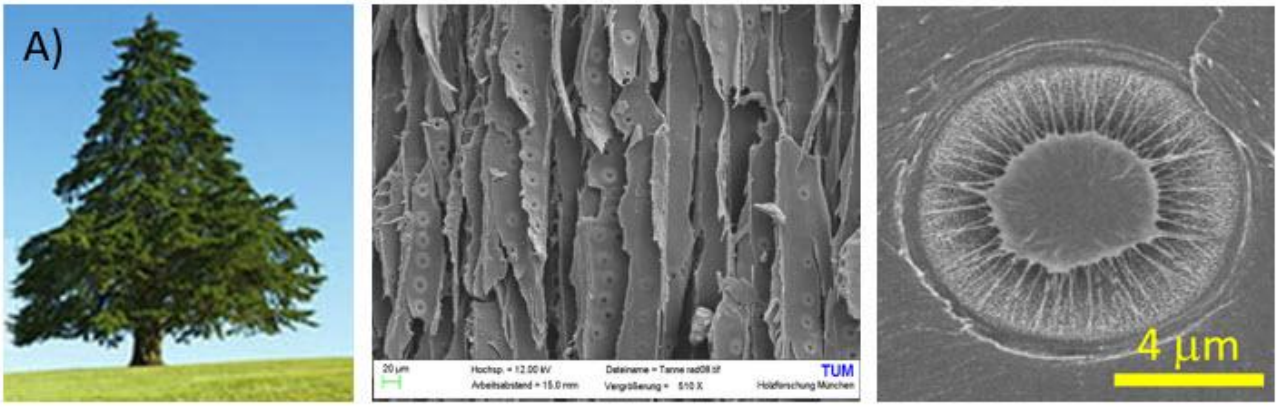
Previous research has investigated more complex methods to make wooden filters involving complex chemical treatments, but these would be impractical in lower-income countries where water-borne illnesses cause hundreds of thousands of deaths a year, say Antoni Sánchez-Ferrer and Jenifer Guerrero Parra at the Technical University of Munich, Germany.

To make more accessible water filters, they tested discs of wood that were 5 centimetres in diameter and 1 millimetre thick. The discs were effective at removing particles around 100 nanometres wide and upwards – enough to catch many microplastics and bacteria such as *Escherichia coli* (Wood Science and Technology, doi.org/10.1007/s00226-025-01645-7). While some smaller pollutants such as viruses may still be able to pass through, the simplicity and low cost of wooden filters could still save many lives, say the researchers.

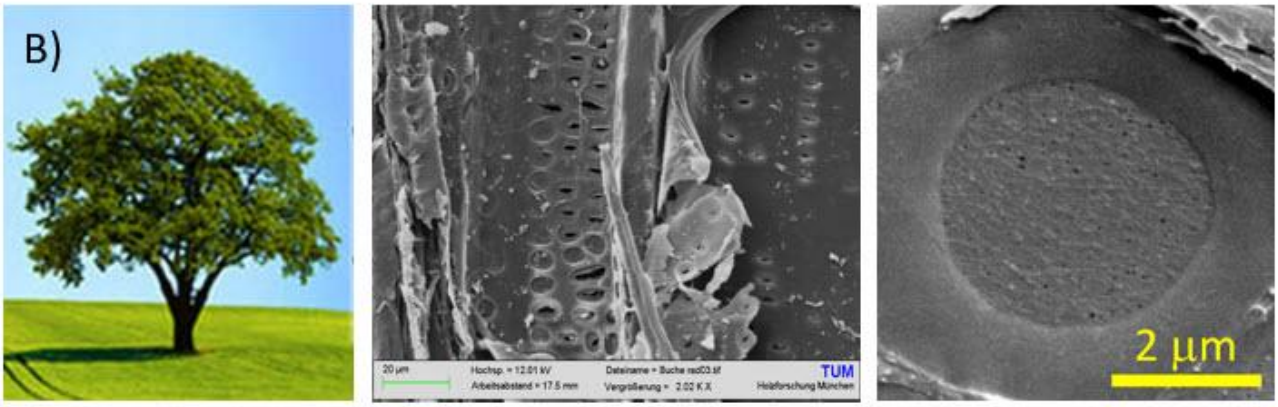


Left: Wood filtration disks (50 mm diameter and 1 mm thickness). Right: Setup for the filtration experiments: graduated funnel (1), filter flask (2), aluminum clamp (3), water trap (4), pressure gauge (5), and vacuum membrane pump (6).

Wood is made up of xylem tracheids (coniferous trees) or xylem vessels (flowering trees), which transport water from the roots of trees to the leaves. Each tracheid or vessel is only millimetres or centimetres long, but water can pass into neighbouring tracheid/vessels through small holes in their walls called pits. It is these pits that allow wood to act as a filter, says Sánchez-Ferrer. “It’s quite a smart system. They have this kind of net, which naturally works as a sieve,” he says. “We’re taking advantage of this.”



intertracheary pit membranes in coniferous trees
(gymnosperms)



intervessel pit membrane in flowering trees
(angiosperms)

The researchers tested slices of yellow poplar (*Liriodendron tulipifera*), European beech (*Fagus sylvatica*), Douglas fir (*Pseudotsuga menziesii*) and silver fir (*Abies alba*). Two were clear leaders: European beech removed 99.7 to 99.9 per cent of nanoparticles and silver fir removed 99.3 to 99.7 per cent. But water flowed quicker through beech wood, so it was the researchers' preferred choice.

"The beauty of the system is that the only thing you have to do is to go to the forest, chop a tree, dry it. And then from here, you just cut the slices," says Sánchez-Ferrer.