Australian Research on Human Hair as an Oil Spill Sorbent

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Project Overview:

Oil spills cause chronic health effects for marine organisms, from severe illness and injury to increased risk of mortality. Compounds derived from petroleum also continue to persist in the environment well after the initial spill has visibly cleared and it is possible that complete removal of crude oil residues from the environment may never fully occur. Therefore, when crude oils are released, or unintentionally spilled, they *pose a serious pollution threat to the environment* and require *an immediate and effective emergency response*.

Sorbent booms are considered a 'first line of defence' technology used for containing and minimizing the impacts of crude oil spills worldwide. The primary considerations for oil spill sorbent effectiveness are the hydrophobic and oleophilic properties of the material. Their efficiency can also be judged on secondary criteria that include (1) amount of oil adsorbed per unit weight of sorbent; (2) retention of the adsorbed oil; (3) buoyancy of boom materials.

In a 2016 - 2017 research study, supported by Sustainable Salons Australia, we tested the effectiveness of human hair salon waste as an oil spill boom sorbent. We also compared hair with the performance of several other widely-used commercial boom products in Australia.

Current Findings:

We found human hair, when used as an oil spill sorbent, was capable of adsorbing crude oil pollution from seawater at *very high rates* and was *significantly more efficient at adsorbing spilled oil on a per gram of sorbent basis* compared to all commercial materials tested.

Human hair booms also had wider variation in oil adsorbency performance, which is likely associated with the non-homogeneous nature of mixed human hair.

Although encased, boom-type hair sorbents were less naturally buoyant compared to commercial materials, mat-type hair adsorbents may provide *a promising solution* for increasing hair buoyancy by modifying the surface of the sorbent to become more uniform and increase water displacement. Alternatively, adding highly buoyant boom casings or extra floatation devices may also assist hair booms in maintaining surface floatation.

The data from this project are due to be published as a research paper in 2018.

Australian research is continuing in 2018 onwards - Exploring more ways hair may be re-used as a safe, effective, and sustainable resource to meet human and environmental needs.