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IIT students develop low cost water filter

Kalyan Ray, New Delhi.

An inexpensive water-filter that can kill microbes and virus besides screening out toxic heavy metals may soon be a reality, thanks to a group of researchers at the Indian Institute of Technology-Madras.

The water purifier is based on composite nano-materials that not only destroy bacteria and viruses but also scavenge toxic chemical contaminants, such as lead, iron and arsenic.

The laboratory prototype uses 120 gm of filtering material, which is enough to produce 3,600 litres of completely clean drinking water. Assuming daily use of 10 litres of drinking water, the filter is good enough for an entire year for the family.

“Going by our estimates, the filter will cost Rs 500 whereas the cost of the cartridge will be Rs 150. The actual pricing will also depend on the scale of production,” said T Pradeep, a professor of Chemistry at the IIT who led the team that created the filter. The cartridge’s life can also be extended by boiling the filter in plain water or rubbing it with lemon juice, commonly available in households.

Cost-wise it is comparable to a popular and branded water-filter available in the market. “But the IIT product can filter out harmful chemicals besides killing the bacteria and virus. Whereas the commercial product (made by an industrial giant) only produces microbe-free water at the moment,” Pradeep told Deccan Herald.

At the core of the technology lies innovative use of silver nano-particles with an anti-microbial composite, which does the trick. The nano-particles are tiny specs of silver whose dimensions are in the range of one-millionth of a millimetre (width of an human hair).

Material properties changes dramatically when they are exploited on a nano-scale. Silver in the nano-form penetrates the cell wall of bacteria and virus to disrupt the biological processes within the cell, eventually killing them. “We have been able to release silver slowly in a sustained manner like a drug without using any electricity,” he said.

But the water coming out of the filter will not have any toxicity. The permissible limit on the presence of silver in water is 100 parts per billion. For the IIT water filter, it is only 40 ppb. “Its same as eating from a silver plate,” said Pradeep. The report on the research appeared on the May 6 issue of Proceedings of National Academy of Sciences.

“Such filtration techniques delivers technology to the user and cuts down on the cost of delivery (such as bottling). The decentralised application of technology for water purification can address many health challenges,” commented T Ramasami, secretary in the Department of Science and Technology, who is not associated with this work.

Availability of safe drinking water at the point of use can save many lives. Out of 35 lakh global deaths caused by water, sanitation and hygiene issues, diarrhoea alone contributes 15 lakh deaths, which can be avoided entirely by providing safe and clean drinking water.