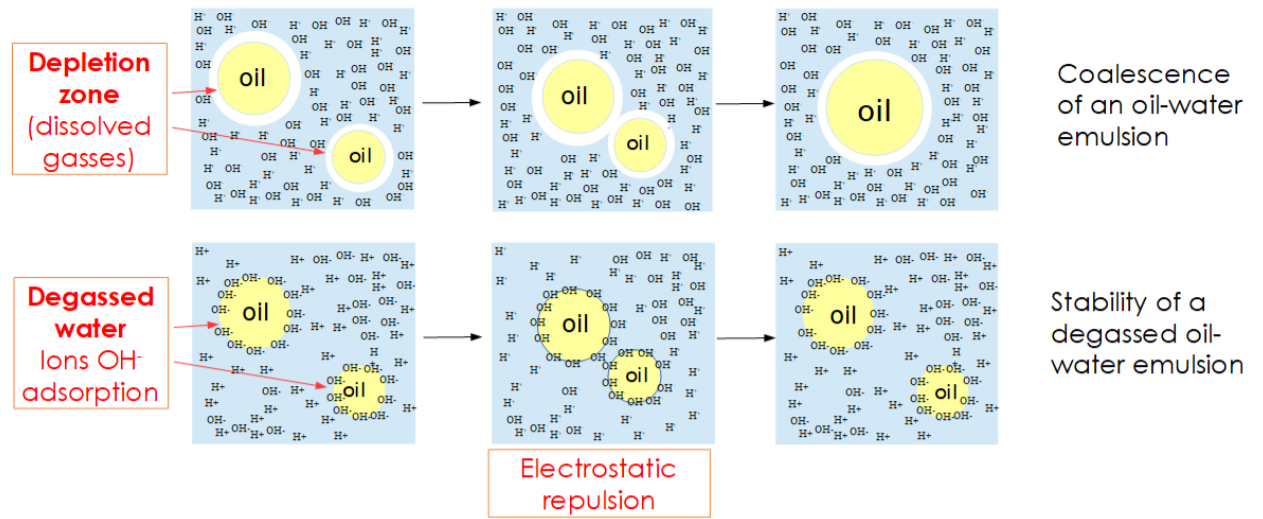


WASHING WITH DEGASSED WATER

A surprising discovery

OH- anions act as surfactants when water is degassed.



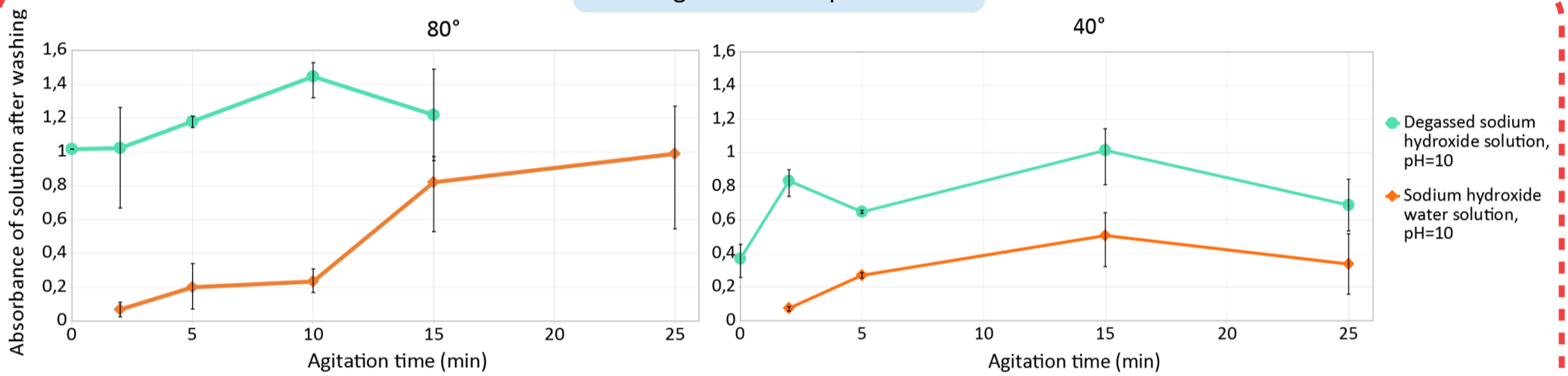
Mathylde SENTIS
Nils DONK

IS IT POSSIBLE TO USE VACUUM INSTEAD OF DETERGENTS ?

Adrien HERMAN
Floriane CAILLIÉRET



Washing of an oil drop on a fabric



At 40°C and 80°C, when placed under vacuum (blue curve) water extracts an oil drop from a fabric, and emulsifies it in the solution, much more than without vacuum (red curve). This leads us to the conclusion that our washing method is working. So we quantified its efficiency applying the international IEC60456 methodology.

Prototype and washing protocol



To verify the efficiency of our washing at a bigger scale, we modified a washing machine and we made sure it stays under vacuum.

We also bought different stains to apply a very specific test of washing. Indeed, we had to put three of each stain during our washing. When the washing was finished, we measured the effectiveness of the washing.



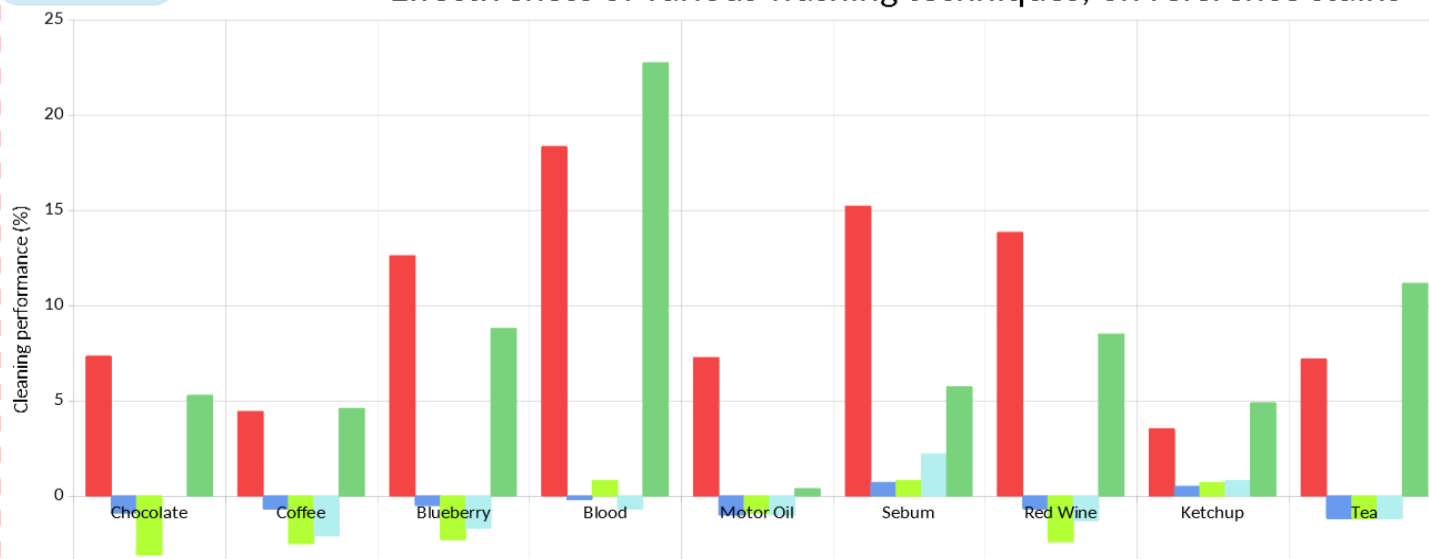
Fabrics without washing



Fabrics washed with vacuum

Results

Effectiveness of various washing techniques, on reference stains



This graph shows the effectiveness of various washing techniques. The 0% corresponds to the efficiency of a water washing.

The results demonstrate that thanks to the vacuum 8 stains over 9 are washed similarly as detergents, or, at least, way much better than with a water washing.

Furthermore compared to other ecological washing techniques, the vacuum technique is the only one to show a real efficiency.

Conclusion

We have found a way of washing clothes without surfactants with similar efficiency. It only needs degassed water using a vacuum pump. A first prototype of washing machine under light vacuum has been able to wash with efficiency without any surfactants.