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IISc researchers develop membranes for safe drinking water

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Researchers at the Indian Institute of Science (IISc) Bengaluru have developed a water-filter membrane with copper ions to make drinking water safe.

The team of researchers made the commonly used polyvinylidene fluoride (PVDF) water-filter membrane to prevent biofouling and kill bacteria. To do this they first made the inert PVDF membrane functional by blending it with a polymer (styrene maleic anhydride or SMA).

The SMA polymer coated on the membrane, which gets partially hydrolysed when in contact with water, interacts with the outer membrane of the bacteria to produce disc shaped structures. It solubilises the membrane protein but does not kill bacteria. But the interaction with the bacterial cell membrane leads to release of a particular enzyme (phosphatase and/or phospholipase).

This enzyme released from the bacteria cleaves the polymer coating found on copper oxide resulting in controlled release of copper ions from the membrane into water.

These membranes with controlled release of copper ion may turn out to be a potential candidate for water purification applications with enhanced antibacterial and antifouling performances.