Aquatic Ferns May Have Cleansing Properties to Absorb Oil While Repelling Water

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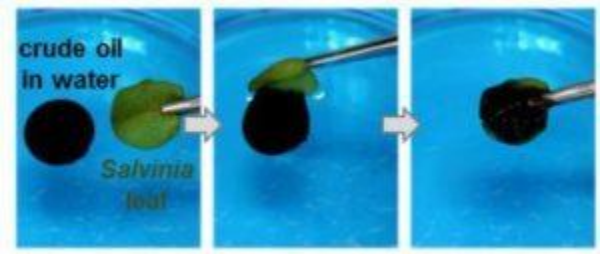

By Susmita Baral

Scientists in Germany are exploring how aquatic plants can help clean up oil spills and there appears to be some potential in water plants.

The team of researchers, who published their findings in the journal Bioinspiration & Biomimetics, looked at a wide array of water plants. They found four species of aquatic ferns to efficiently absorb crude oil with their hairy leaves whilst repelling water.

"From our results we now know that the shape of the hair ends is important in supporting the oil/air interface to ensure maximum oil absorption and retention capabilities," said Claudia Zeiger, of Karlsruhe Institute of Technology's Institute of Microstructure Technology (IMT), in a statement.

The ability to absorb oil without simultaneously absorbing water makes the aquatic plants a potentially efficient solution, as most existing oil sorbents take in water as well as oil.

“The cleanup of accidental oil spills in water is an enormous challenge; conventional oil sorbents absorb large amounts of water in addition to oil and other cleanup methods can cause secondary pollution,” write the authors. “In contrast, fresh leaves of the aquatic ferns Salvinia are superhydrophobic and superoleophilic, and can selectively absorb oil while repelling water. These selective wetting properties are optimal for natural oil absorbent applications and bioinspired oil sorbent materials.”

Researchers at IMT have created a synthetic variation of these aquatic weeds that they call “nanofur.” The synthetic version is designed to be superhydrophobic and superoleophilic, in addition to selectively absorbing oil and repelling water like the aquatic ferns. A nanofur is created by turning a hot rough plate into a polymer foil.

"The surface of the polymer melts and, when the steel plate is retracted, micro- and nanoscaled hairs are pulled from the surface," said Zeiger.