Specialized seeds can really float your boat

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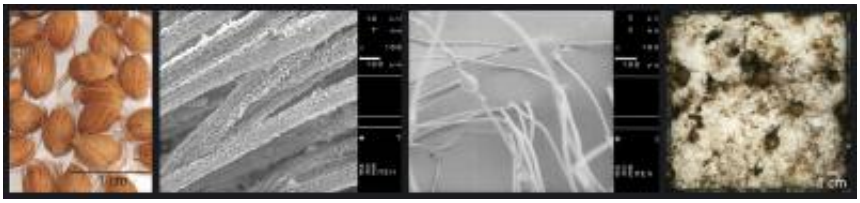

The evolution of a seed-inspired anti-fouling coating. From extreme left: *Dypsis rivularis* seeds; Electron microscope image of the seed surface; Electron microscope image of the artificial surface based on the seeds; Test panel of artificial surface after 12 weeks in the North Sea, showing minimal fouling. Credit: Biomimetics-Innovation-Centre (B-I-C), University of Applied Sciences.

A new artificial surface inspired by floating seeds, which could provide an alternative to the toxic paints currently used to prevent fouling on ship hulls, has been developed by German scientists.

Scientists from the Biomimetics-Innovation-Centre have developed a new anti-fouling surface based on a seed from a species of palm tree. "These plants have seeds which are dispersed by the ocean currents. As it is an advantage for these seeds to remain free of fouling to allow them to disperse further, we guessed they might have specialised surfaces we could mimic," explains Katrin Mühlenbruch, a PhD researcher who is presenting this work at the Society for Experimental Biology Annual Conference in Glasgow on the 4th of July 2011.

The researchers floated seeds from 50 species in the North Sea for 12

weeks. The seeds of 12 species showed no fouling at all. "We then began by examining the micro-structure of the seeds' surfaces, to see if we could translate them into an artificial surface. The seeds we chose to mimic had a hairy-like structure," says Ms. Mühlenbruch. "This structure might be especially good at preventing fouling because the fibres constantly move, preventing marine organisms from finding a place to settle."

Using a silicone base the scientists created an artificial surface similar to the seeds, with fibres covering the surface. Currently the new surface is being trialled by floating it in the sea. "Initial results are quite good," says Ms. Mühlenbruch. "But we still have a long way to go"

Fouling by seaweeds and marine animals is a problem for the shipping industry, resulting in increased fuel costs. Currently the only solutions are highly toxic and environmentally damaging marine paints which are specifically designed to leach biocides to prevent organisms settling on the hull. "Our aim is to provide a new toxin-free and bio-inspired ship coating," says Ms. Mühlenbruch. "This would prevent environmental damage while allowing ships to operate efficiently."

Future work will include analysing the chemical composition of the seeds' surface, to find out whether this adds to their anti-fouling properties.

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