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Project title:	Development of a physical bionic process for the removal of oil contamination from water using superhydrophobic functional textiles
Partner:	Nees Institute for Biodiversity of Plants of the University of Bonn Heimbach GmbH
Duration:	01/2019 - 12/2020
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Mission Statement

Oil pollution in water bodies is a serious and globally increasing environmental problem. The focus of public interest is mostly on major marine catastrophes on drilling platforms and in tanker accidents. Much more frequent and ultimately economically and ecologically significant, on the other hand, are everyday oil films occurring on manageable areas such as ponds or harbour basins. These are caused by accidents or carelessness when handling fuel oil tanks, machine oil or internal combustion engines, etc. Oil-binding chemicals are often used to remove such contaminants, which, if not completely removed, cause additional damage. The aim of the project is to develop a sustainable way, based on purely physical principles, to remove such oil films effectively and in an environmentally friendly manner.

Approach

Biomimetic, super-hydrophobic surfaces form the basis for the planned work. It was found that such surfaces also adsorb oil, whereby the air layer held under water is replaced by the oil. The binding capacity and especially the surface transportability of these materials are extremely high. Experiments have shown that such surfaces can be used to construct a floating device ("oil collector"), which absorbs oil from the water surface in an extremely environmentally friendly way and conveys it into a collection container that can be emptied and then reused.

On the basis of these findings, this project aims to develop optimised functional textiles based on biological surfaces that have the highest possible oil absorption capacity and good oil transport properties. Furthermore, a first prototype of a bionic textile suitable for use in a floating oil collector is to be developed.

The application possibilities and thus the market chances of this novel, environmentally friendly technology for the removal of oil films from water bodies are manifold and range from domestic garden ponds to large harbour basins, lakes or river arms. Against this backdrop, the successful completion of the project can be expected to be followed by timely large-scale technical implementation.

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