The secret to safer drinking water could lie with 'non stick' organic compounds

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Scientists are testing the 'stickiness' of hundreds of organic compounds to improve the detection of the microscopic water bugs that cause millions of cases of vomiting and diarrhoea each year.

Two pathogens, Cryptosporidium and Giardia, are the focus of the research. The microscopic pathogens tend to enter water supplies from animal droppings and quickly cause outbreaks of illness that are characterised by diarrhoea and gastrointestinal illness.

Dr Helen Bridle from Heriot-Watt University in Edinburgh is working in partnership with Dr Moushumi Ghosh from Thapar University, Punjab, to develop a new, 'green' compound that could be used to improve detection rates of such pathogens and improve water filtration in developing and developed countries.

In developing countries persistent diarrhoea caused by bugs such as these accounts for 30-50% of mortality of children under five. It is estimated that 250-300 million cases of cryptosporidiosis occur each year. In England, it's estimated that around 60,000 cases go undiagnosed each year.

Dr Helen Bridle said, "Pathogens like Cryptosporidium and Giardia can be infectious in very low doses, can live for months in water and are also resistant to chlorine. They enter water supplies from animal droppings and quickly cause outbreaks of diarrhoea and gastrointestinal illness.

"Currently tests to detect bugs like these are only 30 per cent effective. When water is monitored, the problem is that the bugs get stuck in the filters. This means they could go completely undetected.

"We're looking for a naturally occurring polymer, or compound, that is 'non stick' and will repel the bugs and keep the filters from clogging up with them, to ensure they travel through the system and show up in results.

"This will mean action could be taken much more quickly to safeguard water supplies and avoid outbreaks, which have an enormous health and financial impact each year in countries across the world."

The team is testing hundreds of natural polymers, which are chains of molecules, by printing them onto an array format. Initial testing will look at how the biopolymers interact with the pathogens and which features influence this, such as surface roughness, whether they repel water, pH conditions and exposure time.

The polymer with the best 'non stick' qualities will then be reproduced on a large scale. The team is testing polymers naturally produced by bacteria and so production scale-up will involve creating optimum conditions for the bacteria to maximise polymer creation. The membranes that are currently used to test water would then be coated with the polymer, keeping costs down and preventing the need for completely new systems.

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Provided by Heriot-Watt University